

What is the Effect of Extended Producer Responsibility (EPR) on Design for Recyclability and Durability?

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» Research Questions Addressed

How do different policy requirements influence strategic design choices such as recyclability and durability?

How can policymakers set requirements to achieve desired results while avoiding unintended consequences?

» Primary Findings

Durable goods producers can respond to EPR legislation by making their products either more recyclable or more durable; the former will decrease the unit recycling cost whereas the latter will reduce the volume the producer has to recycle. While recyclability and durability both affect the environmental impact of durable goods, the attributes are not always complementary. In many instances, improving durability lessens recyclability, and vice versa.

When there are design tradeoffs, the relative stringency of recycling targets and collection targets determined by policymakers have the potential to incentivize different design choices—and ultimately different environmental outcomes. A numerical study calibrated to the Photovoltaic Panel industry suggests that stricter EPR legislation, if not properly designed, may result in an increase in greenhouse gas emissions or total waste generation—precisely the opposite of the intended goal of such legislation.

» Relevant Sectors

Government
Manufacturing
Retail
Waste Disposal

» Keywords

Durability
Extended Producer Responsibility (EPR)
E-waste
Recyclability
Take-back legislation
WEEE Directive

» Firms/Industries Appearing in Research (partial list)

Photovoltaic panel (PVP) solar
Durable goods
Honeywell
Cisco
Samsung
Sony





Box of E-waste. Image: Eco-Business.

» Topic Overview

Extended Producer Responsibility (EPR) is a policy concept that requires producers to finance the management of their end-of-life products through environmentally friendly processes such as recycling. Its goal is to create incentives for producers to design products with environmentally superior attributes.

EPR is gaining interest in step with increasing interest in circular economy concepts. In the U.S., 23 states have incorporated some aspect of EPR for E-waste. Similarly, 27 countries are covered by the European Waste Electrical and Electronic Equipment Directive (WEEE Directive).

» Link to Article

Design Implications of Extended Producer Responsibility for Durable Products. Forthcoming in *Management Science*.
Working Paper (2017), Georgia Tech Scheller College of Business Research Paper Series

» Related Links

The EU Circular Economy Package, *European Commission*

» Highlights

The paper is about the trade-offs (for the producer and policymaker) faced when choosing to focus effort on dichotomous strategies: recyclability versus durability for the designer and recycling targets versus collection targets for the policymaker.

When durability and recyclability can be improved with the same design choices, stricter EPR legislation always improves both.

When producers face cost trade-offs between durability and recyclability, stricter EPR legislation may lead to unintended consequences: more stringent recycling targets or collection targets may lead to less durable or less recyclable products, respectively.

Despite their seeming interchangeability, recycling and collection targets may impact recyclability and durability in opposite directions.

» Implications for Sustainable Business

EPR implementation models that have been successful for product categories such as packaging or batteries may not work for durable goods. Depending on the type of product, policy targets may lead to trade-offs, as well as counterintuitive effects, for design choices affecting recyclability and/or durability. Consequently, policymakers should carefully evaluate the environmental implications of different EPR stringency level choices on a product-by-product basis for durables.