



**DEPARTMENT OF ENVIRONMENTAL  
AFFAIRS AND TOURISM**

**DANIDA**



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**ANNEXURE F**

**NATIONAL WASTE MANAGEMENT  
STRATEGY IMPLEMENTATION  
SOUTH AFRICA**

**RECYCLING**

**EXTENDED PRODUCER RESPONSIBILITY  
STATUS QUO REPORT**

**4 April 2005**

## EXECUTIVE SUMMARY

The Recycling Component of the National Waste Management Strategy Implementation (NWMSI) Project aims to develop a realistic and practical approach to increase and extend waste recycling and minimisation in South Africa. Provision has been made in this Recycling Component for an investigation of Extended Producer Responsibility (EPR) as a mechanism for bringing about waste reduction in South Africa, through the minimisation, reuse and recycling of waste products. As a first step in this investigation, a review of the status quo of EPR, both internationally and locally, was undertaken and is documented in this report.

Three approaches were used for the collection of information for this review, i.e. a literature review was undertaken of EPR internationally and in South Africa; stakeholders currently involved in EPR in South Africa were interviewed; and, additional input was obtained through consultation with stakeholders at a the NWMSI Project Inception Workshop and the Provincial Recycling Workshops held during the period October 2004 to January 2005.

The report provides an introduction and background to EPR. It defines EPR as a pollution prevention policy that focuses on whole product systems rather than individual production facilities. The main goals of EPR are sustainable development through environmentally responsible product development and product recovery, which are achieved *inter alia* through cleaner production and waste prevention. Producer responsibilities include: liability, ownership, economic, physical and information responsibilities. There are three categories of policy instruments that can be initiated by government to encourage EPR, i.e. regulatory, economic and informative instruments.

A brief review is presented of international legislation on EPR and related issues, including legislation from the European Community, Sweden, Denmark, the United Kingdom, Japan, and the USA. International perspectives on EPR are presented for the following products: packaging, electronic equipment, vehicles, batteries and mobile phones. Drivers for businesses to adopt EPR are identified and include: reduced costs, retaining customers, reduced production time, lower production costs, gaining market advantage and the proactive preparation for regulations. Selected case studies are presented to highlight how EPR is applied and the importance European and USA business attach to EPR. The case studies include: AB Electrolux (household appliances, vacuum cleaners, and professional appliances), Straus Family Creamery (milk in glass bottles which they take back, clean, and reuse), IBM (business machines), Ford Motor Company, General Motors and Daimler Chrysler (motor vehicles), and Nike (athletic footwear).

South African policy, strategy and legislation relevant to EPR are highlighted. The White Paper on Integrated Pollution and Waste Management for South Africa provides a broad framework for integrated waste management. The National Waste Management Strategy focuses on waste prevention and minimisation by all sectors of society, as well as identifying the need for developing a list of priority pollutants or waste streams. DEAT is currently in a process of developing an Integrated Waste Management Bill, which will deal with the 'duty of care' and 'producer responsibility'. Specific EPR regulations include the Plastic Bag Regulation which prohibits the production and distribution of plastic bags of a particular thickness.

Voluntary product stewardship programmes currently operating in South Africa are reviewed. A number of manufacturing companies have established take-back and/or buy-back systems for their products, for example for commodities such as used beverage cans (Collect-a-Can), used glass containers (Glass Recycling Association), used oil (ROSE Foundation) and waste paper (SAPPI and Mondi).

Three key aspects that need to be considered in regard to the further implementation of EPR in South Africa are the implications of cost, import, export and infrastructure. These implications are reviewed and selected examples are given to indicate the challenges which South Africa would have address if it were to adopt the EPR approaches currently practiced in a number of developed countries. Selection criteria and considerations for the identification of

appropriate EPR strategies for South Africa include eco-efficiency and economic, social and environmental impacts.

Key issues, concerns and suggestions made by stakeholders and role-players at the NWMSI Project Inception and Provincial Recycling Workshops are documented as a basis for focusing future EPR initiatives. Issues which were raised included: The need for clarity on who the 'producer' is (i.e. consider the whole production chain); The development of a common understanding of the concept of EPR; The development of an enabling legislative environment; and The consideration of the full implication and impacts (i.e. economic, social and environmental) before embarking on an EPR initiative for a specific product. The following products were identified as on-going candidates or potentially new candidates for EPR: plastic carrier bags, waste tyres, glass and e-waste.

Ongoing and proposed new EPR initiatives for priority products are reviewed, including: the Memorandum of Understanding on Plastic Bags; The Memorandum of Understanding on Glass; The Memorandum of Agreement on Waste Tyres; and the Initiative on E-Waste (Waste from Electrical and Electronic Equipment).

The report concludes that there is no single model of EPR which is universally used. The systems implemented internationally share no common set of goals, no uniform regulatory structure, and no comparable pricing schemes. Hence, an EPR process for South Africa would need to be developed on a product specific basis. As a first step a list of potential priority products were identified, based on the DEAT 2002 Product Stewardship Study and consultation process with the relevant role-players and stakeholders through the NWMSI Project Inception Workshop and Provincial Recycling Workshops. Based on these processes the following products (groups of products) have been prioritised for further investigation and implementation for extended producer responsibility:

- The full implementation of the Memorandum of Understanding on the Plastic Bag;
- The conclusion and implementation of the Memorandum of Understanding on Glass;
- The conclusion and implementation of the Memorandum of Agreement on Waste Tyres;
- The support, development and implementation of the E-Waste Initiative.

The experience gained and lessons learnt from the implementation of the Plastic Bag Initiative over the last three years, could be used with benefit to guide the more effective and efficient implementation of future EPR initiatives for other products/commodities.

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## ABBREVIATIONS AND ACRONYMS

|       |  |
|-------|--|
| CFC   | Chlorofluorocarbon   |
| CPUs  | Central Processing Units   |
| CRTs  | Cathode Ray Tubes  |
| DEAT  | Department of Environmental Affairs and Tourism  |
| DWAF  | Department of Water Affairs and Forestry   |
| EC    | European Community   |
| EEE   | Electrical and Electronic Equipment  |
| ELVs  | End-of-Life Vehicles   |
| EPR   | Extended Producer Responsibility   |
| ICT   | Information and Communication Technology   |
| IPWM  | Integrated Pollution and Waste Management  |
| IWMSA | Institute of Waste Management of Southern Africa   |
| MOA   | Memorandum of Agreement  |
| MOU   | Memorandum of Understanding  |
| MPPI  | Mobile Phone Partnership Initiative  |
| NWMS  | National Waste Management Strategy   |
| NWMSI | National Waste Management Strategy Implementation (Project)  |
| OECD  | Organisation for Economic Cooperation and Development  |
| PBBs  | Polybrominated biphenyls   |
| PBDEs | Polybrominated diphenyl ethers   |
| PCBs  | Poly Chlorinated Bi-phenols  |
| PCs   | Personal Computers   |
| PVC   | Polyvinyl Chloride   |
| RoHS  | (EU) Restriction of the Use of Certain Hazardous Substances (in Electrical and Electronic Equipment) |
| SHAR  | Specified Home Appliance Recycling   |
| SMMEs | Small Medium and Micro Enterprises   |
| UK    | United Kingdom   |
| USA   | United States of America   |
| USCAR | United States Council for Automotive Research  |
| VCRs  | Video Cassette Recorders   |
| VRP   | Vehicle Recycling Partnership  |
| WEEE  | Waste from Electrical and Electronic Equipment   |

## 1 SCOPE AND PURPOSE OF REPORT

The report addresses one of the tasks of the *Recycling Component* of the *National Waste Management Strategy Implementation (NWMSI) Project*, viz. 'Recommendations on Extended Producer Responsibility'. The specific purpose of this task is to make an assessment of the feasibility of introducing a policy of Extended Producer Responsibility (EPR) within the constraints of South Africa's socio-economic and policy environment, and based on a Status Quo Study and Implementation Evaluation (if appropriate) make recommendations for the implementation of EPR in South Africa and development of an implementation action plan. As a first step in this process an EPR Status Quo Report has been compiled, based on a review of the readily available literature on EPR and related issues.

The Status Quo Report is structured as follows:

- An *Introduction and Background* section sets out - the definition and goal of EPR, provides an insight in to the various types of EPR found in the world, outlines reasons for producers to assume responsibility for their products, reviews how these responsibilities are implemented in practice and commonly used EPR instruments.
- A brief review is given of *International Legislation and International Perspectives* on EPR and related issues.
- *Selected Case Studies* are presented to highlight how EPR is applied and the importance business attaches to EPR in Europe and the USA.
- The *Status Quo for EPR South African* is presented, reviewing existing South African legislation relevant to EPR and by outlining experiences with voluntary recycling initiatives.
- The *Implication for Introducing EPR* in South Africa are explored with focus on costs, import/export and infrastructure implications.
- *Criteria for the Selection of EPR Strategies* for South Africa are then identified.
- *Input from the NWMSI Project Workshops*, i.e. the Inception Workshop and the Provincial Recycling Workshops are documented as a basis for focusing future NWMSI Project EPR initiatives.
- *Ongoing and proposed new EPR initiatives* for priority products are reviewed.
- Finally, a way forward is presented in the *Conclusions and Recommendation* section.

