EXTENDED PRODUCER RESPONSIBILITY

Putting Responsibility Where It Belongs

Recommendations for the Massachusetts
Beyond 2000 Solid Waste Master Plan

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The solid waste problem has led to increased interest by many government policy makers and business leaders in the United States and across the world in Extended Producer Responsibility (EPR), an emerging concept which shifts the responsibility and costs for managing products at the disposal stage from the consumer and local taxpayer to the manufacturers of those products.

The promise of EPR is, as the producers of goods start taking responsibility for their products after the end of their useful life, that these producers will reevaluate their product design, toxicity, and recyclability, and will be better motivated to reduce the toxicity of products and to maximize their recyclability.

EPR is an emerging idea for pollution prevention that, when fully implemented, could play a substantial role in reducing the solid waste management costs of the cities and towns in Massachusetts while helping reduce toxic contamination of the environment. EPR deserves to be included as an important component of the states new *Beyond 2000 Solid Waste Master Plan*, which is intended to plan for our solid waste management needs for the next decade, from 2000-2010.

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I. INTRODUCTION

Extended Producer Responsibility (EPR) is an emerging principle for a new generation of pollution prevention policies that focus on product systems instead of end-of-pipe regulation at production facilities. The objective of EPR is to encourage producers to prevent pollution and reduce resource and energy use through changes in products and through taking responsibility for the product after the end of its useful life.

Policy tools to impose this responsibility on producers include:

- *physical responsibility* -- where the producer is physically involved in the management of the products, used products, or the impacts of the products;
- *economic responsibility* - where the producer covers all or part of the cost for managing waste at the end of a products life (collection, processing, treatment, recycling, disposal)

- *liability* - where responsibility for the environmental damage caused by a product, in production, use or disposal, are borne by the producer;

The EPR concept is concerned in general with reducing the environmental impact of a product through the entire life-cycle of a product from extraction of raw materials for manufacture, in manufacture, packaging, and distribution, and finally to the collection and management of the product after its useful life:

- EPR internalizes "*end of life*" management costs into the costs of producing products provides incentives for manufacturers to think differently about the resources and materials used in the products, so that the recycling, reuse and toxicity are considered at the product design stage.
- EPR is really a "*market-based*" approach which builds the post-consumer stage of products into a company's bottom line. It is then up to the company to determine how products should be designed or what materials they should be made out of; the objective is to send the correct economic signals and than leave the industry free to innovate. EPR gives a competitive advantage to less wasteful, more economically recyclable products.
- EPR is an application of the "polluter pays" principle. EPR broadens the definition of "polluter" to mean "*the person or organization that produces a good (products or services) that at the end of its useful life is considered a waste*".
- EPR recognizes that the environmental impacts of resource depletion, solid and hazardous waste, and pollution, are a function of the system of production. To reduce these negatives, we need to introduce a feedback loop through EPR for producers to direct their investments towards those outcomes.
- EPR "*closes the loop*" of the product life cycle so the producers who are ultimately responsible for designing the product get their products back and then assume full responsibility for the full life cycle costs for the product.

EPR has been fully embraced as a concept in many other industrialized countries, and EPR programs for various products are in operation in Germany, Belgium, Japan, Austria, British Columbia, Sweden, the Netherlands, Norway, Taiwan, and Switzerland. The U.S. lags behind on this system that will increase the resource efficiency of the economy. Many corporations will have to comply with EPR policies for their products in other countries, but not in the U.S. market.

This report will focus primarily on the responsibility of the producer to manage the product after the end of its useful life. While the focus of this report is on how a producer can be required to take the burden off the municipality to collect discarded products, it should be recognized that requiring the producer to take that responsibility can also serve as an incentive for the producer to:

- take aggressive waste prevention measures;
- use less toxic materials and processes;

- develop closed materials cycles
- develop more durable, less obsolescent, products;
- develop more recyclable and reusable products;
- develop greater infrastructure for recovery, reuse, and recycling;
- assume the costs for pollution prevention, consistent with the "*polluter pays*" principle.

EPR is similar and is closely allied with the concepts of "*product stewardship*" and "*design for environment*," which are programs where the producer of a product takes responsibility to reduce the environmental effects throughout the entire life-cycle of the product.

II. THE PROBLEM

Traditional environmental regulation has focused on controlling the pollution outputs from the end-of-the-pipe from individual facilities without regard to the connections to other stages of the product chain. While this approach has been changed in the area of hazardous waste, by changing the focus from end-of-the pipe to pollution prevention and toxic use reduction, that approach has not yet been applied to the pollution resulting from the products themselves, which results in what is called solid waste -- the disposal of the discarded product after the end of its useful life.

