Extended Producer Responsibility and Ecomodulation of Fees

Opportunity: Ecomodulation of Fees as a Way Forward for Waste Prevention

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Executive Summary

EPR is a policy instrument, which applies the 'polluter pays principle' by placing the responsibility of a product's entire life cycle – from designing environment friendly and low-impact products to managing their end-of-life(EoL) – onto the producers. EPR essentially aims to internalise the negative environmental costs of and shift the responsibility for managing the products' EoL, and waste(s) arising from it, from taxpayers to producers. In the widespread collective EPR systems established across EU Member States, producers pay fees to so-called Producer Responsibility Organisations (PRO) to organise EoL management of their products. In principle, the EPR fees should cover the real EoL costs, i.e. the costs for collection, transport and treatment of the EoL products including costs for awareness raising and administrative issues. EPR fee should also take into account the environmental and social externalities and follow the waste hierarchy.

In order to do so, ecomodulation of EPR fees as a concept can be used. Ecomodulation of EPR fees means charging producers differentiated fees based on certain criteria which support design changes towards environmental sustainability of their products. However, an assessment of current practices in ecomodulation for the product streams packaging, WEEE, batteries and textiles shows that EPR and ecomodulation of fees currently seem focused on waste management, primarily on recycling, instead of on waste prevention. Further, EPR fees and ecomodulation hardly take into account the social and environmental costs associated with the products. **Ecomodulation criteria** for the above product streams center on increasing recycling rates of the products with very little to no focus on promoting criteria relevant for waste prevention, such as reusability, durability, reparability of products. The **size of the modulated fees** is a crucial factor to improve product eco-design. Ideally, the size of the modulation should vary depending on whether products are designed towards complying with the top levels of the waste hierarchy: products designed to foster waste prevention and preparation for re-use should incur lower fees than those, which are only designed for improved recycling. Hence, when developing and applying criteria for deciding on modulated fees, these should focus on waste prevention (e.g., reusability, durability, reparability) and not solely on recyclability. However, currently in most applications of ecomodulation of EPR fees in Member States we do not find such waste prevention criteria.

Furthermore, the size of the modulated fees should also reflect the real EoL associated with managing EoL products, plus environmental costs associated with the products EoL. To this end, a bonus or malus should be added on top of real costs, which covers parts of external environmental costs according to lifecycle analysis. Such bonuses or maluses can nudge producers to shift to environment-friendly products through price effects. For packaging it has been observed that the EPR base fee, i.e. the fee without ecomodulation, is closer to the real cost of end-of-life management of packaging as compared to other product streams, such as WEEE and batteries. For EEE, batteries and textiles, the EPR base fee plus ecomodulation only constitute a small percentage of the overall product price and do not reflect the true EoL costs. Hence, producers do not receive a significant economic incentive to shift to eco-designed products.

The current **cost coverage** in an EPR system is based on the concept of "necessary costs" and seeks to minimize the costs. In the pursuit of achieving cost minimization, the fee potentially becomes too low to encourage producers to design products, which have high environmental performance regarding waste prevention and reusability. With the current focus of the most EPR

schemes resting on increasing recycling rates, the “necessary costs” approach only takes into account costs incurred to improve recycling. This is aggravated by the absence of quantitative targets for waste prevention in EU and national waste legislation, which therefore prioritises recycling over reusability. Thus, costs to increase reusability of a product stream are not covered under the concept of ‘necessary costs’. Therefore, **revenues generated from the EPR fees** are primarily used for funding operational expenses such as collection, sorting and recycling/treatment. This leaves little space for financing measures to foster eco-design for waste prevention.

In addition, **implementation and enforcement challenges** further complicate the use of EPR systems for waste prevention. These challenges encompass
1) **Lack of uniform modulation criteria and fees across member states** creates complications within the domestic market and weakens the effort for EPR to achieve the desired results.
2) **Limited availability of data** on the real costs of EoL treatment as well as product specifications which is needed to estimate EPR fees and ecomodulation
3) **Governance challenges: free riding, reporting and enforcement challenges** have led to distortion of EPR internal market by making it difficult for uniform and widespread adoption amongst producers. Free-riding is expected to increase further with increase in online sales if the reporting and enforcement measures are not improved.
4) **In competitive EPR schemes**, implementation of ecomodulation of fees becomes challenging as increase in EPR fees could create a competitive disadvantage for certain PROs. Certain PROs would be impacted more than the others depending on the product portfolio.

Based on our analysis we propose the following recommendations to increase the focus of EPR and ecomodulation of fees towards waste prevention:

Area of recommendation	Recommendation	Products addressed by recommendation
Modulation Criteria	**Harmonisation of criteria across Member States defined according to the waste hierarchy**	
	Bridging EU-wide eco-design criteria with modulation criteria	
Smartly setting the size of the fees	**Cover real EoL and social and environmental costs**	

Area of recommendation	Recommendation	Products addressed by recommendation
	To influence consumer choices - **Increasing the magnitude of EPR fees including modulation for products with low EPR fees as compared to product's price** - **Visible fees to indicate the amount paid by consumers towards EoL management and to cover social and environmental costs** - **Providing information on environmental performance such as "repairability index" in France for products which have low EPR fees to influence consumer's choices**	
	Fixed level (as flat rate not as percentage of EPR fees) of bonus and malus for competitive schemes	
Cost coverage and revenue use	**Expanding the scope of cost coverage to include waste prevention such as reuse**	
	Earmarking of revenue towards activities such as R&D, development of reuse systems, supporting social economy actors etc.	
Addressing implementation challenges	**Implementing a public online register**	
EPR as a policy mix	**Eco-design Directive, Sustainable Product Initiative, Deposit refund schemes, green public procurement**	

1. Introduction

1.1 Background and Context

In the EU, there is a growing emphasis on adopting initiatives and policies for better-designed sustainable products. As part of the European Green Deal from December 2019, the European Commission (EC) presented a New Circular Economy Action Plan (CEAP) in March 2020, with sustainable products being one of the key focal areas of the CEAP. It announced a sustainable product policy initiative (SPPI) to develop strong policy measures to ensure that only sustainable products are put in European market (European Commission, 2021). As a part of the SPPI, efforts are also underway to broaden the scope of the EU Ecodesign Directive 2009/125/EC to cover circularity issues for a wide range of products, going beyond the Directive's initial sole focus on energy-related products. Extended Producer Responsibility (EPR) and ecomodulation of EPR fees can play a crucial role in achieving the objective to make sustainable products the norm.

EPR is a policy instrument, which based on the 'polluter pays principle' places the responsibility of a product's entire life cycle – from designing environment friendly and low-impact products to managing their end-of-life – onto the producers. It essentially aims to internalise the negative environmental costs and shifts the responsibility of managing the products, and waste(s) arising from it from taxpayers to producers (OECD, 2005). However, this holistic concept in practice has remained limited to end of life (EoL) focus on waste management, primarily on recycling. EPR aims to achieve its objectives by including measures upstream and downstream in product management approaches. Upstream measures include initiatives, which seek to foster circular product design and establish standards to produce resource efficient products that generate less waste during production and after use. Downstream measures aim to build a robust waste management system, which efficiently and cost-effectively collects, sorts and recycles the waste generated from the products (Pouikli, 2020). The EPR system to manage upstream and downstream measures can be an individual system (or individual producer responsibility (IPR)), where a producer organises its own system; or a collective system (or collective producer responsibility (CPR)), where several producers decide to collaborate and thus fulfil their responsibility in a collective way through a specific organization known as Producer Responsibility Organisation (PRO) (Monier, et al., 2014). In a CPR system, a PRO is a pivotal stakeholder and is responsible for setting up,

Waste hierarchy: An approach for prioritizing waste management options according to their environmental impact. It gives top priority to preventing waste wherever possible. Where waste is generated, the options considered for handling it are, in order of priority: preparing for re-use; recycling; recovery and, as a last resort, permanent disposal. (Bünemann, Brinkmann, & Löhle, 2020)

Source: European Commission 2021

Box 1 Definition of waste hierarchy

developing and maintaining the EPR system on behalf of the producers (Bünemann, Brinkmann, & Löhle, 2020) .

In a collective EPR system, producers pay EPR fees to the PRO based on product weight or number of units (depending on the product type) put on the market. Presently, in most European Member States (MS), PROs use the EPR fees received from its members primarily to cover downstream costs of waste management, in particular for collection, transport, sorting and recycling/treatment. In addition, part of fees are used to cover administrative expenses, communication and awareness raising and in some cases research towards innovation. However, upstream processes to facilitate the transition to a circular economy and waste prevention (as the top priority in the EU waste hierarchy, see *Box 1*), such as design for reusability, reparability, and durability are hardly accounted for. Therefore, EPR fees do not (yet) differentiate between products and packaging, which are designed for reuse, remanufacturing, repair and recycling and those which are not. Thus, there is no incentive for a producer to make upstream design changes, specifically focusing on waste prevention (Monier, et al., 2014). In this context, ecomodulation of fees can play a crucial role in incentivizing upstream design changes.