## 2 INTRODUCTION AND BACKGROUND

The concept of Extended Producer Responsibility (EPR) was formally introduced by the Swedish Government in 1975 by the following official statement:

*"The responsibility, that the waste generated during the production processes could be taken care of in a proper way, from an environmental and resource-saving point of view, should primarily be of the manufacturer. Before the manufacturing of a product is commenced it should be known how the waste which is a result of the production process should be treated, as well as how the product should be taken care of when discarded."*

As a point of departure for this report and in order to better understand the concept of EPR, three issues will be addressed, i.e.

- a definition for EPR,
- the basic reasons for introducing EPR, and
- the mechanisms which can be used to implement EPR.

## 2.1 Definition of Extended Producer Responsibility

While there are many definitions of EPR, it is generally described as a pollution prevention policy that focuses on whole product systems rather than individual production facilities. The responsibility for the product is therefore, broadened beyond the emissions and effluents generated by the extraction or manufacturing processes, to also include the management of the product once it is discarded. EPR is based on the premise that the primary responsibility for waste generated during the production process (including extraction of raw materials) and after the product is discarded, is that of the producer of the product (Haskill, 2004).

## 2.2 The Goal of Extended Product Responsibility

The ultimate goal of EPR is sustainable development through environmentally responsible product development and product recovery. The theory is that by making producers pay to remediate the waste and pollution they create, they will have an incentive to include a broad range of environmental considerations into their product design, packaging and even choice of materials. The strategy is to reduce consumption of resources at all stages of the life-cycle of a product. Hence, the overall goals are cleaner production and waste prevention (Haskill, 2004).

## 2.3 Types of Producer Responsibility

Thomas Lindhquist (in Haskill, 2004) has identified five basic types of producer responsibility:

- **Liability** – the producer is responsible for environmental damage caused by the product in question.
- **Economic responsibility** – the producer covers all or part of costs for collection, recycling or final disposal of products they manufacture.
- **Physical responsibility** – the manufacturer is involved in physical management of the products or of the effect of the products. This can range from merely developing the necessary technology, to managing a total "take back" system for collecting or disposing of products they manufacture.
- **Ownership** – the producer assumes both physical and economic responsibility.
- **Informative responsibility** – the producer is responsible for providing information on the product or its effects at various stages of its life cycle.

## 2.4 Why Producers Should be Responsible for Their Products

Since it is the manufacturer who designs and develops and the product or packaging, as well as choosing the materials for that product or package, and hence the most efficient and effective point at which to reduce waste and encourage reuse, reduction and recycling, is at the product design and development stage. It is at that point in the product's life cycle that crucial decisions can be made to minimise the environmental impact of the product.

Internalising the external costs through a combination of economic and physical responsibility provides an incentive to manufacturers to design products that have minimal environmental impact throughout their lifecycle, and maximum reuse, recycling and reduction opportunities (Haskell, 2004, and Business for Social Responsibility, 2001).

## 2.5 Implementation of Producer Responsibilities

There are three categories of policy instruments that can be initiated by government to encourage product responsibility (Haskell, 2004):

- **Regulatory Instruments**, e.g. mandatory take-back; minimum recycled content standards; secondary materials utilisation rate requirements; recovery rates/time; energy-efficiency standards; disposal bans and restricted; materials bans and restrictions; and product bans and restrictions.
- **Economic Instruments**, e.g. advance disposal fees; virgin materials levies; removing subsidies for virgin materials; deposit/refund systems; and environmentally preferable products procurement procedures.
- **Informative Instruments**, e.g. seal-of-approval types of environmental labelling (Environmental Choice); environmental information labelling (energy efficiency, CFC content, recycled content); product hazard warnings; and product durability labelling.

## 2.6 EPR Instruments

A number of instruments are currently being employed to shift responsibility for product and packaging waste from government and taxpayers to producers and consumers. Four policy instruments and examples of each are given below (Haskell, 2004):

- **Deposit Refund Systems:** Deposit refund systems can encourage reuse, but at the very least they provide a monetary incentive to the consumer to return the product or package, and an infrastructure for its collection and recycling.
- **Targeted Product Taxes:** Product taxes influence the choice of materials used. For example, a targeted eco-tax levied in Belgium has reduced consumption of PVC.
- **Advanced Disposal Fees:** These fees are designed to influence the choice of materials used, and can generate substantial funds which may or may not be used by government for environmental projects. They are sometimes refunded to consumers, but generally the consumer is unaware of the fee. Austria has implemented such a fee for refrigerators and refundable disposal fees are required on automobiles in Sweden.
- **Voluntary Agreements Supported by Regulations:** These industry-led agreements are used to phase out undesirable materials, encourage design for recyclability or ensure high rates of reuse or recycling.

## 3 INTERNATIONAL LEGISLATION

While many countries throughout the world have (or soon will be implementing) legislation with regard to EPR, the major driving force for EPR is the European Community. Most EC environmental law, including 'producer responsibility'

legislation, is in the form of Directives. Directives are binding on Member States only in respect of the objectives to be achieved. The means through which Directive objectives are met by domestic legislation is a matter for each Member State to decide (Electronics Scotland, 2002).

The following section presents a summary of European Legislation and thereafter a brief review of some of legislation that has been implemented in other countries. The intent is not to produce a detailed review of all legislation, but rather to present examples EPR related legislation currently in place or being developed and highlighting appropriate aspects of this legislation.

### **3.1 Current European Legislation**

#### ***Landfill Directive (99/31/EC) (implemented July 2001)***

- Prevent or reduce as far as possible negative effects on the environment from landfilling waste.
- Introduction of stringent technical requirements for waste and landfills.
- Ban on specific wastes (2003 whole tyres, 2006 shredded tyres; 2002 liquid hazardous waste, plus other hazardous wastes).
- Pre-treatment (2004 hazardous waste, 2007 all other wastes).
- Targets for reduction of biodegradable waste (2010, 2013 and 2020).

#### ***Waste Framework Directive (75/442/EEC)***

- System for the coordinated management of waste within the community.
- Foundation for sustainable waste management.
- Defines waste and introduced the principles of the waste hierarchy and proximity principle.

#### ***Hazardous Waste Directive (91/689/EEC)***

- Licensing requirements for handling and treatment of hazardous waste.
- Singles out specific waste materials as a consequence of their hazardous nature and potential.
- Impact upon health and the environment.
- 1 January 2002 single list of hazardous waste established (added 200 to original list).

#### ***Incineration of Waste (2000/76/EC) (implemented December 2002)***

- Extended to cover co-incineration plants.
- Sets stricter limit values and technical requirements.
- New plants required to comply 2002, existing plants by December 2005.

#### ***End of Life Vehicles Directive (2000/53/EC) (implemented April 2002)***

- Waste prevention priority.
- Reduce the use of hazardous substances in vehicle design.
- Ease of dismantling, reuse, recovery and recycling of end-of life vehicles priority.
- Increase use of recycled materials in vehicle manufacture.
- Sets targets and deadlines.

#### ***Disposal of Waste Oil (75/439/EEC)***

- Priority to processing of waste oils by regeneration (i.e. by refining).

***Disposal of PCBs (96/59/EC) (implemented March 1998)***

- Aims to dispose completely of PCB's and equipment containing PCB's as soon as possible; for big equipment, deadline is end of 2010.
- Members States required to keep an inventory of equipment containing PCB's and plan for disposal, plus outline plans for collection and disposal of non-inventoried equipment.

***Packaging and Packaging Waste Directive (94/62/EC)***

- Producer Responsibility legislation.
- Lays down essential requirements as to the composition, reuse, recovery and recycling of all packaging.
- New increased recovery and recycling targets for 2008.
- Ozone Depleting Substances Regulations (in force from 1 January 2002).
- Disposal of units containing CFC's through specialist plants to ensure proper treatment and disposal.

***Regulation on the Supervision and Control of Trans-Frontier Shipments of Waste (259/93/EEC)***

- System of supervision and control of all movements of waste.

***EU Regulation on Waste Statistics (2150/2002) (came into force 29/12/02)***

- Framework for the production of community statistics on the generation, recovery and disposal of waste.
- Requires Member States to provide statistics on generation, recovery and disposal of waste.
- First year of collection is 2004, followed by every two years thereafter.

### **3.2 European Legislation with Revisions Proposed**

***Batteries and Accumulators Directive (91/157/EEC)***

- Currently under revision due to its limited scope.
- New proposals for collection and recycling targets and ban on batteries containing mercury.
- Phase out of cadmium by 2008.

***Waste Electrical and Electronic Equipment (2002/96/EC)***

- Producer responsibility legislation.
- Prevent generation and promote reuse, recycling and other forms of recovery.
- Restricting the use of hazardous substances in electrical and electronic equipment.
- Minimise disposal of waste electrical and electronic equipment as unsorted metallic solid waste and set up collection system.
- Targets and deadlines set in place from 2005 in terms of collection systems, and 2006 for rates of separation, recovery and recycling.

***Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment ROHS Directive (2002/95/EC) (Implemented February 2003)***

- Restrictions posed on new electrical and electronic equipment in terms of banning specified hazardous components (contain lead, mercury, cadmium or hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs))

- Target date of 1st July 2006 for new electronic and electrical equipment.