Under the traditional view of environmental responsibility, solid waste management has been considered to be the responsibility of the individual household and the local city or town. Even waste reduction programs have usually focused on what the homeowner or consumer can do to reduce waste, not on what the producer of, say, a product with excessive packaging, should be doing to reduce waste. We must recognize that the design of products is the most critical step in determining the nature and quantity of pollution created by a product and the pollution outputs by the product through its entire life cycle and at the end of its useful life.

Massachusetts is generating an increasing quantity of solid waste each year, which increases the annual solid waste management costs for the cities and towns. Solid waste generation has increased from about 6,750,000 tons in 1990 to about 7,800,000 tons in 1998. Nationally, the total cost of residential disposal and recycling of Municipal Solid Waste (MSW) has increased from $23 per ton in 1984 to $70 per ton in 1997. As solid waste costs have been increasing, this has put an increased burden on local budgets, taking away funds that could be used to fund other priority local programs such as education.

These solid waste management costs can be considered an "*unfunded mandate*" imposed by the producers of goods and packaging. While the recycling rate has also increased, from 10-36% in that same time frame, municipalities are still bearing an increasing cost for disposal and management of solid wastes generated within their borders. These costs are paid for by individual taxpayers through their property taxes. So, while consumers pay for the products in the first place, they then also have to pay

for the recycling or disposal of that product at the end of its useful life. Yet that cost is hidden to the consumer, and therefore does not impact purchasing decisions. Product prices that do not reflect this end-of-life use, give a false signal to the economy, resulting in enormous waste and inefficiency in use of resources.

Municipalities also have to pay an additional amount each year to remove toxics, in what are termed household hazardous products (HHP), in their annual HHP collection days. Cities and towns sponsor these annual collection days to separately collect items such as pesticides, herbicides, pool cleaners, photography chemicals, etc., and some cites and towns are beginning to install permanent collection stations for these items. This costs the cities and towns an estimated[1] $2,000,000 a year total through property taxes, for this small (about 1%) but critical component of the waste stream. Even though relatively expensive, compared to other local solid waste management costs, these collection days and facilities only remove a small percentage of HHP from the waste stream.

However, an economic analysis of the implications of a cradle-to-grave responsibility will inevitably question the feasibility of producing and selling short-life, disposable goods designed for obsolescence, and will question the economic feasibility of re-processing toxic materials contained in used products and will question the use of multiple and composite materials as well as the design of products whose components cannot be reused or the material they are made of cannot be recycled.

LARGE QUANTITY OF COMPUTER & ELECTRONIC WASTE. Electronic products, in particular, create a solid waste problem because of their quantity:

- DEP estimates that 500,000 tons of old computers could enter the Massachusetts waste stream in the next 1-5 years.
- Cathode Ray Tubes (CRT's) are expected to increase from the current 75,000 to 90,000 tons per year of waste to about 300,000 tons annually by 2005.
- Nationally, about 325 million personal computers will become obsolete by 2005.
- About 17% (55 million) will be disposed of in landfills, 44% (143 million) will be recycled), and about 39% (127 million) will be repaired, reused, or stored.
- The amount of computers and electronics sold are expected to increase in the next 15 years.

Electronic products are a particular problem because:

- The upcoming forced obsolescence of television sets when digital transmission television will be required in 2006.
- Short innovation time has increased obsolescence and reduced the life-cycle of computer hardware. As computer sales increase, currently at about 15% a year,

[1] Based on the average $331/1000 population cost incurred for twelve towns on the South Shore for their recent hazardous household products collections days, which cost $75,164 to collect the Household Hazardous Products from 2,612 residents.

obsolescence also increases. It has been estimated that currently that for every three computers purchased, two become obsolete.

- By 2005, it is estimated that for every computer purchased, one will become obsolete. In 1997 the average lifespan of a computer was 4-6 years and monitors 6-7 years. This lifespan is expected to fall to 2 years for each by 2005.
- Miniaturization of electronic equipment reduces the volume of waste, but makes collection, repair, and recycling more difficult.
- The relative costs between repair and replacement of electronic equipment have changed, so that repair is only economical for very expensive or large electronic products.

TOXICS FROM COMPUTERS & ELECTRONICS. Electronic scrap, including computers, are considered hazardous according to the Basel Convention Technical Working Group. The toxics in electronics and computers include:

- Cathode Ray Tubes contain lead in toxic amounts when landfilled or incinerated.
- Cadmium is contained in circuit boards semiconductors and other components. In the estimated 325 million discarded computers by 2005 this represents more than 2 million pounds of cadmium nationwide.
- Mercury is used in batteries, switches, and printed wiring boards. In the estimated 325 million discarded computers by 2005 this represents more than 400,000 pounds of mercury nationwide.
- Hexavalent chromium is used as corrosion protection of untreated and galvanized steel plates and as a hardener for steel housing. In the estimated 325 million discarded computers by 2005 this represents more than 1.2 million pounds of Hexavalent chromium nationwide.
- PVC plastic is used in cabling and computer housings, and represents a potential of about 250 million pounds per year of waste per year nationwide. PVC releases toxic dioxins and furans when burned.
- Disposal of electronics also causes an environmental problem, since toxic leachate is created when landfilled and toxic air emissions are created when incinerated.