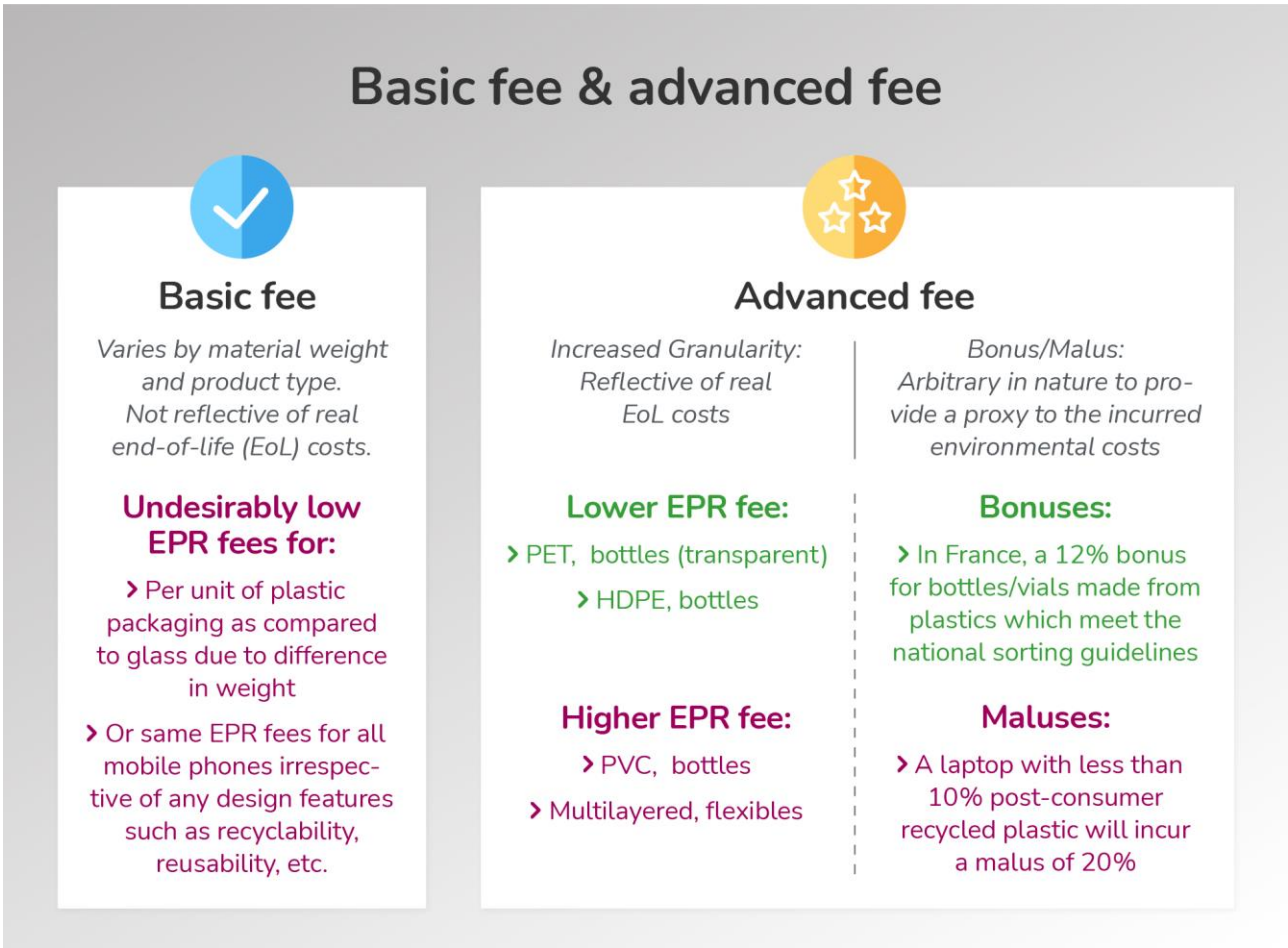
1.2. Understanding Ecomodulation of EPR Fees

In order to comprehend the potential of ecomodulation in incentivizing producers to make environmentally friendly products we need to understand what ecomodulation means theoretically and how it is implemented in practice. In principle, EPR fees should follow the 'true cost' principle which according to Monier, et al., 2014 (p.97) *"should reflect, as far as possible, the true end-of-life management costs of [producers'] [insertion by the authors] own products"* and *(p.95) "aims at individualising the producer responsibility by linking the financial responsibility with the true costs of the management of the products put on the market by a specific producer*". The true cost principle can be interpreted as a combination of real EoL costs which should reflect as far as possible the costs involved in end of life management of producers' own products plus should also take into account the social and environmental costs. In theory, the true cost would translate to charging producers differentiated fees (i.e., modulating fees) based on criteria which support design changes towards environment sustainability (Hilton, 2020). However, in practice, modulated fees neither reflect the real EoL costs nor the social and environmental costs of the products.

Most of the European MS use the concept of "basic" fees, thereby charging fees that differ as per the material weight and the type of product. This is not reflective of the real EoL costs and is only based on the material weight of the product. For example, a unit of mobile phone would have the same fees irrespective of the design features such as ease of disassembly and repair or durability (OECD, 2021). This offers no incentive to producers to improve product design. In the case of packaging this could lead to producing more light-weight products, although these might have higher environmental impacts or fitting less to waste management options higher up in the waste hierarchy (e.g., re-use). Some MS have taken a step further by charging "advanced" fees. The advanced fees can either have increased granularity, which differentiates between products on the basis of the real EoL costs, or can have a bonus or penalty system, which is arbitrary in nature – i.e. not calculated on the basis of the actual costs incurred – but provides a proxy to the potential environmental costs incurred. Thus, a bonus and malus method is used to provide a nudge to the producer to improve product design and standards (OECD, 2021). For instance, EPR

fees can be supplemented with a bonus for products designed for waste prevention and circular economy; or penalties can be introduced for products with high environmental footprint (see *Figure 1*).

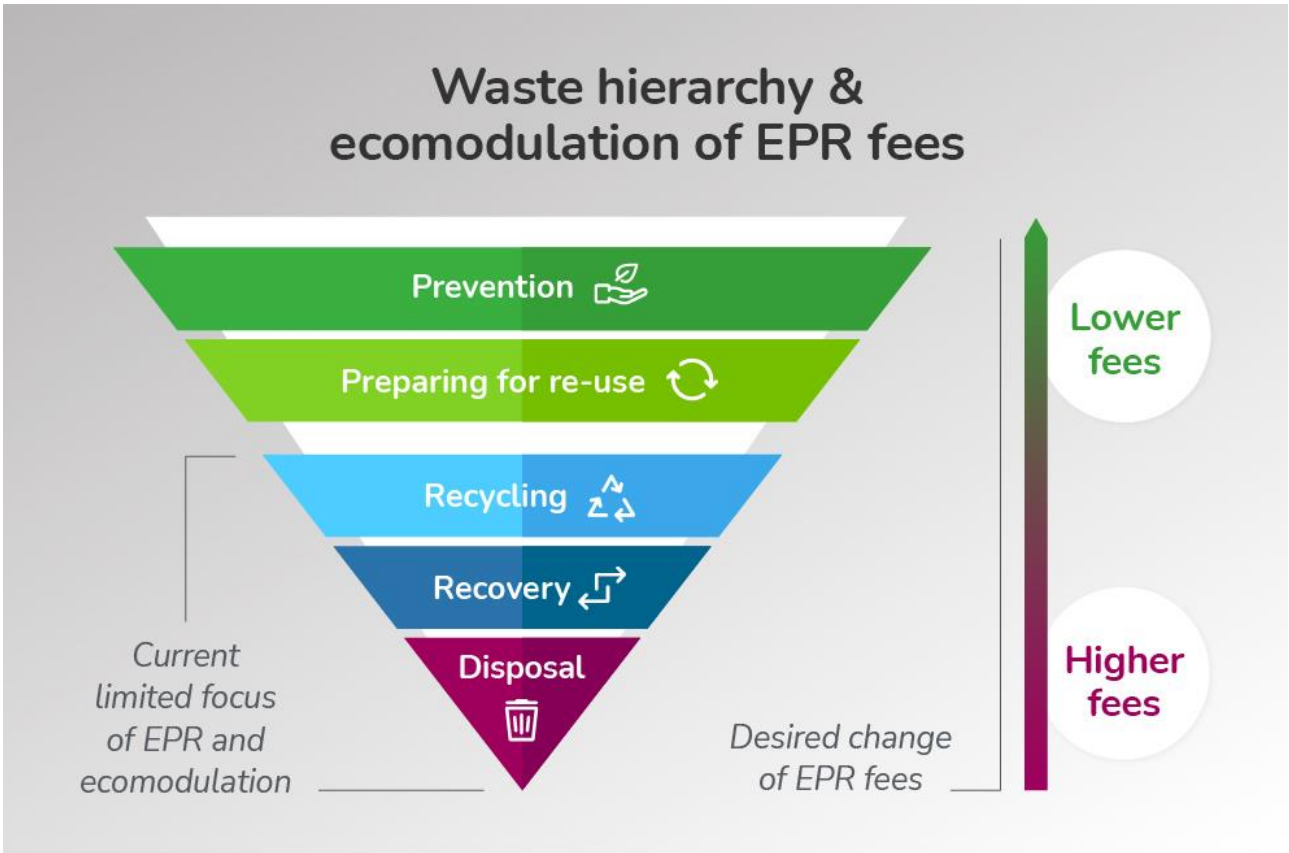
Figure 1 Basic fee and advanced fee



Source: Author's compilation based on: OECD, 2021; Ecologic, 2018; and Hogg, et al., 2020

In existing systems, fee modulation predominantly focuses on improving recycling and waste management. This includes, e.g., criteria such as shifting from low to easily recyclable material, with hardly any emphasis on waste prevention (such as increasing reusability or reparability) (see *Figure 2*). Due to this inherent focus of EPR on downstream waste management there seems to exist a knowledge gap regarding potential effects of EPR on eco-design of products.