### 3.3 Proposed European Legislation

#### ***Proposed Bio-Waste Directive (to be developed by the end of 2004)***

- Aims to provide a strategic approach to the management of bio-waste
- Influence the acceptability of management practices of biodegradable wastes by imposing controls on facility operation and end uses.
- Cover MSW and biodegradable residues from a wide range of processing industries.
- Possible that separate collections be enforced to maximise the scope for composting and anaerobic digestion.

#### ***Proposed Framework for the Setting of Eco-design requirements for energy using products Directive***

- Looks to set requirements for environmentally relevant product characteristics on a life cycle basis.
- Focuses on traded goods not covered by other policy or legislation.
- Work in synergy with other EU legislation.

### 3.4 Sweden

Overall responsibility for waste management rests with the Ministry of the Environment. Two key bills cover waste management:

- The Eco-cycle Bill enacted in 1993, and
- The Swedish Environmental Quality Objectives Bill adopted by Parliament on April 1999

The Swedish Environment Protection Agency (1967) is the central enforcement and supervising agency although it has no licensing powers. It is an independent authority whose Director-General is answerable directly to the Government. Sweden's 289 municipalities are responsible for the planning of all waste management, including the waste for which they do not have operative responsibility. Their responsibility has been increased to embrace packaging waste. Since 1991, municipalities need to establish a waste management plan containing information on waste generation, treatment methods applied and local methods employed to reduce both generation and toxicity of waste (municipal waste only).

Legal responsibility falls to municipalities for household waste and to producers for waste in the producer responsibility scheme (Creative Policy Package for Waste: Lessons from Sweden (undated)). Under the legislation on EPR, producers of goods have to meet statutory targets for recycling. It is up to producers how they meet these targets, and in most cases they have relied on 'bring' systems, i.e. container parks, rather than doorstep collection of recyclables. Waste paper, tyres, and packaging were made subject to EPR in 1994, end-of-life vehicles in 1998 and electrical and electronic products in 2001. The collection and processing costs are passed on to the consumer in the price of the product (Creative Policy Package for Waste: Lessons from Sweden (undated)).

### 3.5 Denmark

Local authorities in Denmark are responsible for the collection and recovery of waste via a statutory order. Unlike Sweden, the system is funded by a consumer charge implemented through local taxes or collection fees. There are a number of voluntary agreements that exist in Denmark which encompasses (DEAT 2002):

- Take back of rechargeable batteries financed by an ecological tax;
- Take back of starter batteries is further supported by two statutory orders;
- Deposit scheme for soft drink containers;
- Take back and recycling of transport packaging;
- Take back of used tyres to limit their disposal in landfill; and
- Tax charges on one-way crockery.

The system ensures that parties within the sector who do not join the agreement are responsible for achieving the same common goals, and it also provides for a fee to cover the cost of the collection scheme.

### 3.6 United Kingdom

The UK has made provision for the implementation of EC 'producer responsibility' Directives in Sections 93 - 95 of the Environment Act 1995. This section provides for the introduction of regulations to impose recovery, recycling or reuse obligations on producers of certain products. Section 93 of the Environment Act relates to the general Producer Responsibility provisions in that it gives power to the Secretary of State to make Producer Responsibility regulations. Section 94 relates to the supplementary provisions for Producer Responsibility and deals mainly with:

- The provision for the Producer Responsibility obligations to be placed on a particular class or description of persons and to be applied to particular products or materials.
- The provisions for the setting of targets which are to be achieved in respect of reuse, recovery and recycling.
- The provision to specify the detail of particular Producer Responsibility obligations.

Section 95 relates to the provision for a person who contravenes a prescribed requirement of any Producer Responsibility regulations to be guilty of an offence (the detailed offences will then appear in the relevant regulations).

### 3.7 Japan

Japan's Law for Promotion of Effective Utilization of Resources (often referred to as the Recycling Promotion Law) was enacted in 1991 to promote increased recycling of a variety of products and materials (Inform 4, 2004). One of the law's major goals was the promotion of product designs that facilitate waste reduction, recycling, and reuse. In 2001, the law was revised to address personal computers. It is estimated that 51 percent of households in Japan own personal computers, i.e. a total of 24 million units. The government predicts that the number of discarded computers will grow significantly over the next few years. Until the revised Recycling Promotion Law was implemented, management of discarded PCs was the responsibility of municipalities. This revised law embraces the principle of extended producer

responsibility (EPR) by requiring manufacturers to establish collection and recycling systems for used computers. As of April 2001, the law required recycling of PCs discarded by businesses. Since October 1, 2003, it has required recycling of PCs discarded by households. The revised law also requires manufacturers of small batteries and of electronic products that contain them to establish a recovery system for rechargeable batteries, including nickel-cadmium, nickel-metal hydride, lithium-ion, and small sealed lead-acid batteries (Inform 4, 2004).

The Specified Home Appliance Recycling (SHAR) Law in Japan (now Home Appliance Recycling Law (Inform 4, 2004) , which was enacted in 1998 and enforced in 2001, is the second EPR programme in the country that legally assigns part of the responsibility for the end-of-life management of products to manufacturers. The scarcity of final disposal sites and the increase of Electrical and Electronic Equipment (EEE) in the waste stream and the inadequacy of existing treatment plants for handling EEE, are the main driving forces for the enactment of the Law. Under the programme, manufacturers and importers of four large electrical home appliances (TV sets, refrigerators, air conditioners and washing machines) are required to take back their discarded products, to dismantle them and to recover the components and material that can be reused or recycled. (Naoko Tojo (undated).

### **3.8 USA**

The USA places the responsibility for EPR on the individual states and has no all encompassing legislation on EPR. There are however, some focussed pieces of legislation which are aimed at particular products. One such piece of legislation is The National Beverage Producer Responsibility Act of 2002. It identifies a new approach to address concerns of industry stakeholders without compromising public interest. It sets a performance standard rather than taking a traditional prescriptive approach, therefore giving industry the freedom to exercise their expertise in designing the most efficient deposit-return programme. This proposed legislation would extend the beverage company's 'supply chain' to include the management of empty containers after consumption.

The only prescriptive requirement is that the system must use an economic instrument (a 10-cent deposit) to encourage recycling. The Act complements state container deposit laws. Brand owners who currently achieve a recovery rate of at least 80%, under a current state beverage container programme, are exempt from this legislation (White, 2002).

## **4 INTERNATIONAL PERSPECTIVES**

In 2001 some 28 countries had "take-back" mandates for packaging, another 16 had battery recovery laws, and 12 planned to implement electronics recycling laws (Business for Social Responsibility, 2001). The extension of producer responsibility to end-of-life products has been enacted or is under serious consideration in the European Union, Japan, Taiwan, Korea, Brazil, Peru, and Canada. The range of products and waste streams targeted under these emerging policies includes packaging, paper goods, consumer electronics, office machinery, cars, tyres, furniture, electrical appliances, buildings and construction materials, batteries, and household hazardous wastes. Below is an overview of the EPR regulations and initiatives that have developed over the last ten years internationally (Business for Social Responsibility, 2001).

## 4.1 Packaging

The European Union (EU) issued a packaging directive in 1994 for its member countries which mandated recycling targets for packaging waste of 25 to 45 percent, with a minimum of 15 percent recycling rate for each material. As a result, all 15 member countries will ultimately have "producer pays" systems for packaging waste, although the policies are taking different forms in different countries. The EU is finalizing legislation that will standardize EPR for packaging among the 15 member countries. Examples of current EPR policies include the following (Business for Social Responsibility, 2001):

- Germany's Green Dot system requires manufacturers to pay a fee based on the type of material and weight of the packaging they use.
- Japan's fee-based packaging law is similar to the Green Dot system.
- In France's Eco-Emballages system, industry pays a fee to join an organization, Eco-Emballages, which thereby funds the recycling efforts of the organization. A uniform contribution is paid by the industry regardless of the composition of the packaging.
- Differing somewhat from the above, UK regulations have actively sought to promote market competition by placing legal responsibility for recovery and recycling upon all of the producers of packaging generated in the UK.

## 4.2 Electronic Equipment

A number of European countries mandate producer responsibility for electronics at end-of-life, and the EU is currently developing a directive to address this issue called Waste from Electrical and Electronic Equipment (WEEE). Producer responsibility legislation for electric and electronic equipment has been adopted in Switzerland, Taiwan, the Netherlands, Italy, Japan, and Norway. At least 12 other countries are contemplating similar legislation, though many are waiting for the EU to move on a proposal to require take-back of a wide range of electronic items, including appliances, medical equipment, computers, and toys. Targets under discussion range from 50 to 90 percent recovery.

## 4.3 Vehicles

The EU directive on end-of-life vehicles (ELVs) is currently being developed. The draft holds manufacturers responsible for take-back and mandates recycling rates of 80 to 85 percent, respectively, for vehicles that go on the market after 2005 and 2015. Recovery targets are 85 percent for 2005 and 95 percent for 2015. Japan is currently considering recycling and recovery goals similar to those of the EU. Other countries that have producer responsibility policies for vehicles already in place have recycling and recovery targets similar to those under consideration by the EU.

