Operationalising the 'Polluter Pays Principle'

Extended Producer Responsibility and Circular Economy: Three Design Flaws

The existing system of Extended Producer Responsibility focuses on waste generation on the national level. To account for the international trade of waste and second-hand products the concept of Ultimate Producer Responsibility is a promising approach.

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Extended producer responsibility (EPR) emerged as a means of operationalising the "polluter pays principle", promoting the idea that those who produce pollution should bear the costs of post user-phase recycling. It was introduced as a policy instrument in the early 1990s by various countries such as Germany, Sweden, France and the Netherlands. During the 2000s, EPR was adopted at the European level as a part of the waste management legislation for end-of-life vehicles, waste of electrical and electronic equipment and batteries. In the Waste Framework Directive (2008/98/EC), the justification of EPR was "one of the means to support the design and production of goods, which take into full account and facilitate the efficient use of resources during their whole life cycle including their repair, re-use, disassembly and recycling without compromising the free circulation of goods on the internal market" (Consideration 27). A few hundred EPR schemes have been created for a wide variety of product groups in EU member states. Often these EPR schemes cover a whole country, but in various countries multiple (regional) systems co-exist.

EPR evolved through administrative, economic, and informative instruments with sole focus on enabling collection and recycling. The original idea behind EPR was to connect business' responsibility for the end-of-life management to eco-design [1].

Three design flaws in current practices

It is commonly acknowledged that the current EPR approaches fail to stimulate eco-design. This has far-reaching implications. As EPR is expected to be a main instrument in the EU's circular economy (CE) policies, it needs to promote and stimulate the redesigning and reconfiguring of business models, the increased use of secondary materials, and ultimately replacing the use of virgin resources. The EU's Green New Deal and the 2020 Circular Economy Action Plan aim at making sustainable products the norm and create a fully circular economy. Various countries explicitly aim to strongly reduce the application of newly mined resources in new products, like in the Netherlands' policy goal of 50 % reduction by 2030.

In recent projects, we analysed to what extend the current formats of EPR are suitable for these new CE policy ambitions. These studies (Campbell-Johnston et al. 2020, 2021 and 2022, Thapa 2022) highlight three main design flaws in the current practice of European EPR.

Design Flaw #1: Recycling includes downcycling and excludes R0-R6

Recycling is loosely defined as any form of recovery operations where waste materials are processed into products materials or substances in either the original or a new application. Both in policymaking and in the academic discourse, waste management hierarchies have been applied, originally a simple 3Rs hierarchy (Reduce, Reuse, Recycle, often inconsistently applied). Nowadays, a more systematically derived 10Rs waste hierarchy is applied, both in academic discourses and in policies, which distinguishes the shorter loops (R0 Refuse, R1 Reduce, R2 Resell/reuse), the middle long loops (R3 Repair, R4 Refurbish, R5 Remanufacture, R6 Repurpose) and the long loops, mainly downcycling (R7 Recycle Materials, R8 Recovery of energy and R9 Re-mine).

The current definitions of the goals to be achieved under EPR regulations promote the cheaper downcycling of materials. This is driven by the efficiency rationale in the Waste Framework Directive 2008/98/EC, Article 8, which calls for a mixed environmental and economic assessment. Targets are formulated in terms of collection and recycling rates as a percentage of the overall weights of the products waste streams collected. In the current EPR policy, no requirements are provided for an integrated sustainability assessment of available technologies as a base for such decision-making on preferred value-retention options. Within the current regulatory framework, producer responsibly organisations that implement the EPR requirements for producers are only obliged to organize the recycling of the collected post-consumer waste as efficiently as possible for their members: the producers. Within this institutional context, one

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cannot expect PROs to do more than look for the cheapest R7 or R8 solution only.

Finally, after the extended lifetime resulting from any of the R1-R6 value retention options, ultimately the product will still arrive in the stage of R7 recycling. In this stage, alternative forms of high value retention are competing with the cheapest alternatives. In the current situation the choice of recycling options is left to the market. This is clearly illustrated with the fate of the high value and scarce rare metals in e-waste. The dominant recycling approach under the EPR programs is shredding to gain the iron and copper. Expensive and geo-politically sensitive rare metals are often ignored and thus lost in the process, because there are no built-in reward systems.