Figure 2 Waste hierarchy and ecomodulation of EPR fees



Source: Adapted from waste hierarchy figure by European Commission. Link: https://ec.europa.eu/environment/green-growth/waste-prevention-and-management/index_en.htm

1.3. Study Objective and Approach

This study focuses on the scope of ecomodulation of EPR fees in fostering waste prevention and circular economy in EPR schemes for the following product streams: packaging, electrical and electronic equipment (EEE), batteries and textiles. It looks into aspects of how ecomodulation of EPR fees can be used to expand the scope of EPR schemes in "*designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them*" (Sanz, Rica, Palacios, Alsina, & Mouriz, 2015, p.5). This study focuses on the scope of ecomodulation of EPR fees in fostering waste prevention and circular economy EPR schemes for the following product streams: packaging, electrical and electronic equipment (EEE), batteries and textiles. This focus has been chosen because of the high environmental and circular economy relevance of these products and the current policy context.

EPR as a policy measure is already in place at EU level for packaging (Packaging and Packaging Waste Directive 94/62/EC), Waste Electrical and Electronic Equipment (WEEE) (WEEE Directive 2012/19/EU) and Batteries (Batteries Directive 2006/66/EC). For textiles, the development of the EU Textiles Strategy foresees adoption of EPR schemes for all MS. Furthermore, the 2018 revision of the Waste Framework Directive (2008/98/EC) as part of the first Circular Economy Action Plan of 2015, introduced the idea of ecomodulation of EPR Fees based on the products' environmental

impact such as durability, reparability, reusability, recyclability and presence of hazardous substances. The EC is also preparing a guidance document for implementation of modulation criteria, which is expected to be published in the autumn of 2021.

This study aims to develop a knowledge basis for using EPR and ecomodulation of fees as a tool to foster waste prevention and circular economy. As a first step, the study created a synopsis of current practices in ecomodulation by taking a knowledge stock from existing literature. Subsequently, expert interviews were conducted with a diverse set of stakeholders including policy makers, industry representatives, PROs and civil society to fill knowledge gaps identified through literature review. The study is structured as follows: first, we will provide the main findings of literature and interview based assessments of current practices in ecomodulation, using case study insights from good practices across European MS where relevant. Then, we will present policy recommendations we derived from the assessment.

2. Assessment of Current Practices in Ecomodulation

An assessment of current practices is crucial to understand the knowledge gaps and implementation challenges of achieving the desired objectives of EPR and ecomodulation. Due to the prevailing scope of current EPR systems, which mostly focuses on improving downstream waste management, there is an emerging debate on needs and options to strengthen the role of EPR and ecomodulation of fees to achieve desired circular economy results. EPR schemes in the EU range from matured EPR schemes for packaging in 26 Member States (MS), with varied degrees of ecomodulation of fees, to emerging EPR schemes for textiles, with France currently as the only example of a nationwide EPR scheme for textiles (Hogg, et al., 2020). While for packaging, WEEE and batteries EU-wide directives regulate the introduction of EPR schemes, for textiles EPR schemes are only being implemented on the basis of initiatives by national authorities, e.g., in France with more MS, such as Sweden and Netherlands, in the process of preparing the introduction of an EPR scheme for textiles (Tojo, 2019; Mathews, 2021). In the following sections, we take stock of the current practices of ecomodulation by covering modulation criteria, size of modulated fees, cost coverage and implementation challenges.

2.1. Fee Modulation Criteria Analysis

EPR fees are modulated based on certain design criteria. The criteria are determined based on product characteristics, such as material, type and its functionalities. The ecomodulation criteria should reflect the product characteristics and its circular economy performance. For example, for a mobile phone, in theory, modulation criteria could depend on the material used, availability of spare parts, durability etc. There exists a plethora of fee modulation criteria, some cutting across different product streams, while some being specific to product characteristics. The modulation criteria could broadly be categorized in general terms, such as regarding the products' recyclability, recycling rate, reusability, recycled content, durability and reparability. Some criteria, such as recyclability, recycling rate, presence of recycled content, are focused on the end of life, while criteria such as reusability, durability and reparability are of interest from a perspective of waste prevention and extending product's lifetimes (OECD, 2021). Within these

general criteria categories, depending on the product type and requirements, there could be specific criteria that would differ depending on the product type. For example, for packaging "recyclability" would be a general criteria, within which the specific criteria could be avoiding the use of recycling disruptive material such as laminated plastic packaging with aluminum film. For EEE, a general criterion could be recyclability, with a specific criterion being, e.g., the ease of disassembly. In the light of this, it becomes important to understand and identify modulation criteria, which can foster the waste hierarchy for the different product groups in focus.

2.1.1. Criteria for Packaging

Ecomodulation of fees is most widely adopted for packaging in 26 European MS, with simple modulation of fees, i.e. a varied fee structure for different type of materials, such as plastics, glass, paper etc. (Hogg, et al., 2020). Certain materials which are, for example, easy to recycle or have high resale value, such as glass, have lower EPR fees than for materials, which are difficult to recycle or have low resale value such as flexible plastic packaging. Adding to this modulation, some MS have implemented greater granularity of fee structures for certain types of packaging. For example, the Italian EPR scheme has different categories of fee modulation depending on whether the packaging is sortable and recyclable by use of current technologies. Sweden, in addition to sorting and processing, also uses 'saleability' post sorting and processing (i.e. demand and resale value in market) as a criteria for modulation. Some MS, such as the Netherlands, use lower fees for rigid plastic packaging made from Polyethylene (PE), Polypropylene (PP) or Polyethylene terephthalate (PET) that are easy to recycle and avoid the use of any recycling disrupting material. France and Portugal issue bonuses or impose penalties depending on the adoption of certain design features, for example, the French EPR scheme gives a bonus 12% on the total fee contribution for bottles and vials made from PET, HDPE, or PP as it meets the national sorting guidelines (Hogg, et al. 2020; Watkins, et al., 2017).

In current EPR systems, most ecomodulation criteria, such as sortability, recyclability, market demand of secondary raw material, are primarily focused on improving the recycling of packaging and not on generating less waste in the first place (waste prevention). Since packaging is not a durable product and typically turns to waste after one use only, product lifetime related criteria, such as durability, do not play a significant role in fee modulation unless there is an increased focus on reusable packaging.

Reusability as a criteria can play a crucial role in waste prevention by ensuring multiple use cycles over the product's lifetime and in moving away from single use packaging. However, there has been limited success in introducing reusability criteria due to a number of reasons. 1) In the absence of reuse targets, the current EPR system inherently focuses on increasing recycling rates; 2) The other issue is also that if a producer is putting reusable packaging on the market to comply with EPR regulation it either participates through a PRO or setup a system by itself, which is rarely done due to high costs. If the producer is a member of the PRO, due to the absence of the reuse logistical infrastructure such as separate collection and sorting, the reusable packaging seldom reaches the producer for reuse giving preference for single use packaging which is cheaper; and 3) The EPR system, due to its focus on cost minimization and achieving recycling targets, is a low cost system focusing primarily on recycling. Between the choices of single use packaging with lower EPR transaction costs or going the extra mile to invest and participate in the deposit-refund systems which are comparatively expensive (Kling, Seyring, & Tzanova, 2016; OECD, 2014), the producer is more inclined to opt for the former. Some MS have introduced one time fees for

reusable packaging. However due to the absence of logistical infrastructure in place, to make reusable systems work, the packaging does not reach back the producer. The producer, therefore, ends up paying more since reusable packaging is heavier by weight. Some countries (see table 1 for examples) have given an exemption for reusable packaging, which is preferable from the perspective of the waste hierarchy. However, these exemptions often do not lead to greater reuse of packaging due to the absence of logistical infrastructure financed by the EPR schemes themselves. The *table 1* below distinguishes between criteria that focus on just end-of-life and the criteria, which focus on waste prevention measures.