## 4.4 Batteries

An EU Directive from 1991 requires that certain batteries (mainly lead-acid, nickel-cadmium (Ni-Cd), and hearing aid batteries) be easily removable from appliances, labelled, and recovered from the waste stream. It also limits mercury, lead, and cadmium in batteries. A new proposed EU Directive would extend the mandate to all batteries, and ban cadmium altogether.

## 4.5 Mobile Phones

The Mobile Phone Partnership Initiative (MPPI) was launched in December 2002 and is expected to be a model for future partnerships between the Basel Convention (for the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal) and industry. The world's leading mobile phone manufacturers are participating in the MPPI, including Matsushita (Panasonic), Mitsubishi, Motorola, NEC, Nokia, Philips, Samsung, Siemens and Sony Ericsson. Participating countries include Belarus, Canada, China, the Czech Republic, Germany, Japan, South Africa, South Korea, Sweden, Switzerland, and the US. Many factors contributed to the selection of mobile phones as the focus of the first partnership. Principal among them are rapidly rising waste generation rates for these products, which have become a global concern (Inform 2, 2004).

## 5 SELECTED CASE STUDIES

### 5.1 Importance of EPR to business

The following motivating issues have been identified as drivers for business to adopt EPR (Business for Social Responsibility, 2001):

- **Reduced Costs:** Many EPR initiatives allow companies to reclaim their products and reuse the materials or components for new products. This often results in reduced raw materials and manufacturing costs. For instance, Xerox saves over \$200 million a year by recovering and remanufacturing used copiers. Additionally, designing products to eliminate hazardous substances and reusing components can decrease costs and liabilities associated with product storage, shipping, handling, and disposal.
- **Retain Customers:** When companies offer leasing and take-back programs, customers become long-term clients rather than one-time purchasers. By providing post-purchase services, companies develop a relationship with a customer that can yield referrals and grow the company. Also, retaining customers over an extended period of time provides opportunity to offer a greater number of products and services, thereby generating more revenue than from a one-time sale of a product.
- **Reduce Production Time/Lower Production Costs:** When product designers consider recyclability and reuse issues, they design products with features such as quick-release fasteners and fewer parts to facilitate easier disassembly and recovery. This can speed up the manufacturing process, increase worker productivity, and decrease the amount of time to get a product to market. Additionally, when whole components can be reused in a "next-generation" product, some manufacturing processes can be eliminated.
- **Improve Decision-Making:** In many cases, an EPR-focused approach to life-cycle management leads to better-informed decision making. For instance, unforeseen liabilities and environmental problems associated with production and distribution can be minimized during product design, material selection and asset recovery.
- **Open New Market Opportunities:** An EPR approach can spark innovation in product design and delivery, opening up new market opportunities and enhancing

competitiveness. For example, DuPont works with Ford UK such that DuPont is paid based on how many cars are painted rather than the amount of paint sold to Ford. This new arrangement has sparked innovation in paint application that has minimized waste from the painting process. By refining a new business approach that includes splitting the savings with Ford from increased efficiency, DuPont has increased its market competitiveness since other companies do not offer this specialized service to car companies.

- **Proactively Prepare for Regulation:** Product manufacturers are closely following the development of producer responsibility regulations in Europe and proposed product responsibility regulation in the United States of America. Many see the extension of product responsibility to USA manufacturers as an inevitable trend in the coming years. Given this belief, failure to prepare now will result in costly and hasty decisions when and if new requirements come into effect. Though producer responsibility-type regulations do not currently exist in the USA, many multinational companies are facing these regulations in Europe and therefore are already being forced to comply with the requirements.
- **Gain Market Advantage:** Customers increasingly demand environmentally preferable products without a price premium. For example, according to "The 1999 Millennium Poll on Corporate Social Responsibility" by Environics International Ltd. in *Business for Social Responsibility, 2001*, over one in five consumers report either rewarding or punishing companies in the past year based on their perceived social performance, and almost as many again have considered doing so. Customers expect companies to bear the financial burdens of minimizing the impact of their products without compromising environmental concerns. Companies that can creatively and strategically meet this goal while maintaining product performance and price will have a marketing advantage with an increasing number of discriminating consumers.
- **Increase Marketability:** One approach to EPR is to offer services or leases rather than sell products. Companies that provide services or leased products can market this as an opportunity for clients to strengthen their balance sheets by removing debt. Since appliances and other capital are taxable property if owned, leasing reduces net property value and thus tax burden.
- **Generate Consistent Corporate Environmental Principles:** Many companies that work to support their environmental principles with measurable improvements are using EPR as a way to reach corporate environmental goals and as a means to demonstrate product stewardship.

## 5.2 Case Study from Europe

**AB Electrolux** adopted the servicing concept under the title "Functional Sales" in which they sell product function rather than the product itself. Electrolux is the world's largest producer of white goods such as household appliances, vacuum cleaners, professional appliances, and outdoor products, and includes common brands such as Frigidaire. Their Functional Sales model offers competitive advantages and reduced environmental impacts while guaranteeing responsible end-of-life management such as reuse and recycling. Customers pay a monthly fee for the function of the product, including rental of the equipment, training of staff, supplies, and maintenance, and Electrolux takes back the product at the end of its useful life.

The company has found the following advantages of this approach: brand differentiation and improved market share; reduced cost to the user of obtaining a service by eliminating the need for capital investment; improved maintenance and operator training; and capture of the considerable economic value of a product at the end of its life. This model is especially useful for cleaning, laundering, and kitchen equipment since environmental and economic costs can be minimized by upgrades to newer appliances. Specifically, Electrolux estimates that 80 percent of a product's environmental impact occurs during the in-use phase (e.g.: water and energy), and the remaining 20 percent is from the manufacturing phase. Because newer appliances are on average 50 percent more energy efficient, the leasing model of Electrolux that allows for replacement with newer models reduces cost and environmental impact from water and energy use.

### **5.3 Case Studies from USA**

**Straus Family Creamery** supplies their milk throughout the Western United States in glass bottles which they take back, clean, and reuse for future shipments. Their bottles are made of 40-50 percent recycled glass and are used an average of 7 times. The company takes back the bottles when they deliver a shipment, working with retailers or even single-house large consumers. There is a \$1.00 refundable deposit on each bottle which is returned by the retailer when the bottle is returned. Straus Family Creamery initiative has resulted in a reduction of over 55 million one-way milk containers that are put into California landfills each year.

**The Ford Motor Company, General Motors and DaimlerChrysler** have formed a partnership called the United States Council for Automotive Research (USCAR) Vehicle Recycling Partnership (VRP). The partners have a goal of increasing the recyclability of their products through leveraging the research efforts of these companies in non-competitive areas. Automotive shredders currently recycle three-fourths of most vehicles (by weight). Some products are reprocessed into their original form, such as anti-freeze and other fluids; other products are "down-cycled" to generate less-refined components in the car or for other industries. VRP researchers look for efficient, cost-effective methods for recycling the remaining shredder residue. For example, scientists at Argonne National Laboratory working with the VRP have developed new methods for removing and cleaning seat foam. Argonne is building a prototype system to efficiently and continuously clean the foam. The VRP plans to reuse the foam as carpet padding or for sound suppression in test vehicles.

**IBM's** corporate environmental policy commits the company to several EPR-related goals including conserving natural resources through reuse and recycling. IBM supports the concept of shared responsibility with its customers for environmentally-sound alternatives at product end-of-life. IBM works to offer cost-effective alternatives to its customers, and, to this end, has implemented 14 product recycling programs worldwide to date. The product return offering in the USA, called Product End-of-Life Management Service, was announced by the IBM Credit Corporation for commercial customers in 1997. IBM operations include 10 major Re-utilisation and Materials Recovery Centres around the world, with additional locations supporting parts return and regional collection. In 1999, these operations processed more than 59,000 metric tons of manufacturing scrap, IBM owned end-of-life machines, and customer returned equipment. More than 90 percent of this amount was recycled and less than 3.7 percent was sent to landfills. Dismantling and recycling expertise is shared among these centres and with IBM's Engineering Centre for Environmentally

Conscious Products to increase recycling efficiencies and reduce the amount of waste sent to landfills.

**Nike's** Reuse-a-Shoe Program was created to "down-cycle" old unwanted athletic footwear. Nike retailers across the country provide collection receptacles for customers' old athletic shoes of any brand (not just Nike shoes). Through partnerships with leading sports surfacing companies, the granulated outsole rubber and mid-sole foam from the used shoes is converted into high performance running tracks, courts, gym floors, soccer fields and playgrounds. The granulated fabric from the shoe uppers becomes the padding under carpets. Currently, this program has kept more than 7.5 million post-consumer and defective shoes out of landfills.

