Reason Public Policy Institute

Extended Producer Responsibility:

Reexamining Its Role in Environmental Progress

This backgrounder was adapted from Reason Public Policy Institute Policy Study 293, *Extended Producer Responsibility: Reexamining Its Role in Environmental Progress*, by Dana Joel Gattuso and Joel Schwartz. The full text of the study may be downloaded free of charge from the Reason Web site at

http://www.RPPI.org/PS293.html

A Shifting Environmental Focus

Purveyors of environmental policy, once preoccupied with pollution from the production of goods and services (factory emissions, etc.) and the use of these goods (electricity consumption, automobile emissions, etc.) have increasingly turned their attention to the environmental impacts of products after their useful life (recycling, reuse, disposal, etc.).

Within this context, one concept—extended producer responsibility (EPR)—has captured the fancy of policymakers globally. Proponents of the idea argue for "a new generation of pollution prevention policies that focus on product systems instead of production facilities." EPR rests on the idea that if manufacturers pay for the post-consumer (waste) impacts of products, they will design them differently to reduce waste.

Many policies and programs—both mandatory and voluntary—potentially fall under the EPR umbrella including mandatory take-back programs with recycling targets, deposit-refund systems, environmental fees on products, materials-use restrictions, and voluntary private-sector programs of product leasing, take-back, and "green" design consortia.

All these programs and policies aim, in various ways, to influence product design. However, the concept of EPR has been most consistently identified with programs that require firms to "take back," recycle, or reuse (either directly, or indirectly by contracting with a third party) their products when discarded by the end user.

Thus, most mandatory EPR programs impose manufacturer-paid fees on targeted products and establish specific take-back goals for each targeted material or product. Product take-back programs have taken root internationally. Over 25 nations have some form of EPR program for packaging—the most celebrated program being Germany's packaging ordinance, which gave rise in 1991 to its privately operated Green Dot program. Nearly two dozen nations, including the United States, have EPR programs for some batteries. Others are rolling out EPR programs for automobiles, electronic and electrical equipment, appliances, and other products.

The Age of Dematerialization

Most proponents of EPR assume that current product-design practices are deterring efficient resource use and do not adequately mitigate environmental impacts. Yet product-design trends belie this assertion. Manufacturers are moving toward reduced material use per unit of output, reduced energy use in making and delivering each product, and improved product performance, including environmental performance without EPR measures:

- *Consumption per unit of economic activity generally declines over time.* Researchers at Rockefeller University and University of Texas concluded that "assessment of consumption per unit of economic activity shows a dematerialization in physical materials of about one-third since 1970."
- *Consumption of materials per unit of output also declines over time.* The same researchers concluded that "each new material shows improved physical properties per unit quantity,

> thus leading to a lower intensity of use." They amplify this point by noting that, "with regard to industry, encouraging examples of more efficient materials use exist in many sectors, functions, and products. Firms search for opportunities to economize on materials, just as they seek to economize on energy, labor, land, and other factors of production."

These trends in dematerialization recur across many materials and product types, including automobiles, electronic equipment, and appliances (see table below). Packaging, the focus of many early EPR programs, showed dramatic and persistent dematerializing trends in the United States predating introduction of any up-front fees or take-back programs. For example, grocery packaging as a percentage of total municipal solid waste dropped between 1980 and 1993 from 15.3 percent to 12.1 percent, despite a population increase of 14 percent over the same time period.

Reductions in weight and volume of materials used reflect only part of the environmental improvements induced by these changes in materials use. These changes often introduce large "spillover" environmental benefits. Downsizing a juice package by 16 percent and the label size by 10.7 percent, for example, saved one manufacturer 20,000 pounds of materials, more than 500 truckloads of outgoing freight, 20,000 shipping pallets, 7,000 pounds of stretch wrap, and 250,000 square feet of chilled warehouse space. Similar environmental benefits can be identified in the dematerialization trends of various other products like consumer electronics, automobiles, and appliances.

Though intuition might suggest that EPR programs would speed up the pace of product dematerialization, it is not clear that they do so. For example, fees set to reflect recycling costs and, thus, encourage "design for recyclability" may discourage source reduction and materials conservation achieved through use of laminates, composites, plastics, and other modern materials because they may be more difficult to recycle.