Table 1 Modulation criteria for packaging

Modulation Criteria	Focusing on end of life	Focusing on waste prevention
	Sortability; recyclability; recycling rate; saleability (demand of secondary raw material); avoid use of disruptors, such as PVC labels, that can hinder recycling, consumer awareness	Reusable packaging; size of packaging; reducing the number of units put on the market; use of permanent material such as glass; reduction in the use of resources, weight reduction for packaging (quantitative prevention); hazardousness reduction
Existing Examples	Fostplus in Belgium charges Euros (€) 200 per ton for transparent colorless PET as compared to € 400 per ton for colored PET (which complicates recycling)	Reusable packaging is given exemption from EPR fees in Belgium. In Estonia, consumer packaging does not need to be declared as long as it is being reused.

Source: Authors' compilation based on: Fostplus, 2021; Hogg, et al., 2020; and Watkins, et al., 2017

2.1.2. Criteria for EEE

In contrast to packaging, there is only one European MS using fee modulation explicitly for EEE: France (WEEE Forum, 2019). The criteria used in the French system include (Hogg, et al., 2020, p.54):

- Post-consumer recycled (PCR) plastic content;
- Ease of disassembly;
- Ease of upgrade;
- Availability of spare parts;
- Availability of technical information to facilitate professional repair;
- Lack of coatings that can inhibit recycling;
- Lack of hazardous substances (any brominated flame retardants); and
- all LED (lamps only).

For its first phase (2010 – 2015), modulated fees were introduced only for six criteria, each of which concerned only one specific type of product and were targeted at specific problematic substances. However, since 2015 the scope of the ecomodulation has been expanded to cover a total of 18 product categories and also to include waste prevention (Hogg, et al., 2020). Some concrete examples are listed in *Table 2* below.

Table 2 WEEE modulation examples from the French EPR system

Product group	Criterion	Base fee per unit [€]	Eco-modulated fee [€]	bonus/ malus
Mobile phone or smartphone	Lack of standardised connections (charger and other connections) **or** Lack of mutually compatible software updates, essential for the basic use of the device	0.02	0.04	+100%
Laptop (>2kg*)	Absence of paint and coatings incompatible with recycling and reuse on plastic parts >100g **and** Incorporation of post-consumer recycled plastic (minimum threshold of 10%) **and** Product upgrade with standard tools, including memory drives, chips and cards	0.42	0.34	-20%
Washing machine	Provision of essential parts for equipment use for 11 years **or** Incorporation of post-consumer recycled plastic (minimum threshold of 10%)	8.33	6.66	-20%
Printer (>10kg*)	Complete disassembly capability with commercially available standard tools **and** Provision of essential parts for equipment use for 5 years	1.50	1.20	-20%

**other products in these categories with different weights are also subject to ecomodulation, but only one weight range is presented for illustration purposes. Source:* (Ecologic, 2018)

Depending on the product group, a bonus or malus is added to the EPR fees if the product meets or does not meet the defined criteria. For printers, for example, a bonus of 20% is given if the printer has complete disassembly capability and there is provision of essential parts for equipment use for 5 years. Both the criteria ensure extension of the lifetime of the product thus supporting waste prevention. The *table 3* below distinguishes between criteria that focus on just end-of-life and the criteria, which focus on waste prevention measures for EEE.

Table 3 Modulation criteria for WEEE

Modulation Criteria	Focusing on end of life	Focusing on waste prevention
	Post-consumer recycled (PCR) plastic content; Ease of disassembly and availability of information for it; Lack of coatings that can inhibit recycling; Lack of hazardous substances (e.g. brominated flame retardants); Use of all-LED lamps; Ecolabels	Availability and affordability of spare parts over a specific timeframe; Availability of compatible software updates; Ease of upgrade; Availability of technical information to facilitate professional repair; Ease of disassembly and repair; Durability and warranty period, battery life; lack of standardized connections (charger and other connections)
Examples	The French PRO in France, Ecologic, charges producers of Laptops with a weight above 2Kg a fee of €0.34 instead of €0.42 if their products do not have paintings and coatings that inhibit recycling and if they incorporate at least 10% PCR plastics, and if the product is upgradeable with standard tools (including memory drives).	Producers of smartphones in France have to pay €0.04 EPR fees if their products lack standardized connections or lack compatible software updates, compared to €0.02 that they would have to pay otherwise (ecomodulation of 100%).

Source: Authors' compilation based on: Ecologic, 2018; Hogg, et al., 2020

2.1.3. Criteria for Batteries

In general, the EPR fee is based on battery weight and mostly reflects the collection and recycling costs of a particular chemistry such as zinc-carbon, and it does not take into account criteria such as design for durability and reusability, rechargeable cycles, recyclability or the use of sustainable battery materials (Hogg, et al. 2020). The battery EPR system of France is the most advanced for considering criteria for Ecomodulation, for example, it provides a bonus of 3% for the use of recycled content for alkaline battery (Hogg, et al., 2020). In general, the rechargeable batteries have lower fees as compared to single-use batteries with additional bonuses and maluses applied for certain chemistries based on their environmental performance. However, France is deliberating on accommodating other crucial Ecomodulation criteria such as lifespan and rechargeability, which can play a pivotal role in waste prevention (Hogg, et al., 2020). Low collection rates of batteries risks losing critical raw materials (CRMs), such as rare metals in Li-ion batteries. These raw materials are often limited in supply and procured from areas affected by violence and conflict such as cobalt – 63% of which is supplied by Democratic Republic of Congo where mining of the mineral has often been connected to violence (Church & Crawford, 2018). A higher charge in the form of penalties for such batteries with presence of CRMs and collection rates below a certain threshold could incentivise producers and PROs to improve and invest into

expanding collection and recycling infrastructure. This potentially can improve the supply of CRMs within Europe and decrease import dependency.

Until recently, the automotive and industrial batteries have reported 100% collection and recycling rates due to the inherent revenue potential and EPR fees only reflect the administrative fees (Hogg, et al., 2020). However, with increasing use of non-portable batteries such as batteries used in electric vehicles (EV) the approach would need to change as the batteries would need collection and also because batteries used in EV, after they are considered no longer useful, still have 70-80% capacity left which can be repurposed for other uses Here, ecomodulation of EPR fees on the basis of ease of refurbishment could play a crucial role in ensuring repurposing after they are no longer used in EV (Olsson, Fallahi, Schnurr, Diener, & Loon, 2018). The *table 4* below collates some of the criteria differentiating between a focus on end-of-life and on waste prevention.

Table 4 Modulation criteria for batteries

Modulation Criteria	Focusing on end of life	Focusing on waste prevention
	Design for recyclability; use of more sustainable battery materials, recycled content; collection rate; recycling rate and recyclability; removability of batteries; recovery of critical raw materials	Durability and reuse; battery lifespan; rechargeable cycles; charge capacity; reduction in the use of resources; rechargeability; hazardousness reduction; charge capacity and battery lifetime **EV batteries:** Extending the battery life; direct reuse of the batteries; refurbishment, remanufacturing and reuse
Existing Examples	In the French system, a 3% bonus is applied for use of recycled content in Alkaline battery	In general, for most MS, rechargeable batteries have less fees as compared to single-use batteries

Source: Hogg, et al., 2020; OECD, 2016

2.1.4. Criteria for Textiles

There is no EU-wide EPR legislation for textiles, but EPR introduction is planned with the EU Strategy for Textiles. France is the only country in the EU that implemented a mandatory EPR scheme for end-of-use textiles. Producers primarily fulfil this obligation by contributing financially to a PRO, Eco TLC, which currently represents 95% of the textiles industry in France. Eco TLC has three scales of ecomodulation:

- Eco-modulation 1 (EM1)with the objective to encourage durability of textiles and footwear by giving a bonus of 50% on EPR fees per item;
- Eco-modulation 2 (EM2) and 3 (EM3) to promote the integration of recycled materials from production process or post-consumer textiles[1] (Eco TLC, 2019).

With new evidence on the potential release of microplastics from the washing of textiles, product performance regarding release of microplastics could be used as one potential waste prevention

[1] https://refashion.fr/pro/en/eco-modulated-scale

criterion (Hann, et al., 2018). The below *table 5* shows potential criteria differentiated between focus on end of life vs. on waste prevention.

Table 5 Modulation criteria for textiles

Modulation Criteria	Focusing on end of life	Focusing on waste prevention
	Recycled content; Sortability; consumer awareness; type of treatment; recyclability	Prevention of microplastic release; reduce, reuse and repair; reduction in the use of resources; design to be repaired; hazardousness reduction; durability: abrasion resistance, colour fastness, dimensional stability and piling
Examples	The French EPR scheme gives a 50% discount for textiles made with a minimum of 15% post-consumer recycled fibers	The French EPR scheme has recently started giving 75% bonus for items: t-shirts, jeans, jumpers, bedsheets, and shoes, which fulfil at least two criteria for durability such as abrasion resistance, colour fastness, dimensional stability and piling

Source: Authors' compilation based on: Hogg, et al. 2020; and Eco TLC 2020

2.2. Size of the Modulated Fees, Costs and Use of Revenues

2.2.1. Size of the Modulated Fees

The magnitude of fee modulation is a crucial factor to improve product eco-design. Ideally, depending on the different criteria discussed above, the size of the modulation should vary depending on its proximity to the top level of the waste hierarchy: Criteria fostering waste prevention and preparation for re-use should lead to lower fees than criteria, which are only focusing on increasing recyclability (see *Figure 2*). Ideally, the fee size should internalize the environmental costs (i.e., add costs needed to alleviate environmental impacts associated with the product to the fee), however it becomes increasingly complex to do so on product-by-product basis. In this context, ecomodulation of fees according to the waste hierarchy can provide a good proxy. This would incentivise producers to adopt eco-design towards waste prevention and re-use and shift to more circular and sustainable products. However, while modulating the fees, it should be kept in mind that EPR fees should allow full cost coverage. Fixed levels of bonuses or penalties could lead to revenue instability if, for example, the amount of overall bonuses issued are more than the penalties received (Hogg, et al. 2020). Therefore, the size of the fee modulation should be carefully estimated so that overall costs are covered and at the same time it drives efforts towards circular economy and waste prevention.