**Safety-Kleen** has applied the concept of "servicizing" or leasing to its core business as it recovers and reuses solvent for parts cleaners in a variety of businesses. A trend towards "servicizing"-- replacing a product with a service via leasing, rentals, or flat-fee contract provision -- is emerging in many industries. This allows companies to establish ongoing relationships with customers, as well as to collect and maximize reutilisation of resources. Safety-Kleen leases their parts-cleaning solvent in a variety of assembly and repair shop settings such as auto shops, bicycle repair shops, print shops, and industrial facilities. Motivated by cost pressures created by providing virgin solvent with each service call, Safety-Kleen now provides and reclaims the solvent. It then "closes the loop" by recycling the solvent in its hub facilities. The parts-cleaning solution was modified in 1993 to employ cyclone separation during use, reducing solvent demand, and extending service intervals. Safety-Kleen also works closely with trade associations to educate small businesses on their environmental costs and compliance.

## 6 THE SOUTH AFRICAN STATUS QUO

### 6.1 South African Legislation

The DEAT report "Study on Product Stewardship" (DEAT, 2002) provides an overview of South African legislation *inter alia* related to EPR and selected voluntary recycling initiatives. The White Paper on Integrated Pollution and Waste Management for South Africa (IPWM), 1998 gives a broad framework on how the government intends dealing with waste management. The policy also commits government to principles such as 'cradle to grave' and 'polluter pays' which underscore the concept of EPR and inform the development of product stewardship programmes. The National Waste Management Strategy (NWMS) was developed as a high level strategic plan for the implementation of the IPWM policy. The NWMS aims to ensure that waste prevention and minimisation by all sectors of society, with a special focus on the principal generators of waste particularly those producers who generate waste with a high environmental impact (NWMS, 1998). The strategy identified the need for developing a list of priority pollutants or waste streams with the intension of setting specific industry waste minimisation targets, as well as the need for industries (on a site specific basis) to compile integrated waste management plans. It also proposes the introduction of economic instruments and product take-back legislation as mechanisms to encourage waste minimisation.

Recycling initiatives and extend producer responsibility are encouraged and supported in the strategy. The Polokwane Declaration (DEAT, 2002b) signed by representatives from government, business community and the civil society during South Africa's first National Waste Management Summit, further outlines government commitment to integrated waste management. The declaration indicates South

Africa intention to reduce waste generation and disposal by 50% and 25% respectively by 2012 and develop a plan for zero waste by 2022. DEAT is currently in a process of developing a draft bill on integrated waste management, which will also have sections that deal with the 'duty of care' and 'producer responsibility'.

The Plastic Bag Regulations promulgated under section 24 (d) of environmental Conservation Act No 73 of 1989 prohibits the production and distribution of plastic bags of a particular thickness (Government gazette No 7348, 2002). DEAT has entered into an agreement with organised labour and organised business in amending the regulation. The agreement makes provision for the establishment of a section 21 company that will be responsible for among other things the promotion of efficiency in the use, reuse, collection, recycling and disposal of plastic bags; this company was formally launched earlier this year (2004). The underlying purpose is to promote the production and distribution of reusable and recyclable plastic bags. The policy framework raises a number of issues that forms the basis for the initiation of product stewardship and EPR programmes.

## 6.2 Voluntary Recycling Initiatives in South Africa

Notwithstanding, the limited enforcement of the regulatory framework that is in favour of product stewardship and EPR, some companies within the country are involved in voluntary product stewardship. These companies have established take-back and deposit refund systems for their products, for example for commodities such as glass, aluminium, oil, paper, rubber and plastic manufacturing companies (NWMS Version C, 1999).

The **glass companies** formed the Glass Recycling Association to recover used glass containers (e.g. glass bottles and jars). The glass manufacturing companies have indicated that there is significant potential for the recycling of glass. Consol, one of the glass making companies, has indicated that the recovery rate could be improved by legislative support, encourages waste separation at source, particularly at the household level. Consol is supporting buy-back centres as a means of encouraging increasing levels of glass recovery. A Memorandum of Understanding, which formalises roles and responsibilities, has recently been developed between the glass manufacturers and the Department of Environment Affairs & Tourism (see section 10).

The steel making industry involved in can production such as Nampak (Metal Box) and Crown Cork founded the **Collect-a-Can Company** for recovery of used steel beverage cans for recycling. The company is recognised as a pre-eminent recycler of one-way packaging in Southern Africa and is unique in the world. The company had a can recovery rate of 63.7% in Southern Africa in the year 2000/1. It pays cash for cans recovered by consumers including small businesses, individuals, schools, charity organisations and church groups, which serves as an incentive to those participating in the recovery of cans. Collect-a-Can estimates that their initiative has provided up to 30 000 jobs.

The paper recycling companies in South Africa recycle about 43% of the 1,8 million tons of paper produced each year (Engineering News, 2002). Different companies in the paper manufacturing industry have started some initiatives over the years to recover and recycle used paper. For example **Mondi Recycling** has in the last four years been involved in the development of small medium and micro enterprises (SMMEs) for the purpose of improving their recycling initiatives. The company has invested R3,5 million worth of equipment for buy-back centres in Gauteng, KwaZulu-

Natal and the Western Cape. This initiative has not only improved the state of the environment but it has also provided 2,215 jobs in the paper recycling industry. The company is also responsible for environmental awareness initiatives aimed at educating the public about the importance of recycling paper. Mondi has called for legislation that will force householders to separate waste in the home, in order to increase recycling in general and paper in particular. In 2001, DWAF reported (Reference) that some 818 000 tonnes per annum were recycled and SAPPI in 2004 reported 922 000 tonnes of paper were recycled. This represents a total paper recovery rate of 52% (DEAT, 2004).

Voluntary recycling initiatives have been continuing for many years in South Africa with a great deal of success without legislation. The ongoing and future success of these voluntary initiatives and the initiation of other programmes could possibly be further enhanced through specific policy or legislation for product stewardship and EPR.

## **7 IMPLICATION OF INTRODUCING EPR**

The specific purpose of this study is to present the status quo in regard to EPR both internationally and in South Africa to serve as a basis for making an assessment of the feasibility of introducing a policy of Extended Producer Responsibility (EPR) within the constraints of South Africa's socio-economic and policy environment. Sections 2 to 6 have given a brief overview of the status quo. EPR is applied with considerable success in many developed and developing countries, and its application is growing. There are many forms of EPR and the key questions surrounding formal legislation of EPR in South Africa, what the benefits and implications would be.

Three key aspects that will need to be considered in regard to the benefits and implications of introducing EPR in South Africa are:

- Cost implications
- Import / export implications
- Infrastructure implications

In this brief review, a selection of examples are highlighted indicating challenges which South Africa would have to consider in trying to adopt EPR approaches currently practiced in a number of developed countries.

### **7.1 Cost Implications**

In most developing countries the cost of EPR is passed onto the consumer directly as part of the purchase price of the product, e.g. the costs associated with recyclable packaging for foodstuffs. In this case the consumer has no choice but to pay the additional cost. This pushes up the cost of living (probably only marginally), but these increased costs could be more significant in the case of poor communities in developing countries.

In Europe and the US, two other options for EPR have been developed, i.e. take-back and leased products. With take-back products, the cost of recycling and reusing components is factored into the wholesale cost of the product. This cost is ultimately passed on to the consumer through purchase of the product, but the

purchaser then has a product which has an inherent value at end-of-life. It is in his interests to dispose of the produce correctly and timeously and not to store or discard the product. The negative side, however, is that this additional cost may affect the vendor negatively as the cost of product may be higher than the competition and so sales may be reduced. With both the take-back and leased product systems, the consumer is encouraged to obtain the product by lease which ensures that the producer will take back the product at end-of-life, and replace with new components. For the producer this has a number of benefits:

- The customer essentially enters into a long term relationship with the supplier; and
- The supplier is ensured that he will receive back his product as it will be replaced.

In the United States, leasing of personal computers is growing dramatically, e.g. by 149 percent between 1997 and 1998 alone. In 1998, leasing accounted for one-third of all computer transactions (Inform 4, 2004).

On the negative side, leasing has the following potential drawbacks;

- Consumers may wish to own outright the product;
- Consumers may not wish to incur additional debt (lease payments include a portion for interest); and
- In poorer communities, the majority of the population may not have access to regular or sufficient income to be approved by leasing institutions.

One mechanism that has worked to a varying degree is that of the deposit-on-return systems. On the international level, many countries have implemented deposit refund legislation. Traditionally these have been implemented in packaging systems, such as glass containers. The potential benefits include (Zero Waste New Zealand Trust, 2002):

- Reduce the natural resource demands of beverage packaging;
- Encourage reuse and recycling;
- Reduce litter;
- Bring environmental benefits without requiring economic sacrifices;
- Provide a monetary incentive to the consumer to return the product or package, and
- Create an infrastructure for collection and recycling

## **7.2 Import / Export Implications**

In the US and around the world, waste generated by discarded cell phones is an issue of growing concern. According to Inform, 2004, over 1 billion cell phones are currently in use worldwide. In the USA, subscriptions have increased from 340,000 in 1985 to almost 153 million at the end of 2003. These high rates of use, combined with the very brief, 18-month average lifespan of the typical phone, are producing enormous and increasing quantities of cell phone waste. By 2005, approximately 100 million cell phones will be retired each year in the USA, over 25 times more than in 1990. While many of these units will initially be stored away, all will eventually be thrown out and end up in landfills, at least if current trends continue (Inform 2, 2004). Some programmes that have been implemented include cell phone design and cell phone collection programmes.