How Do EPR Programs Perform?

What does the record to date show? Germany's celebrated take-back program for packaging has a mixed record, with high costs for performance achieved. Under its Green Dot EPR program, Germany exceeded its waste-recovery targets. But over the same time period, with no EPR system in place, the United States experienced even greater reductions in total packaging used per unit of output. Canadian packaging manufacturers, who set a voluntary reduction target of 50 percent in packaging sent for disposal, achieved that goal four years ahead of schedule with no EPR and at lower costs than Germany. The Netherlands also had a voluntary approach to packaging reductions under which packaging consumption declined 6 to 15 percent per year in the initial years, dropping to 1.5 percent in later years. Overall reductions in packaging consumption were stronger in the Netherlands than in Germany.

Benefits from mandatory electronics take-back programs are undocumented or ambiguous. And, such mandatory efforts run the risk of reversing light-weighting trends, with implications for shipping costs and energy use. At the same time, costs are quite significant, estimated to average 5 to 15 percent of the manufacturing costs of electronic equipment. State pilot projects to collect and recycle electronic equipment in the United

Average Weight per Appliance Unit Discarded

	1972		1987		% Weight Change/Unit
	Avg. Size	Avg. Lb./Unit	Avg. Size	Avg. Lb./Unit	
Range	36 in.	245.57	30in.	203.29	-17.18
Refrigerator	7.5-8.4 ft^3	299.67	11.5-14.4 ft^3	373.63	24.68
Washer	12-lb load	245.57	Std. Size	207.36	-15.56
Dryer	10-lb load	191.22	Std. Size	150.71	-21.19
Dishwasher	Std. size	136.88	Std. Size	142.50	4.11

Source: Franklin Associates, *Analysis of Trends in Municipal Solid Waste Generation: 1972–1987*, pp. 2–4.

States have cost anywhere from $0.17 to $0.50 per pound. In California, the average cost per pound of electronic equipment waste collected was $0.29 per pound.

Moreover, some EPR programs may have direct negative environmental consequences. For instance, recycling and reusing one ton of waste from television sets, as proposed in Europe, would actually increase carbon dioxide emissions by 29 percent and acidic air pollutant emissions by 18 percent in England. It is crucial that such environmental costs be included in efforts to calculate environmental benefits of recycling requirements.

A Problem Already Repairing Itself?

Though mandated programs may generate costs with few environmental gains, some voluntary programs are also emerging in the "industrial ecology."

Effectiveness of voluntary EPR programs depends on a number of factors. How well these programs perform depends on program design and the nature of the production and consumption marketplace within which the program operates. The failure of voluntary EPR programs to emerge in some instances is not evidence of market failure. It is an indication that manufacturers anticipate more costs than benefits to their consumers from these programs; and that some barriers (for example, disadvantageous tax treatment for leased rather than purchased products) may inhibit introduction of take-back programs. If benefits from EPR in a particular situation appear likely to accrue, those potential benefits represent an entrepreneurial opportunity that will, over time, attract investment.

Industrial ecology—market-driven innovations to add economic value through investing in environmental improvements to products and manufacturing processes—offers a more comprehensive framework than EPR for achieving environmental benefits. It involves a systematic search by manufacturers for opportunities to reduce environmental impacts as a source for cutting costs or increasing customer benefits.

Conclusion

Twenty-first century environmentalism will increasingly move toward decision processes that routinely blend environmental considerations into product-design and manufacturing decisions. Moving toward this "industrial ecology" involves experimentation in product development and new technologies as well as in organization strategy and institutional design.

As consumers press for continued environmental protection, firms competing in the marketplace are stepping up their efforts to add "environmental value" to their customers through new products, new services, and new organizational arrangements. In other words, markets are serving as a discovery process in which part of the search for adding value involves experimenting with new manufacturer-supplier-customer relationships.

Mandated EPR programs override this discovery process, forcing the creation of take-back schemes into a regulatory framework that prescribes institutional arrangements. Like earlier environmental regulations that prescribed technological responses, such mandates stifle innovative market processes, impose uniform procedures for diverse circumstances, and, because they are mandatory, necessitate the acquisition and reporting of large amounts of implementation and compliance data.

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