One important factor in determining the appropriate level of fee modulation could also be the scope for a producer to save money on modulated fees by improving the product design, investing

into better recycling capacities or promoting waste prevention. However, this could carry risks for competing collective schemes, such as the competing EPR schemes for packaging in Germany, where increase in fees could lead to producers switching to another scheme instead of investing into design changes. To counter this, a fixed level of bonuses or penalties as a flat charge on the basis of the product design criteria could be decided by a central organization. For example – the central organization could fix the ecomodulation of EPR fees for sortability criteria at € X per kg of packaging and this would be added on top of the different EPR fees charged by different PROs. This would ensure that irrespective of the fee size the bonus or penalty remains same throughout all competing schemes (Hogg, et al. 2020).

Packaging

For packaging it has been observed that the EPR base fee is closer to the real cost of end-of-life management of packaging as compared to other product streams, such as WEEE and batteries. Therefore, a small bonus or penalty which internalizes the environmental cost is expected to have a significant impact on the cost of the product and hence incentivise producers to shift towards better product design. For reusable packaging, which theoretically is put onto market once and then reused multiple times, to encourage shifting from single use alternatives to packaging with multiple reusable cycles, some MS have exempted reuse packaging from EPR fees. For example, Belgium and the Czech Republic do not charge EPR fees to producers for reusable packaging (Watkins, et al. 2017). However, due to the reasons discussed in section 2.1.1 the focus in the current EPR has mostly remained limited to ensuring recycling of packaging instead of increasing reusability.

The size of the modulated fees should reflect the real EoL and environmental costs, which take into account the costs associated with managing waste generated through packaging such as collection and sorting supplemented with a bonus or malus that internalizes the environmental cost, to nudge producers to shift to environment-friendly packaging. In Portugal, for example, the base fee is fixed and it is not reflective of the real EoL costs. A 10% penalty is charged on the base fee of €0.25410/kg for a PET bottle with PVC labels, which is same for all types of plastics and is not impacted by waste management costs (PRO Europe, 2021). In our view, this should be avoided as the base fee does not take into account the differing waste management costs and revenues generated from different kind of materials. If the base fee is fixed, plastic packaging which has lower waste management costs due to well established waste value supply chain and has higher demand as a secondary raw-material would have the same base fee as compared to material which has higher waste management costs or lower revenue potential, thereby providing no incentive to producer to shift to better packaging. See *Box 2* for a best practice example in calculating EPR fees for packaging practiced in Belgium. In this system, the base fee is reflective of the real EoL costs of different types of plastic packaging, which is supplemented by a bonus or malus to encourage adoption of packaging which has lower environmental costs.

Box 2 Best practice for calculating EPR fees

The packaging EPR system in Belgium: Fostplus calculates and charges EPR fess for household packaging on the basis of the real EoL costs, which is supplemented by a penalty for example bonus or malus to give incentive to producers to shift to sustainable packaging. For example, a transparent and colorless PET bottle has an EPR fee of 0.2004 €/kg and if is it covered by a sleeve of a material different from the bottle, which will obstruct recycling will incur a higher fee of 2.2674 €/kg (Fostplus, 2021).

Batteries and EEE

For EEE and batteries, the EPR base fee is a small percentage as compared to the actual price of the product and does not reflect the true EoL costs. For example, a single LR6 (AA) battery, which might cost at least 0.5 EUR, has an EPR fee of €0.0086, i.e. just 2% or so of the product price. For WEEE, as it can be observed from Table 2, the size of the EPR fees for laptops which might cost atleast €300 is just €0.42. According to Micheaux and Aggeri (2021), the penalty represented by this malus is insignificant and so-far did not create a significant economic incentive to improve eco-innovation. However, the new French Circular Economy Law[2] passed in 2020 foresees an expansion of the ecomodulation mechanisms used, for instance by allowing "*modulation rates higher than 100% of the fee, but not exceeding 20% of the selling price of the product*" (Micheaux & Aggeri, 2021). A report from Eunomia suggests that, where the objective is to influence consumer choice, a bonus or malus should be applied that constitutes a significant proportion of the average cost of that battery type, for example +/20% of the retail cost, rather than 20% of a relatively small collection and recycling charge (Hogg, et al. 2020).

PROs for EEE in France cannot set the amount of fees without the State's agreement and are bound to a set of rules for ecomodulation since 2010, which are based on a bonus/malus system according to pre-defined critera. This means that producers get either a reduction (bonus) or an increase (malus) in their base fees according to extent to which they meet the specific criteria (Micheaux and Aggeri 2021). This fee is visible on the price of the product. Visible fees means separate invoicing of the costs of net collection and recycling costs and is visible to the customer at the point of sale. By making the EPR fees visible to the customer it increases the transparency and can prevent free riding among producers. Visible fees also increases consumer access to information on the costs incurred for the EoL management of the product. However, as mentioned before, since the fees are not reflective of the environmental costs and are too low in relation to the product cost it is unlikely to influence consumer's choice against environmentally harmful products on the basis of the visible fees. This as a consequence will have no effect on producer's design choices towards sustainable products (Hogg, et al., 2020).. If the fees are directly paid by the producers, a small modulation factors applied across a large number of items sold in the EU could still encourage adoption of eco-design measures. However, if EPR fees are 'visible fees' then in order to encourage and influence consumers to buy products, which have

[2] Law 2020-105 of February 10, 2020 on Anti-Waste and Circular Economy.

high environmental performance, it is required to have a significant size of ecomodulation of fees in order to have a significant impact on purchase decisions.

For batteries, visible fees is currently not in practice. Eucobat, the association of PROs for batteries in the EU, is in favor of introducing visible fees as it can help in reducing free-riding by increasing transparency of the overall system by invoicing the EoL management costs separately. (Eucobat, 2016). However, as explained above, similar to WEEE, since the EPR fee is not reflective of the environmental costs and is too small as compared to the price of the product, it is not expected to have significant impact on consumer's buying decisions.

Textiles

Eco-TLC, the French PRO for textiles, calculates the EPR fees based on the number of items placed on the market or charges a fixed rate as EPR fees for members with a global turnover less than 750,000 €/year. The categories of fees are divided into 4 levels of scale depending on the size of the items: very small, small, medium and large items (Eco TLC, 2019). Ecomodulation is applied on top of the standard fee, which in turn is based on the 3-ecomodulation levels explained in section 2.1.4 above. Similar to WEEE and batteries, EPR fees along with ecomodulation make a very small part of the price of the product. *Table 6* below shows the EPR fees for clothing and ecomodulation categories.