Existing cell phone collection programs in the USA have recovered only a negligible portion of the millions of phones discarded each year. Between 1999 and 2003, Donate-a-Phone, HopeLine, CollectiveGood, and Charitable Recycling collected approximately 2.5 million cell phones, about 1 percent of the phones discarded during this period, and an even smaller fraction of the hundreds of millions of units removed from service to await disposal at a later date (Inform 2, 2004).

Another problem with the collection programs as they currently exist is that they fail to take any responsibility for the ultimate destination of the phones they recover. The majority of collected and refurbished units are sold abroad, in developing countries, where little or no infrastructure is in place to manage them responsibly at end-of-life. Thus, these programs are providing just a temporary solution to the problem of cell phone waste by shifting the disposal problem abroad. There is also evidence that foreign workers in Asia are being exposed to unsafe levels of toxic chemicals at facilities that recycle exported electronics, including cell phones (Inform 2, 2004). The implication therefore, is that these cell phones could easily find their way into the South African market (as is happening with re-furbished notebook computers from the US) but any tax or tariff wadded in the original price would have been used in the original producer country. Hence, South Africa may become a net importer of hazardous material without the funds to deal with the environmental impacts.

From an export view, the situation could have similar significant impacts. The Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (EU RoHS Directive) states that, by July 1, 2006, no new electrical and electronic equipment put on the market may contain lead, mercury, cadmium, or hexavalent chromium (Inform 3, 2004). Polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) — two types of flame retardant — are also prohibited. There are exemptions for some uses of mercury in fluorescent bulbs, and for lead in glass used in CRTs and in solder used in servers and other network infrastructure.

In the USA electronic manufacturers have generally made a start on aligning their products with the Directive. The driving force is the size of the European market (377 million people) and the standardisation of all production facilities to reduce costs (Inform 3, 2004). Additionally, with other manufacturers in the Far East also wishing to compete in Europe, there is a global trend to comply with the Directive. It would therefore also be incumbent on South African companies to ensure compliance with the EU Directive, should they wish to provide individual electronic components to the European market (Ishmail, 2002). While the South Africa export electronics market is relatively small, the lesson is that South Africa is part of the global community and to compete, local companies will have to comply with international EPR trends.

### **7.3 Infrastructure Implications**

In the developed countries, infrastructure is generally better than in the developing countries. Similarly the population of developed countries expects a good standard of infrastructure and have the necessary resources to pay for such infrastructure. This is born out by the following examples of deposit refund infrastructure in developed countries (Zero Waste New Zealand Trust, 2002) (see table below).

According to the OECD (OECD 1993 in DEAT, 2000), the deposit-refund systems have increased return rates and the quality of returned materials when compared to kerb side recycling systems. There are, however, arguments against deposit-refund systems. Opponents of the deposit-refund systems claim that they unfairly

discriminate against the types of packaging covered by the system. They claim that the laws are too expensive to administer and impose unrealistic paperwork requirements. In many states of the USA for example, there has also been concern over the use of revenue from the deposit-refund systems for funding improvements in the management of non-beverage waste materials. In addition, in California, the deposit-refund systems have produced such high recovery rates that profits have declined and the financial structure of the system is not very stable. (McMahon 1992 in DEAT 2000)

**Nova Scotia.** With 95 'Envirodepots' spread throughout the province (recorded in 2000) it is convenient for residents to return redeemable beverage containers for reuse or recycling and a refund. In Nova Scotia 98% of residents live within 20km of an Envirodepot. In the financial year of 2002, 235 million beverage containers were recycled, a return rate of 83%. The recovery rate for beverage containers has increased since the Envirodepots were implemented. Money raised from the deposit programmes has helped to set up a number of employment opportunities in the province, including at a tyre reprocessing facility.

**British Columbia.** In 2000, consumers returned 94% of beer bottles and 95% of cans. Reasons for high return rates point mainly to the healthy partnership between the 'return to retail' system and select recycling depots. Partners such as liquor distribution branches, cold beer and wine stores and licensees provide consumers with the convenience of returning empty beer containers. Return to retail works because:

- 1) It is convenient for the consumer to return empties when buying more beverages.
- 2) Consumers can return empties 12 hours a day, 7 days a week at over 600 locations in British Columbia.
- 3) It ensures a closed loop system runs most efficiently. A closed loop system allows empties to be picked up at the same time beer is dropped off ensuring trucks are never empty.

**Manitoba.** Currently over 95% of Manitoba's population has access to municipal kerbside or depot programmes. Kerbside programmes collect beverage containers which are then processed. In Manitoba beer is sold only in deposit-bearing containers and is thus exempt from the product stewardship levy. The empty containers are returned only to the point of sale (cold beer / hotel outlets) for full deposit redemption.

**Denmark.** 2,000 new deposit machines capable of receiving all types of labelled cans and plastic bottles will be placed in shops and supermarkets throughout Denmark. A machine will also accept labelled packaging even if the shop in which it is located does not itself sell the product. By reading a bar code, the machines will determine whether a deposit is returnable on the empty packaging.

Internationally, deposit refund systems have generally proven to be an expensive solution and target only a narrow range of packaging material. Vendors are obliged to collect the returned container which incurs additional costs. The sale of the product has shown to fall due to the increased cost of marketing a reusable container. Studies in Canada have shown that deposit/refund systems costs five times what it costs Ontario residents to operate multi-material kerbside recycling systems (DEAT, 2000).

In South Africa, deposit/refund systems are in place for glass containers. Specifically these are for certain types of bottles from Amalgamated Beverage Industries and South African Breweries (SAB). Not all glass containers from these two companies are subject to deposit's and as such are therefore only targeting a portion of the market. In 2003/4 SAB used 6.8 million returnable bottles and 5.6 non-returnable bottles (SAB 2004).

In summary, an improvement in infrastructure and technology is required to comprehensively implement deposit/refund system in developing countries. For South Africa, such infrastructure development would have to compete for resources with other high priority infra-structure the provision, e.g. for housing, water and sanitation and transport routes.

## **8 CRITERIA FOR SELECTION OF EPR STRATEGIES FOR SOUTH AFRICA**

### **8.1 Priority Products**

If EPR strategies are to be implemented in South Africa, the challenge will be to identify the environmental, social and economic impacts. In 2002 DEAT listed the following as priority products for consideration for implementation of EPR:

- *Electronics*: CRT's, CPUs, VCRs and cell phones;
- *Products containing mercury*:
  - Thermometers, thermostats, electrical switches (including automotive);
  - Fluorescent lamps;
  - Button cell batteries;
  - Products with trace mercury (e.g. soaps, cleaners, shampoos);
- *Pesticides*: Household, commercial / institutional and agricultural;
- *Paint and paint products*: Latex, oil based paints and thinners;
- *Other products/materials*: Tyres, carpets, packaging (e.g., plastics), beverage containers, batteries, appliances, furniture and food wastes.

These products are readily available in South Africa either as local products or as imported goods. The challenge will be to prioritise implementation of EPR for these products, based on the risk they pose to the safety, health and the environment and the implications of implementing EPR.

### **8.2 Legislative Instruments**

A brief overview of EPR legislative instruments worldwide (Schwartz and Gattuso, 2002) identified that in 1998 international legislation was dominated by packaging laws. Additionally, Europe was by far the most well represented as all countries had some form of EPR legislative instruments. This is understandable considering the requirements of the various EU Directives which individual countries must comply with. The table below summarises the results of the Schwartz and Gattuso review.

One of the main aspects of the review was that developing countries have limited EPR legislation. There may be a number of reasons for this:

- uncertainty regarding EPR,
- institutional limitations,
- import to export ratios,
- infrastructure limitations,
- social limitations such as poverty and unemployment, and

- different priorities.

In the DEAT review on Product Stewardship (DEAT, 2002) it was recommended that legislation and policy arrangements needed to be strengthened by the introduction of product-based legislation or policy that is in-line with international practice. Recent local response to this has been the introduction of the Plastic Bag Regulations. This demonstrates that the government of South Africa is willing to implement legislation for EPR, but the experience gained with this initiative has indicated the need to more carefully consider the implications of legislating specific products/commodities for EPR, and the crucial need for the active and extensive stakeholder engagement. Crucial to the selection and prioritisation specific products/commodities for consideration EPR is the development and implementation of appropriate evaluation criteria.