There are also a plethora of other electronic items we now use, games, video cameras, phones, CD players, and are also constantly becoming obsolete.

III. EXTENDED PRODUCER RESPONSIBILITY: HOW IS IT APPLIED?

Examples of EPR programs from around the world:

- THE GREEN DOT PROGRAM. Germany's Ordinance on the Avoidance of Packaging Waste (the "Green Dot" program), the first mandated EPR program, placed the financial responsibility for collecting and reducing packaging waste on manufacturers. The results of this program include:

    - between 1991 and 1995, reduced overall packaging use by almost 11%, when the US increased discard of packaging waste by 14%

- reduced packaging going to landfills by about 60%; while the US diverted only about 4% of packaging waste;
- reduced secondary packaging (such as outer packaging and shipping containers) by 80%.
- outer secondary packaging has nearly disappeared;
- detergent packaging consists of a thin layer of plastic and thin paperboard;
- electronics packaging uses more corrugated or molded pulp for cushioning rather than plastic foams; and
- reusable crates have grown in use for grocery and other sectors.

- **PRODUCT CHARGES** - Belgium imposes "eco-tax" on polyvinylchloride plastic (PVC) to discourage PVC use
- **ADVANCED DISPOSAL FEES** - Advanced disposal fees are charges to manufacturers for the up front for cost of disposal; which is then offered as a refund for consumers to handle the waste product in a certain way. Such fees are charged for refrigerators in Austria and cars in Sweden.
- **PRODUCT STEWARDSHIP.** British Columbia has programs in place which require producers to take responsibility for the collection of used motor oil, household paint, and beverage containers. This is accomplished through the imposition on the sale price of a product an "eco-fee" which is designed to account for the cost of properly disposing of the product by the manufacturer.
- **INDUSTRY PROGRAMS.** Compaq Computer, Hewlett Packard, and IBM, for example, have product stewardship programs in place where the companies examine live-cycle environmental impacts and have changed product design to improve environmental impacts. Xerox dismantles used copier cartridges and cleans, sorts and repairs them.
- **TAKE BACK PROGRAMS**; examples from throughout the world
  - Netherlands mandates take-back by manufacturers for household appliances, computers, and telecommunications equipment.
  - Sweden, Norway, Taiwan, and Switzerland adopted legislation, to take effect in Norway on July 1,1999 and in Sweden on January 1, 2000, that requires manufacturers of electronic and electrical goods to provide free end-of-life care for their products though licensed handlers. The Norwegian law allows consumers to take discarded white goods, personal computers, telephones, cables, electronic and industrial electrical materials free of charge to dealers of local authority collection points; financed by a "recycling charge" on such products at the point of sale.
  - Italy requires take back for refrigerators
  - Japan: take back required for refrigerators, air conditioners, TV's and washing machines (allows companies to charge end user for the "service")
  - Vehicles: Sweden mandates free take back for end of life vehicles (ELV) . The European Union is working on a directive to require EPR for ELV. France & Germany have negotiated take-back programs for ELV with industry
  - USA: the only nationwide take-back program is for NICKEL-CADMIUM BATTERIES a "voluntary" industry-sponsored program established through federal legislation enacted in 1996 through the non profit Rechargeable

Battery Recycling Corporation (RBRC) that manages the collection and recycling of Ni-Cad batteries (formed after 8 states mandated take back of Ni-Cad batteries).

An effective EPR program for electronics products, for example, can result in the following types of improvements that can increase reuse and recyclability:

- product simplification
- standardization of components, and product configuration;
- modular designs, including components for reuse
- standardization of material types;
- easily detachable parts;
- reduction in number of parts that require dismantling;
- accessibility of components; and
- reduction in material types to reduce sorting.