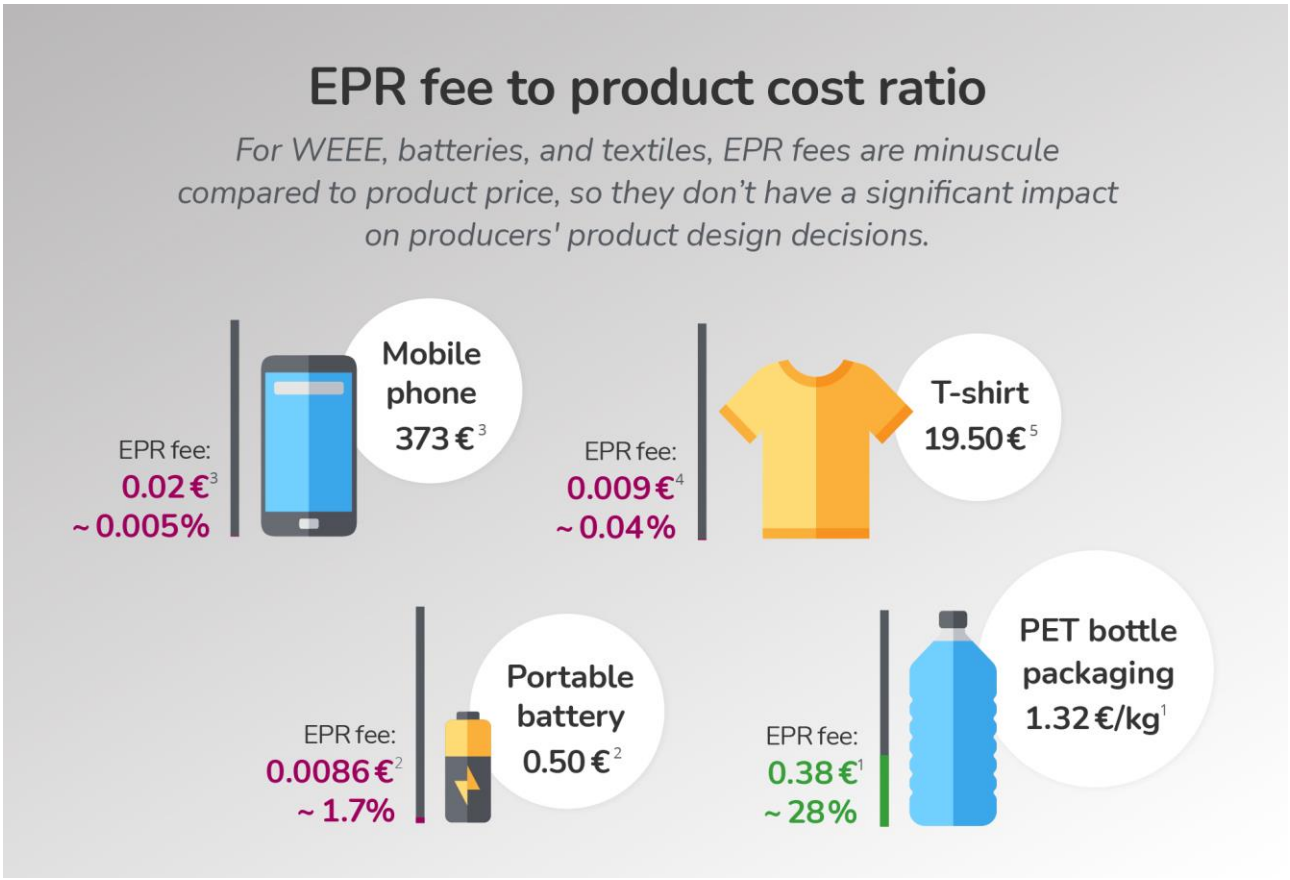
Table 6 EPR and modulated fees for Eco-TLC

Size of items:	Very small	Small	Medium	Large
Standard fee scale (in € excl. VAT/items)	0.002	0,009	0,020	0,063
EM1	0.001	0,0045	0,010	0,0315
EM2	0.001	0,0045	0,010	0,0315
EM3	0.0015	0,00675	0,015	0,04725
Fixed rate	75.00			

Source: https://refashion.fr/pro/en/calculating-fees

The *figure 3* below shows the microscopic EPR fees for WEEE, batteries, and textiles as compared to the price of the product. For example in the case of a mobile phone, which costs around €373 the EPR fees is only 0.005% of the product price. Even after a modulation of 100%, which is observed in the case of France, the EPR fee becomes €0.04 which is still miniscule of the price of the product and is only expected to have impact on product design if the quantity put on the market is large enough to incentivize producers to move to better product design to avoid revenue losses through penalties. For packaging, however, the EPR fees as shown in the graphic is 28% of the price of the product. A bonus or penalty on this fee can provide a significant incentive to the producers to shift to alternatives, which have bonuses.

Figure 3 Illustrative depiction of EPR fee to product cost ratio



Source: [1]https://www.plasticportal.eu/en/polymer-prices/lm/14/; [2]Hogg, et al., 2020; [3]Ecologic, 2018; [4]https://refashion.fr/pro/en/calculating-fees; and [5]Eurostat consumer prices research (Price of ladies' t-shirt in Belgium in 2010)

2.2.2. Issues of Cost Coverage

In the present system, there is a shared understanding that EPR schemes should cover the operational costs of collection, sorting and treatment of the waste minus the revenues generated from the sales of the sorted waste. It is also expected that EPR fees include the costs of providing supporting services such as administrative costs, data collection, and monitoring and compliance (Monier, et al. 2014). This arises from the concept of "necessary costs", which seeks to limit the level of the fee to what is necessary and minimizes waste management costs. In the pursuit of achieving cost minimization, the fee potentially becomes too low to encourage producers to design products, which have high environmental performance such as reusability. This is aggravated by the absence of quantitative targets for waste prevention measures such as reusability, which leads to prioritization of recycling over reusability and thus the costs to increase reusability of a product stream would not be covered under the concept of 'necessary costs'. Since "necessary costs" largely cover waste management costs, EPR schemes have no incentive to prioritise re-use over recycling. In order to minimize costs, PROs will continue to invest in improvement of recycling supply chains and infrastructure instead of developing waste prevention measures such as fostering reuse along the supply chain (RREUSE 2020).

The current cost coverage in an EPR system, due to its limited focus on covering necessary costs, does not take into the social and environmental costs of the products. Even if the cost coverage

covers the real EoL costs, it is limited in its scope as it excludes the environmental and social costs incurred due to the focus on EoL management. For example – single-use plastic packaging which is not collected and recycled ends up in the open environment including oceans. Various studies have reported increasing amounts of plastic pollution has proven to adversely impact human health, food quality and safety, coastal tourism as well as contribute to climate change (Thevenon, Carroll, & Sousa, 2014). If the focus is on only covering real EoL costs, then the social and environmental costs arising out of the plastic pollution mentioned above are neglected and not accounted for. This presents a stronger case for expanding the scope of cost coverage which takes into account the real EoL management costs plus social and environmental costs.

Moreover, successful implementation of modulated fees is expected to involve additional administrative costs, such as monitoring costs and costs for improved data collection. Because at present EPR systems are based on the principle of costs minimization and “necessary costs”, it creates a bottleneck since the revenue generated is presently limited to cover primarily operational expenditure and management costs. This added cost stream might create revenue imbalances, which would then have to be to be balanced by appropriate modulation of fees.

2.2.3. Use of Revenues

Revenues generated through EPR fees and sales of material collected is primarily used for funding operational expenditures. In addition, a small percentage is used towards supporting services such as awareness raising, monitoring and compliance, and to cover administrative costs. The status-quo of EPR schemes follows the principle of cost minimisation and is not able to internalise external costs associated with (managing) the products’ end-of-life, and even less the external costs associated with the products full life cycle. This leaves little space for measures to foster eco-design and waste prevention. There have been various suggestions made by different organisations and authors to extend the use of revenues towards research funds for improving eco-design of the products (Brouillat & Oltra, 2012). Learning from the French textile EPR requirements this can be implemented by a fixed rate or as a percentage of total of the EPR fee in the PRO’s budget (Bukhari, Gallego, & Cueto, 2018) (see *Box 3*).

Box 3 Best practices for use of revenues

The French solidarity re-use fund: With the new French Circular Economy Law, the national transposition of the updated EU Waste Framework Directive, the French state has also created the so-called "Solidarity Re-Use Fund" (Fonds pour le Réemploi Solidaire). This fund will receive 5% of the total fees collected by the EPR schemes for various product/waste streams (e.g. textiles and WEEE) which will be specifically earmarked for this financing actors involved in reuse and the social economy (such as those promoting insertion through employment in recovery and recycling centres). It is expected to receive €50 million a year which will help enable the development of reuse and related networks, which in turn will also contribute to job creation while helping to reduce the amount of EEE that gets disposed. (Rreuse, 2020; Ministère de la Transition Écologique , 2020)

Eco-TLC support to R&D: Eco-TLC from its annual budget allocate € 500,000 to support R&D projects such as research on the use of recycled post-consumer polyester in new clothes; on the remanufacturing or recycling of shoe soles; on the decolorization of fibres to facilitate recycling; and on the mechanical separation of leather and rubber from shoes. As per the Eco-TLC annual report 2019, it had directed € 4.2 million in supporting 53 projects for research and development (Eco TLC, 2019; Ernst & Young, 2018).

2.3. Implementation and Enforcement Challenges

Lack of uniform modulation criteria and fees in MS

There are wide-ranging models of EPR implementation across MS and product streams supplemented by varied criteria for fee modulation. Therefore, depending on the MS and the modulation criteria, a producer will have to pay different EPR fees, thus creating complications within the domestic market and weakening concerted efforts in adopting eco-design and waste prevention measures. If, for example, fees are modulated just in one MS, such as in France for WEEE, there is limited motivation to improve product design for producers putting their products onto different national markets (Hogg, et al. 2020; Watkins, et al. 2017).

Challenges of data availability

Currently, there is limited data available from all stakeholders, such as recyclers, on the real costs of EoL treatment of products as well as on the product specifications including standards, materials and design features. Modulation of fees would need detailed data to conduct analysis on factors such as real EoL costs, social and environmental costs and the level of modulation needed to influence design changes.