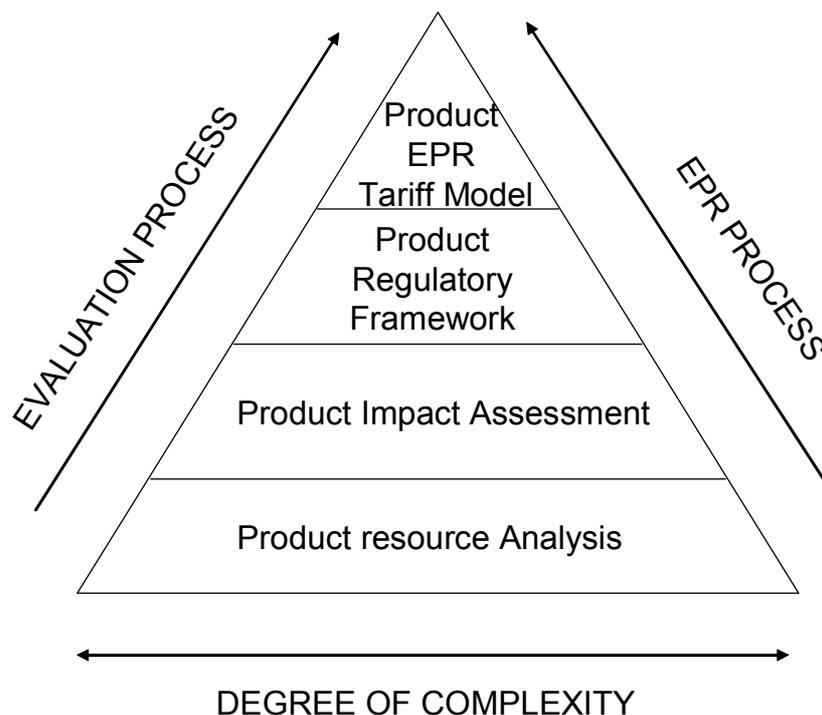
| Nation                          | Products  | Recycling or Recovery Target   |
|---------------------------------|---|--|
| <b>Europe</b>                   |   |  |
| ▪ European Union (EU) Directive | Directive on packaging binding on national governments<br>Directive on electronic equipment | 50% minimum recovery by 2001; 25% minimum recycling rate. Recycling targets vary by product type.                          |
| ▪ Austria                       | Batteries, refrigerators, packaging   | Various materials, 20%-70% recovery.   |
| ▪ Belgium                       | Appliances, batteries, electronics, packaging   | Recovery targets by 2000: 95% ferrous, 85% non-ferrous, 20% plastics; 50% total packaging recovery by 1999.                |
| ▪ Denmark                       | Batteries, packaging (voluntary)  | 54% overall recovery rate by 2000, with 50%-60% industrial waste.  |
| ▪ Finland                       | Packaging   | 82% of packaging recovery.   |
| ▪ France                        | Batteries, packaging  | Follows EU directive.  |
| ▪ Germany                       | Batteries, packaging  | Various materials 60%-75% recovery.  |
| ▪ Greece                        | Packaging   | 25% recovery by 2001.  |
| ▪ Ireland                       | Packaging   | Not Available  |
| ▪ Italy                         | Appliances, batteries, packaging  | Recover 30,000 appliances a year; follows EU directive for packaging.  |
| ▪ Luxembourg                    | Packaging   | 55% recovery.  |
| ▪ Netherlands                   | Appliances, batteries, packaging  | Appliance/battery recovery: 90%.<br>Packaging recycling: 65%.  |
| ▪ Norway                        | Appliances, batteries, packaging  | Appliances: 80% recovery within 5 years; ni-cad battery pilot: 20,000 households; packaging recovery follows EU directive. |
| ▪ Poland                        | Packaging   | Follows EU directive.  |
| ▪ Portugal                      | Packaging   | 25% recovery by 2001; 50% recovery by 2005.  |
| ▪ Slovakia                      | Packaging   | Follows EU directive.  |
| ▪ Spain                         | Batteries, packaging  | Follows EU directive.  |
| ▪ Switzerland                   | Packaging   | Follows EU directive.  |
| ▪ United Kingdom                | Packaging   | Overall target 38%, increasing to 52% by 2001.   |
| ▪ Czech Republic                | Packaging   | Similar to EU directive.   |
| ▪ Estonia                       | Packaging   | 60% recovery by 2001.  |
| ▪ Slovenia                      | Packaging   | Recycling recovery: 48% by 2000; 78% by 2010.  |
| <b>Asia</b>                     |   |  |
| ▪ China                         | Packaging   | Not Available  |
| ▪ Japan                         | Appliances, packaging   | Not Available  |
| ▪ South Korea                   | Packaging   | Not Available  |
| ▪ Singapore                     | Packaging (voluntary)   | 80% waste reduction through recycling.   |
| ▪ Taiwan                        | Packaging   | Not Available  |
| <b>Latin America</b>            |   |  |
| Brazil                          | Packaging   | Specific manufacturers must set up recycling centers for combustible oils, cosmetics, etc.                                 |

### 8.3 Evaluation Criteria

The fundamental criteria for evaluating the necessity of implementing EPR must be based on a holistic assessment of each product. Schwartz and Gattuso (2002) propose that such a holistic assessment needs to consider the following:

- ***What evidence is there to show trends in product “eco-efficiency” (energy and materials use per unit of output)?*** Identifying these trends will disclose whether claims that resources are inefficiently used and waste is increasing are actually valid. Resource efficiency is both a relative and a dynamic concept, so a key question is whether trends are moving toward reductions in resource (and energy) use per unit of output.
- ***What are the relative influences of product design, demographic trends, GDP growth, changes in per capita income, and other factors on materials and energy use and environmental impacts?*** Understanding these influences may reveal the importance of macroeconomic and social factors relative to company decisions in overall consumption and resource-use patterns. If macroeconomic or other social factors are significant, policies that reorganize company incentives may have little overall effect on materials use and waste generation.
- ***What are the key environmental impacts of different product categories?*** In a product life cycle, where are impacts most pronounced - upstream, in the manufacturing phase, in transportation and distribution, in use, or at end-of-life? Understanding these differential impacts is relevant to product policy, since environmental benefits accrue to targeting the most significant impacts. Impacts may vary by product, product category, and location.
- ***What criteria influence product design and process decisions?*** Identifying these influences will help identify those policies and market practices that undermine or slow the search for resource efficiencies and environmental impact reductions. Institutional arrangements that place the costs of end-of-life handling on consumers or taxpayers are only one influence on product-design and process decisions and may vary in their significance from product to product. Other factors, such as relative availability and price of materials, safety and other product performance requirements, may “drive” design decisions more than disposal costs.

The development of criteria for evaluating the need for EPR for a particular product therefore can be encapsulated in the following process:



At the base of the evaluation process is a comprehensive product resource analysis. This needs to consider all aspects of the product cycle from raw materials to final product. Once the product analysis is complete, an environmental impact assessment is required to identify critical high impact points. The definition of environment includes biophysical, social and economic spheres. At this point the regulatory framework needs to be evaluated. Appropriate local and international legislation needs to be reviewed to identify whether the product is regulated whether as a complete product or as a component in another product. The final step in the EPR evaluation process is to determine whether there is a need to invoke some form of tariff for EPR for the product or whether this falls outside of the EPR requirements.

## 9 INPUT FROM NWMSI PROJECT WORKSHOPS

### 9.1 NWMSI Project Inception Workshop

The NWMSI Project was designed in 2001 but due to various circumstances implementation only commenced during 2004. During the intervening period there were various significant developments that had to be taken into account in the final design of the project. The need for an update of the 2001 Project Document, including project objectives, outputs and activities, was identified and the DEAT decided to consult with the relevant key stakeholders from the public and private sectors through an Inception Workshop held during March 2004.

The following concerns about extended producer responsibility (EPR) and related topics were raised for consideration by the NWMSI Project:

- Clarity on who the 'Producer' is;
- Create a common understanding of the concept of EPR among stakeholders;
- Use EPR as a means to emphasize waste minimization;
- Explore opportunities for energy recovery;

- Ban certain waste streams from the landfill sites;
- Create incentives to facilitate recycling;
- Develop legislation that promotes recycling; and
- Consider health and environmental risks and legal implications; and

## **9.2 NWMSI Project Provincial Recycling Workshops**

A series of Provincial Recycling Workshops for the NWMSI Project were held between October 2004 and January 2005. These workshops were held to discuss and consult with stakeholders on the NWMSI Project Recycling Component, with the following specific objectives in mind, i.e. to: Raise awareness at provincial and local level of the NWMSI project; Report on progress thus far; Consult with provinces and local authorities to establish their recycling needs, requirements and priorities; Identify existing provincial and local recycling initiatives; and to discuss the concept and implementation of Extended Producer Responsibility, as well as identifying problematic commodities which could be considered for investigation as potential candidates for a future programme of EPR.

The Workshop attendees agreed that EPR could hold multiple benefits, but it was felt that all those within the product cycle (raw material supplier, production, use and disposal of a product) should share the responsibility for the management and ultimate disposal of the waste associated with the product. EPR should be the joint responsibility of government, manufacturers, and end users.

It was proposed that international producers should be forced by the authorities to apply international best practice when operating in South Africa. When products or commodities are imported an appropriate waste management levy or tax should be applied, and there should be strict monitoring of impacts of such product. Where there is a significant pollution impact, the polluter-pays principle should be applied.

The following products/commodities were identified and discussed as potential priority candidates for EPR: plastic carrier bags, waste tyres, glass and e-waste (waste from electrical and electronic equipment – WEEE; including batteries and fluorescent tubes). The next section gives a brief overview of the status quo in regard to initiatives relating to these products/commodities.

## **10 PRIORITY PRODUCTS: ONGOING AND NEW INITIATIVES**

The ongoing and new initiatives for the following priority products are briefly discussed: the Memorandum of Understanding on Plastic Bags; the Memorandum of Understanding on Glass; the Memorandum of Agreement on Tyres; and the Initiative on E-Waste (Waste from Electrical and Electronic Equipment).