Design Flaw #2: The responsibility is not transferred to the right actors

The institutional structures required in the ERP regulations are limited to producers and importers (who are held responsible for the post-consumer phase). The European approach has been to formulate this as an individual responsibility for all producers (and importers), but also allow the creation of collective approaches, namely, the PRO's, who decide *how* and *where* recycling takes place. The PROs function to meet the governmental goals. However, the pathway towards CE is far more crowded than with just these three actor groups. In the CE, first preference is to be given to arrangements that prolong the user phase of products and services (R1-R5) or enable re-use of products or components in another function (R6), before products are dismantled and shredded for mechanical or chemical recycling processes (R7). These encompass other economic actors, who are now excluded from the decision-making processes. Their roles are neither acknowledged, nor rewarded. In practice economic actors engaged in reselling, repairing, refurbishing or in introducing new high value retention recycling options are not participating in the design of the circular strategies for specific sectors.

Design Flaw #3: The instrument ignores the multiple re-use, resell cycles crossing borders

Products are often used in multiple "use – dispose – collect – (repair/refurbish) – resell – use – … etc."-cycles. Within these repeating cycles a fair share of the "to-be recycled" and "to-be-reused" products cross borders between EU member states and outwards to countries in the global South. What happens after the first collection by PROs, when products are forwarded to recycling companies abroad is not properly organised in the ERP regulations. Some PROs have setup quality assurance schemes, but these don't address the upcycling, cascading and innovations towards high value retention. They merely serve as risk avoidance mechanism to prevent rogue business behaviour.

The export of "to-be-recycled" plastic waste has been documented, showing that a substantial share of this is likely to be incinerated, landfilled, and end up as ocean debris, with United Kingdom and Germany having the highest contribution to ocean debris. Inspections at the ports of Nigeria revealed that most "reusable" electronic equipment imported also came into the countries hidden in second-hand cars mostly from also the United Kingdom and Germany, followed by Belgium and the Netherlands. Proper policies, knowledge transfer and infrastructures for addressing high value retention recycling are lacking in most waste receiving low income countries.

Designing-out the three design flaws

These three design flaws implicitly outline the ways out. The current EU and national ambitions for a CE focus on phasing out the use of newly mined materials and replacing them with recycled materials. Explicit policy targets for the short and middle long loop value retention options are still lacking, but, in general the CE policies stress the need to extend the lifetime and user phase of product to reduce the need for new resources and reduce environmental impacts per unit.

In our recent whitepaper on CE and EPR (Vermeulen et al. 2021), we stressed the need to include all crucial economic actors in the CE into the set-up of EPR systems. This is done by separating the role of the *financial* responsibility for organising the collection and recycling, from the responsibility in *designing* the CE strategies for the specific sector. This implies including economic actors engaged in these activities for the product groups addressed, for example repair and remanufacturing actors. It further requires a systematic assessment of the applicability, impact and financial implications of applying all value retention options R2 to R8 in an integrated strategic programme for the product group. The core principle of EPR is then maintained: Producers (and importers) are financially responsible for the infrastructures of the respective value retention options. They can still decide to take on that responsibility either individually or collectively. However, all economic actors related to R3-R8 need to be represented in an additional "circular value chain management organization" that decides on the "circular transition strategy" for the product group which needs to be based on the cascading principle. Decision making needed for achieving the governmental goals on CE requires a wider representation of the stakeholders involved in the transition. This also includes redesigning the fee structure of EPR schemes, including all costs needed for achieving the CE targets of phasing out of the use of virgin raw materials. This will result in higher and modulated financial incentives, depending on the distance to the targets for the national and/or European CE policy.

The third design flaw requires improving the traceability of "to-be-recycled" products after collection by PROs and other actors in the market, especially when borders are crossed. This includes the development of quality assurance system for recycling companies that also includes stimuli for innovation towards circular business models. Where multiple "use – reuse"-cycles result into exports towards low-income countries, additional assurances and checks are needed. These countries do not have the means to set-up a decent recycling infrastructure on their own. Initial consumers have (in the product price) paid

their share for proper recycling and can expect producers to take their ultimate responsibility, not just limited to the first life use cycle, but to the ultimate end-use destination. Where repeated life cycles still take place within the European context, national EPR schemes still can be adequate for arranging proper recycling. However, where products (like cars, tyres, electronics, plastics etc.) move towards the Global South, the industry's responsibility should not cease. Acknowledging the border crossing nature of repetitive life cycles, we propose the concept of ultimate producer responsibility (UPR) (Thapa 2022). The existing EPR system must transform to make the producers responsible for their waste generation everywhere, not just nationally. UPR takes international trade of waste and second-hand products into account to reshape the existing EPR. UPR includes a financial transfer mechanism from EU-based EPR programmes to countries that import waste or second-hand commodities from Europe. UPR is dedicated to make producers responsible for their products even if it crosses boarders for sustainable and circular practices through value-retaining and recycling practices.

Annotation

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