Governance Challenges: Free riding, reporting and enforcement

Free riding is a widely reported challenge for EPR schemes in different MS and for different product schemes. (Some) Producers in this case do not pay EPR fees although they are putting

their products on the market (Monier, et al. 2014). In some cases of ecomodulation, free riding could include that producers are not declaring in full the product specifications to avoid penalties. With online sales becoming increasingly popular in Europe there is reported increase in free riding. Similarly, reporting requirements and efforts also discourage small producers with limited capacities or producers selling in multiple markets to resort to free-riding (Hilton, et al. 2019; Hogg, et al. 2020). Free riding results in under-financing of an EPR system as well as over-reporting of collection and recycling targets since not all products placed on the market are declared. It has been estimated that in OECD countries EPR fees are currently unpaid for around 5-10% of the EEE products placed on the market (Hilton, Sherrington, McCarthy, & Börkey, 2019). This share is likely to grow with increase in online sales if monitoring and enforcement measures are not developed alongside. A joint industry commentary on modulating producers' financial and contribution for WEEE highlighted free-riding as one of the major issues in distorting the EPR internal market (DIGITALEUROPE, 2019). Therefore, owing to varied EPR systems in MS, non-harmonized product criteria, limited data and multiple stakeholders involved in an EPR system, enforcement of the modulated fees becomes a challenge. Some MS have implemented measures to check on free-riding, see *Box 4* for some best practice examples.

Box 4 Best practice to reduce free-ridership

Compliance assurance through multi-seller platforms: As a part of the French Circular Economy Roadmap, France announced new obligations for online platforms to tackle free riding in the WEEE compliance system. France requires online multi-seller platforms, such as Amazon, to ensure that the collection and recycling of WEEE arising from products marketed and sold on such websites is properly financed. The onus of proving that the businesses selling product on their website is participating in the EPR scheme lies with the multi-seller platform. The enforcement mechanism, however, is yet not clear. (House of Commons, 2020)

Role of the central packaging register in Germany - The packaging EPR scheme in Germany has developed a web-based public platform called Zentrale Stelle Verpackungsregister (ZSVR) for data monitoring and compliance requirements as per the federal packaging law. The producers putting packaging on the German market are required to register on ZSVR and the data is open to public. This helps in ensuring transparency and the resulting "name and shame" option has helped in reducing free-riding. If a producer is not registered, a distribution ban is applied and penalties are charged. ZSVR is also responsible for creating minimum standards for packaging such as recyclability which is expected to be used by the PROs for ecomodulation of fees (Stiftung Zentrale Stelle Verpackungsregister, 2021).

Compatibility with Competitive Schemes

Different MS have varied EPR systems depending on the respective EPR regulations. For example, for packaging Germany has a competitive EPR system that has ten for-profit PROs competing in an open market, whereas France by regulation is required to have a monopolistic PRO. In a

competitive system, implementation of ecomodulation of fees becomes complicated since any increase in EPR fee for a poor product design would create a competitive disadvantage in a competitive market. This could increase the risks of losing producers as members of a PRO. In a competitive system, certain PROs would be impacted more than the others depending on the product portfolio. For example, if there is a bonus on a certain product and if that product falls in the portfolio of one of the PROs, it risks losing its revenues though the costs incurred would not change significantly since the collection of the product is not happening on product basis but rather on geography basis. For competitive systems, a centralised register, similar to ZSVR in Germany (see *Box* 4) can play an important role in deciding on standards for modulation of fees and ensuring fair competition amongst PROs.

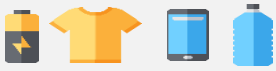
3. Policy Recommendations

3.1. Overarching Policy Recommendations

3.1.1. Developing Modulation Criteria

a) **Harmonisation of criteria across Member States defined according to the waste hierarchy:** There should be harmonisation of product standards and of criteria on which fee modulation is based across the EU. The EU can introduce or call upon uniform product standards set by industrial standardisation bodies (e.g., CEN) that would require producers to maintain such standards, e.g. in relation to durability, reusability, reparability or recyclability. These standards could then be reflected in EU-wide harmonised criteria for ecomodulation of EPR fees, i.e. linking compliance to standards set to lower EPR fees. Overall, product standards should be defined keeping in mind the waste hierarchy by prioritising standards promoting waste prevention over standards focused on EoL of products. With the motive to increase the product lifespan, some recommended overarching waste prevention criteria, which should achieve more attention and priority are highlighted in the table below.

Table 7 Recommend modulation criteria

Waste prevention criteria	Product streams
Reusability/Rate of reuse	
Reparability	
Durability such as extended life time and warranty period	
Absence of hazardous chemicals	

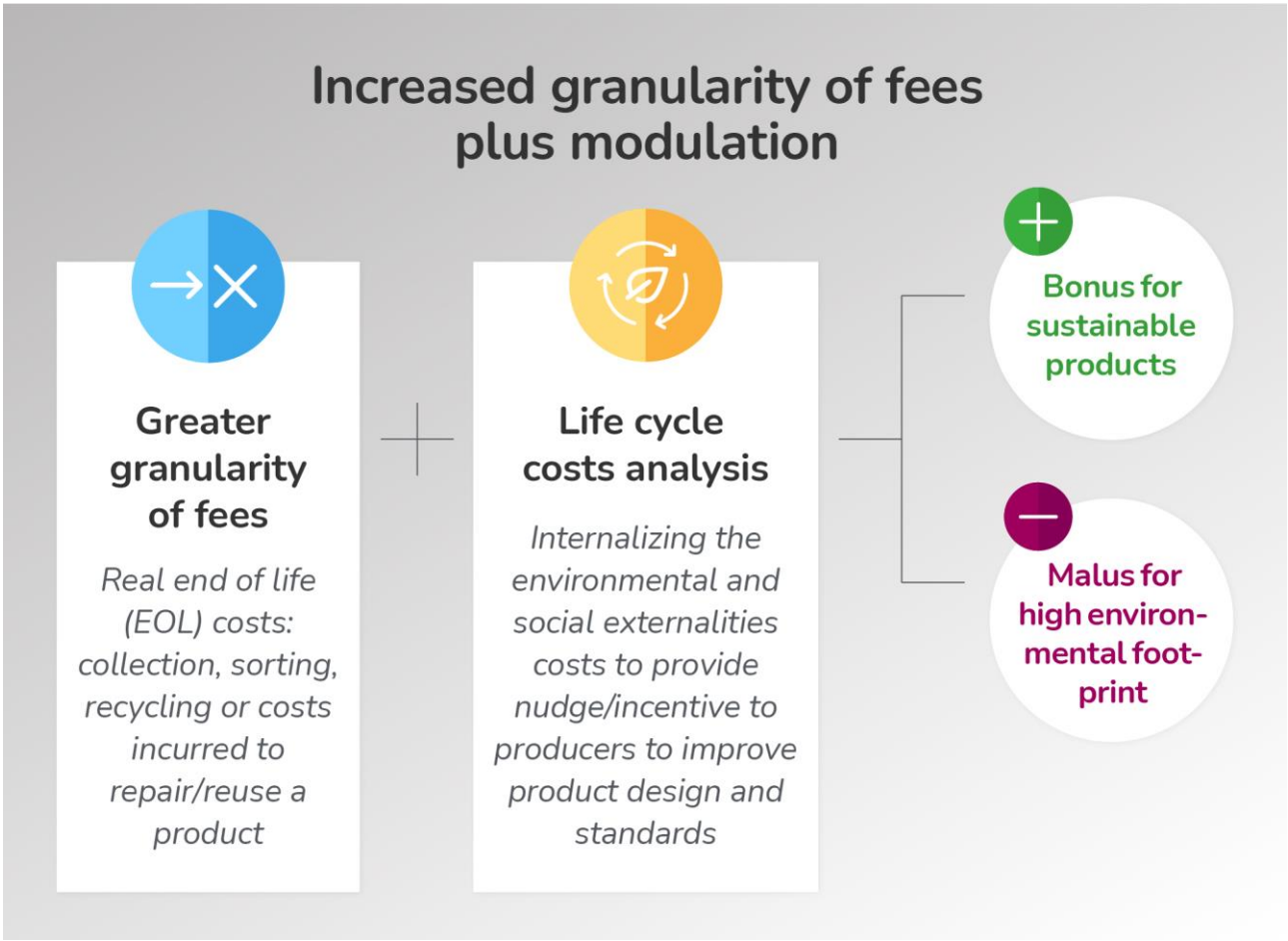
Source: Ecologic Institute, 2021

b) **Bridging EU-wide eco-design criteria with modulation criteria:** The Ecomodulation of fees should be used as an incentive to push for increased adoption for eco-design measures in parallel to the process of broadening the scope of the Eco-design directive to include non-energy products. The link between ecomodulation and eco-design can be defined under the sustainable product initiative. It can be used to create consistency by setting minimum eco-design criteria related to circular economy. Ecomodulation in the form of bonus (malus) can be applied if the product meets (does not meet) the minimum eco-design criteria. Ecomodulation of fees can also act as a stepping stone to achieve eco-design requirements by creating a market incentive especially for measures which require providing access to information such as presence of recycled content.