IV. EXISTING EPR PROGRAMS ON A STATE LEVEL

Effective EPR programs *can* be implemented on a state level, through mandates imposed by state laws, regulations, or policies. While nationwide EPR programs are preferable, Massachusetts could take action on its own to place the responsibility for collection of used products on the manufacturer. For example:

- **Advanced Disposal Fees**. Three states impose Advanced Disposal Fees on white goods - Maine ($5 on retail sale, North Carolina, $10 with CFC's or $5 without; South Carolina, $2 at wholesale). More than half the states have advanced disposal fees for tires. San Jose, California requires payment of an advanced disposal fee for construction materials.
- **Deposit Refund Systems**. The "bottle bill" is the oldest and most pervasive EPR take-back program in the United States, and is implemented for beverage containers on the state level by state law in 10 states including Massachusetts (on some containers but not all).
- **Mandatory Take Back**. A few states require retailers of lead-acid batteries to accept spent batteries from consumers. Some states, such as Minnesota, require manufacturers of rechargeable nickel-cadmium batteries or products containing those batteries to take them back at the retail store.

The experience to date shows that effective EPR programs:

1. Extend producer responsibility to the post-consumer stage (to encompass disposal and recycling).
2. The product responsibility is always physical and/or financial; the producers either take back the product physically themselves or hire a third party (called a "producer responsibility organization or "PRO") to do so.
3. Guidelines or requirements, usually set by government, require specific reporting requirements, recovery rates, recycling rates, etc.

4. Mandatory programs usually work better than voluntary programs
5. State-level programs work best that target wastes with toxic constituents and problem wastes (white goods, automobile "fluff", mercury, PVC, etc.)

V. PROPOSED EPR PROPOSALS FOR MASSACHUSETTS

We propose that the Cellucci Administration, in the Beyond 2000 Solid Waste Master Plan, include the following EPR program elements:

Recommendation - EOEA SHOULD FILE EPR LEGISLATION

- The Beyond 2000 Solid Waste Master Plan should plan on EOEA Secretary Durand filing EPR legislation for the next biennial (2001-2002) legislative session (which must be filed by December 2000), to provide government mandates for required producer take-back of certain products, which may include the following:

  (1) **TOXIC CONSTITUENTS** - all products containing mercury; also PVC, lead, and other identified priority toxic chemicals; which even though their total tonnage is not high their total impact is, because of toxicity. (*For example: Massachusetts and other New England states are now considering EPR legislation to require producers to take responsibility for the collection of mercury-containing products*.)
  (2) **HOUSEHOLD HAZARDOUS PRODUCTS** - paint, pesticides, motor oil, etc. (i.e., the products municipalities spend money for their HHP collections); while the tonnage of these items is not large, their cost to local communities are and their toxic impact is.
  (3) **BULKY/PROBLEM WASTE** - white goods (refrigerators, freezers, washing machines, dishwashers, dryers, etc.), large appliances, air conditioners, mattresses, etc. (These wastes are a headache and often costly and difficult for municipalities to dispose or recycle.)
  (4) **ELECTRONIC EQUIPMENT** - computers, monitors, CRT's (DEP estimates that 500,000 tons of old computers could enter the waste stream in the next 1-5 years.) Because of the rapid obsolescence of these products, and their toxic constituents, electronic equipment, including computers and monitors (and other CRT's) deserve to be considered for take back requirements.
  (5) **VEHICLES** - we should require car manufacturers to provide for the end of life collection of used vehicles; while the bulk of a vehicle and is usually recycled, there are still toxic residue (called "fluff") remaining that needs to be managed:

    - An estimated 94% of the 10-11 million cars and trucks junked each year in the US are returned to dismantling and shredding facilities for recycling.
    - About 75% of the vehicle, by weight, is recycled at these facilities.

- The 25% not recycled is the plastics and fibers, usually contaminated with gasoline and motor oil, called "fluff", is a substantial waste stream.
- About 2.5 - 3.0 million tons of such "fluff" is disposed of in solid waste landfills in the US each year.
- Auto "fluff" is not usually considered a hazardous waste, but has been known to fail EPA toxicity tests so its disposal is restricted in MSW landfills.

VI. CONCLUSION

EPR is an emerging force throughout the world, and is being increasingly accepted by both businesses and governments. There are specific, concrete EPR programs that could be adopted in Massachusetts and should be considered by the Cellucci Administration in the new solid waste master plan.

Massachusetts led the way for the nation with its innovative Toxics Use Reduction Act that focuses primarily on hazardous waste and the reducing the use of toxic chemicals in the production process. Now Massachusetts should lead again with a focus on product disposal and redesign.

The recommended EPR programs for Massachusetts could be effective in

(a) reducing toxicity of waste,
(b) reducing the tonnage of waste that needs to be disposed of;
(c) reducing municipal solid waste costs, and
(d) encouraging more sustainable production processes for the entire life-cycle of products, thereby reducing air and water pollution.

The Beyond 2000 Solid Waste Master plan would be incomplete without a firm commitment to *implement* EPR programs in Massachusetts. **We urge the Cellucci Administration to include a commitment to adopting Extended Producer Responsibility in the Beyond 2000 Solid Waste Master Plan.**