### **10.1 Plastic Bags**

During May 2002 DEAT and the key stakeholders in the plastics sector, i.e. Organised Labour (The Congress of South Africa Trade Unions and National Council of Trade Unions) and Organised Business (Chemical and Allied Industries Association, Plastics Federation of South Africa, Plastic Recyclers Employers Organisation, and The Retailers Plastic Bag Working Group) entered into a Memorandum of Understanding on discarded plastic bags, with the following aims:

- Addressing the problem of dispersed waste (i.e. litter) created by discarded plastic bags in South Africa and encouraging the re-use and recycling of plastic bags. There is a need to address environmental issues, including dispersed waste, in a sustainable manner;
- Adopting an approach for addressing the negative impacts associated with the generation, use, collection, transportation and disposal of plastic bags which will optimise the impacts of the DEAT's regulatory efforts whilst minimising any negative social or economic impacts, especially those relating to workers, the poor, women and rural areas.
- Commitment to taking a co-operative approach towards addressing environmental problems that face South Africa and furthermore reflects the spirit of collaborative partnerships.
- Commitment to a partnership approach to the achievement of sustainable development, which includes social, economic and environmental goals. Sustainable development promotes environmental justice which integrates environmental considerations with social, political and economic justice and development in addressing the needs of all communities, sectors and individuals.

This MOU was signed on 26 September 2002, soon after the World Summit on Sustainable Development, which was held in Johannesburg and built on the spirit of sustainable development enshrined in the Johannesburg Plan of Implementation. The MOU signatories committed themselves to the successful implementation of this partnership. The MOU made provision for the implementation of the Regulations and establishment of a Section 21 company to take the initiative forward. The Plastic Bags Regulations were promulgated by Government in 2003, and aim to reduce the number of plastic shopping bags that are discarded in the waste stream, often landing up as unsightly wind-blown litter. The Regulations limit the thickness of the plastic bags, the type of ink used in printing and proposes the tariffs for purchasing of the bags. The intention is to turn the plastic bag into a value product that is recovered and recycled.

Many practical problems were encountered in getting this initiative off the ground, but the Section 21 company, Buyisa-e-Bag, has been recently (2004) registered and has started functioning. The DEAT is engaging relevant stakeholders to ensure that the terms of MOU, such as establishment of standards, are adhered to. The problems with the collection and proper utilisation of the 3c levy per carrier bag are also being addressed.

## **10.2 Glass**

A Memorandum of Understanding has been jointly developed between the Department of Environment Affairs and Tourism (DEAT) and the key stakeholders in the Glass sector, i.e. the Glass Manufacturers, the Users, the Recyclers and Collectors, the Processing Sector, Organised Labour, Consumer Organisations, and the Consumer Goods Council of South Africa. The MOU provides an industry-wide structure that will facilitate a process to achieve the following objectives:

- Promote the reuse and recycling of glass containers in South Africa in order to minimise waste of glass, facilitate environmental awareness in regard to these

- issues and effect sustainable environmental improvements;
- Put in place an industry wide structure which will facilitate a substantial increase in the collection, recycling and/or reuse of used glass in the industry;
- Increase the number of jobs in both the informal and formal sectors of the South African economy, more particularly in the glass industry as regards the collection, recycling and re-use of glass containers;
- Commit the MOU signatories to job creation in these sectors taking into account the objectives of transformation and employment equity, the establishment of buy-back centres and the transfer of skills to previously disadvantaged individuals; and
- The MOU signatories will endeavour to ensure that no exploitation of workers occurs in the glass industry as regards to the collection, recycling and re-use of glass containers.
- The MOU makes provision for a structure (a Section 21 company) to implement the objectives of the MOU, for the setting of targets, for the establishment of a task team, and defines the roles and responsibilities of all the Parties to the MOU.

• The glass MOU has been redrafted to address the concerns of the Competition Commission and there is a strong commitment both on the side of Government and the industry to have the redrafted MOU signed in the near future (April 2005). A task team has been established to prepare for the launch of the MOU.

### **10.3 Waste Tyres**

A Memorandum of Agreement (MOA) is being jointly developed between the Department of Environment Affairs and Tourism (DEAT) and the South African Tyre Recycling Process Company (representing the Tyre Suppliers and the Waste Tyre Users). The aim of the MOA is to promote the collection, recycling, reuse and reduction of waste tyres in South Africa and in particular to reduce the amount and volume of tyres littering the country. Certain aspects of the MOA are still being finalised and it is hoped to sign a final MOA in the near future.

Government has drafted a Tyre Regulation which is to be published in the near future for public comment. The tyre industry (including the manufacturers, importers, and retreaders) has registered a Section 21 company to manage the process, of which three key functional areas have been identified:

- Management of a sustainable collection process for waste tyres;
- Promotion of the expansion of the waste tyre industry; and
- Conducting of a public awareness and support programme in respect of environmentally sound disposal of waste tyres.

It has been proposed that financing for the company and the programme will be raised by way of a 'green fee' or levy. The intention is for the Section 21 Company to raise a levy on new tyres. The levy is to be paid to the Section 21 Company by the tyre dealers who will pass it on as a line item to the customer (VAT payable). Most of the levy (about 85% will be used to collect and transport the used tyres (via appointed contractors) to for recycling, e.g. 5% of vulcanised rubber can be recycled to industrial tyres and the remainder can be used as additives to tar, tiles and bricks. Tyre dealers will have the responsibility to assess whether a second hand tyre is suitable for retreading; if unsuited the tyre will be shredded for authorised collection and reuse. Government is considering the prohibition of landfilling tyres.

A number of issues are still under discussion with regards the new tyre recycling initiative:

- Which authority will monitor and audit the Section 21 Company;
- A mechanism for incorporating Historically Disadvantaged Individuals in the initiative?; and
- The need for Government to legislate on conditions when a tyre has to be withdrawn from use for recycling.

#### **10.4 E-Waste**

Waste from Electrical and Electronic Equipment (WEEE), known as e-waste, is rapidly increasing in South Africa (EMPA, 2005 and Basel, 2005). As part of a Swiss initiative, "Knowledge Partnerships with Developing and Transition Countries in e-Waste Recycling", an investigation to assess the management, handling and practices of e-waste recycling in South Africa, using the computer hardware industry as the indicator, with Gauteng as the study area, was launched in February 2004. The main findings of the initiative are briefly set out below.

E-waste is a relatively new concept in South Africa at present, and there is no legislation regarding its handling or recycling. Most of the e-waste material is stored and eventually disposed of in municipal landfill sites. Some commercial manufacturers and distributors pay for the disposal of e-waste in permitted hazardous waste disposal sites, obtaining a certificate of safe disposal from the contractors that carry out that work. Waste originating from these sources is thus generally buried inaccessibly in permitted hazardous waste disposal facilities, e.g. the Holfontein H:H Landfill in Gauteng. There are currently no organised take-back systems and no licenses are required to sort or dismantle e-waste. This function is performed by scrap metal merchants. Recycling companies include Universal recycling company and Desco Electronic Recyclers. Rand refinery is the principal refinery located in Johannesburg. Investigations have shown that very little informal e-waste recycling occurs, due to the strict precious metal regulations that are in place.

The E-waste Initiative has recommended a 'Cradle to Cradle' approach, i.e. a WEEE (Waste Electronic and Electrical Equipment) system, which encourages the maximisation of repair, re-use and recycling, effectively reducing the amount of e-waste going to landfill. The following strategies have been proposed for minimising E-waste (Lombaard et al., 2004): The establishment of an E-Waste Interest Group managed by the ICT Industry, the creation of employment opportunities with recovery of old machines from storage through buy-back centres, and the extension of equipment life cycles through the use of open source software. The E-waste Working Group has been established and has held three meetings to date. It has attempted to elicit a wide membership of relevant role-players and stakeholders. The following five task teams have been appointed and are currently pursuing their designated areas of focus: Policy and Legislation, Extended Producer Responsibility, Background Information, Recycling Systems, and Public Relations and Campaigns.

## 11 CONCLUSIONS AND RECOMMENDATIONS

There is no single model of EPR which is universally used; the systems implemented internationally share no common set of goals, no uniform regulatory structure, and no comparable pricing schemes (Schwartz and Gattuso, 2002). Hence, an EPR process for South Africa would need to be developed on a product specific basis. As a first step a list of potential priority products were identified, based on the DEAT Product Stewardship Study (DEAT, 2000) and consultation with the relevant role-players and stakeholders through the NWMSI Project Inception Workshop and Provincial Recycling Workshops. Based on these processes the following products (groups of products) have been prioritised for further investigation and implementation for extended producer responsibility:

- The full implementation of the Memorandum of Understanding on the Plastic Bag;
- The conclusion and implementation of the Memorandum of Understanding on Glass;
- The conclusion and implementation of the Memorandum of Agreement on Waste Tyres;
- The support, development and implementation of the E-Waste Initiative.

The experience gained and lessons learnt from the implementation of the Plastic Bag Initiative over the last three years, could be used with benefit to guide the more effective and efficient implementation of future EPR initiatives for other products/commodities.

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