3.1.2. Smartly setting the size of the fees

c) **To cover real EoL costs as well social and environmental costs:** The EPR base and modulated fees should reflect the real EoL costs and should also include externalities such as social and environmental costs as far as possible. To ensure that EPR fees and ecomodulation takes into account the market externalities such as environmental and social costs, it is recommended that ecomodulation should be applied on top of advanced fees, which is variable and reflective of true EoL costs according to lifecycle assessment data. Bonuses or maluses should be given on top of this as a nudge or incentive to internalize environmental costs arising from market failures (see *Figure 4*)**.** However, care should be taken while determining bonuses and maluses. Fixed levels of bonus or penalties could lead to revenue instability if, for example, the amount of overall bonuses issued are more than the penalties. Therefore, the size of the fee modulation should be carefully estimated such that overall costs are covered and at the same time it drives efforts towards circular economy and waste prevention.

Figure 4 Increased granularity of fees plus modulation



Source: Ecologic Institute, 2021

d) **To ensure fair competition amongst PROs in competitive EPR schemes:** For competitive schemes, a fixed level of bonus or penalty could be decided by a central organisation based on harmonised product standards so that irrespective of the fee size the bonus or penalty remains the same throughout all the competing schemes.

e) **To influence consumer choices**: Currently, for products such as WEEE, textiles and batteries, size of the EPR fee including modulation is very low as compared to the price of the product (see section 2.2.1). This does not have significant impact on either consumer choices or on producers' effort to shift to sustainable products. Therefore, the size of the modulated fees should be kept high enough, which reflects the real EoL costs and social and environmental costs, to have significant influence on consumer and producers preference for sustainable products. Also, currently the price difference between more sustainable and less sustainable product is high. For example: rechargeable batteries cost 4-5 times the price of single use alkaline alternatives, hence to nudge the consumer choice the ecomodulation of fees should be high enough to act as a trigger point for preference for sustainable products.

The increase in size of the fees can be supplemented with visible fees to provide increased access to information for consumers as it can signal the increased amount spent by the consumer in managing the EoL of product and also any bonus or penalty applied to the product. However, for products where the size of the modulated fees is low even after

including real EoL and social and environmental costs, consumers can be provided with information such as on recyclability or reparability. For example, the "reparability index" in France, the first-of-its kind mandatory index, consists of a score between 1 – 10 based on self-reporting by the producers on five different eco-design criteria: ease of disassembly, availability of repair information, availability of spare parts, price of spare parts and conformity to norms on repair related to the product group (mdepypere, 2021). This instrument is intended to foster a more explicit communication of best practices in eco-design.

3.1.3. Cost Coverage and Revenue Use

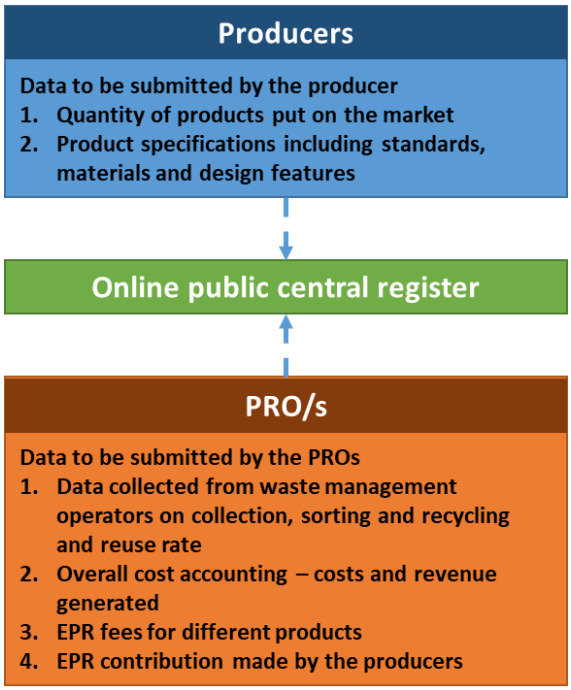
f) **Redefining EPR scheme to expand the scope and cost coverage to include waste prevention measures:** The scope of the EPR fees should be expanded beyond the present understanding of the "necessary costs", which is focused on recycling and waste minimisation, to include costs needed to adopt waste prevention measures. There should be quantifiable targets for waste prevention measures such as reuse, which will push producers and PROs to invest in reuse infrastructure. For plastics packaging, cost coverage could also including a clear (legal) definition of littering clean-ups, which could fall under operational costs of collection, and hence under necessary costs. This could help incentivise waste prevention through re-use as clean-up costs can be very high (e.g.; 13.8 million € annually for Belgium and the Netherlands and around 18 million € annually for the UK, (Watkins & Brink, 2017)).

g) **Earmarking of revenues for circular economy innovation and social economy actors:** The EPR system can be expanded in scope to take into account business models which are promoting and innovating on circular economy (Ecopreneur, 2017). With increase in the size of the EPR fees and expansion of cost coverage principle, as suggested, revenues generated would be expected to increase. This increase in revenue generated from a reformed EPR system can be used to incentivize pioneering companies, social economy actors such as reuse operators, or fund research programs focused on new circular product designs. However, in order to ensure that the increase in revenue generated is used for desired purposes such as – enablement of reuse and repair through supporting social economy actors or investment in research and development, the use of the revenue will have to be earmarked and spent only on desired activities.

3.1.4. Addressing Implementation Challenges

h) **Use of an online platform to tackle free-riding and improve data availability:** Improvement of an EPR scheme is dependent on the availability of data and evidence provided by the producers, such as regarding the quantity of products/packaging put on market, characteristics of the products, as well as of data and evidence provided by the PROs on information such as collection and recycling rates. In the light of ecomodulation of fees availability of such data can play a significant role in improving the knowledge base and working towards an EPR system, which focuses on improved product eco-design. Better availability of data on product eco-design also forms a basis for a fair and transparent system for EPR fees. This could be done by establishing an online platform by a central authority as a clearing house mechanism (see *Figure 5*).

Figure 5 Online public register



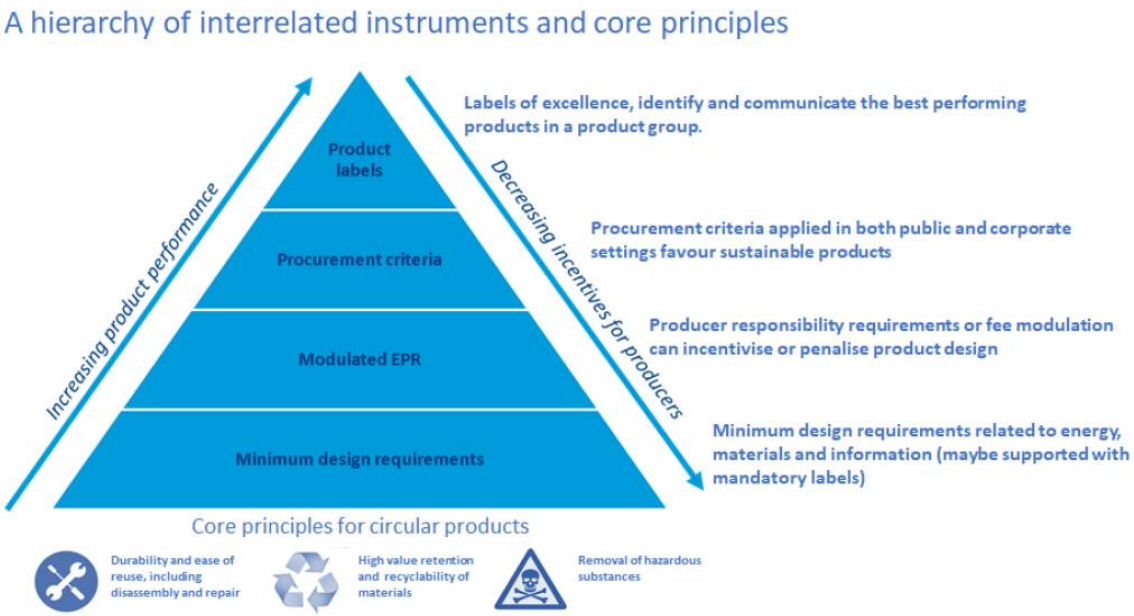
Source: Ecologic Institute, 2021

3.1.5. Make EPR and ecomodulation a key part of a policy mix

i) Through ecomodulation of fees as suggested in this study, EPR has the potential to foster eco-design and circularity in batteries, EEE, plastics and textiles. However, the challenges of adjusting fees at the right level to incentivise design changes as well as more sustainable consumer choices show that EPR can only be part of a wider, overarching policy approach fostering waste prevention and sustainable product design. Therefore, we recommend viewing EPR and ecomodulation as a key part of a policy mix, which in addition also integrates

- regulatory instruments, in particular changes to the Ecodesign Directive to broaden the scope to include circularity issues and going beyond energy-related products;
- further economic incentives, in particular deposit-refund-systems to incentivise (design for) re-use beyond products' end of life; and
- increased transparency and consumer information at the point-of-sale regarding environmental performance, e.g. via the Product Environmental Footprint methodology, and credible labelling.

Figure 6 EPR supplemented by policy mix



Source: European Environmental Bureau, 2020

The table below summarizes the recommendations and also the scope of recommendations for different product streams.

Table 8 Recommendations summary

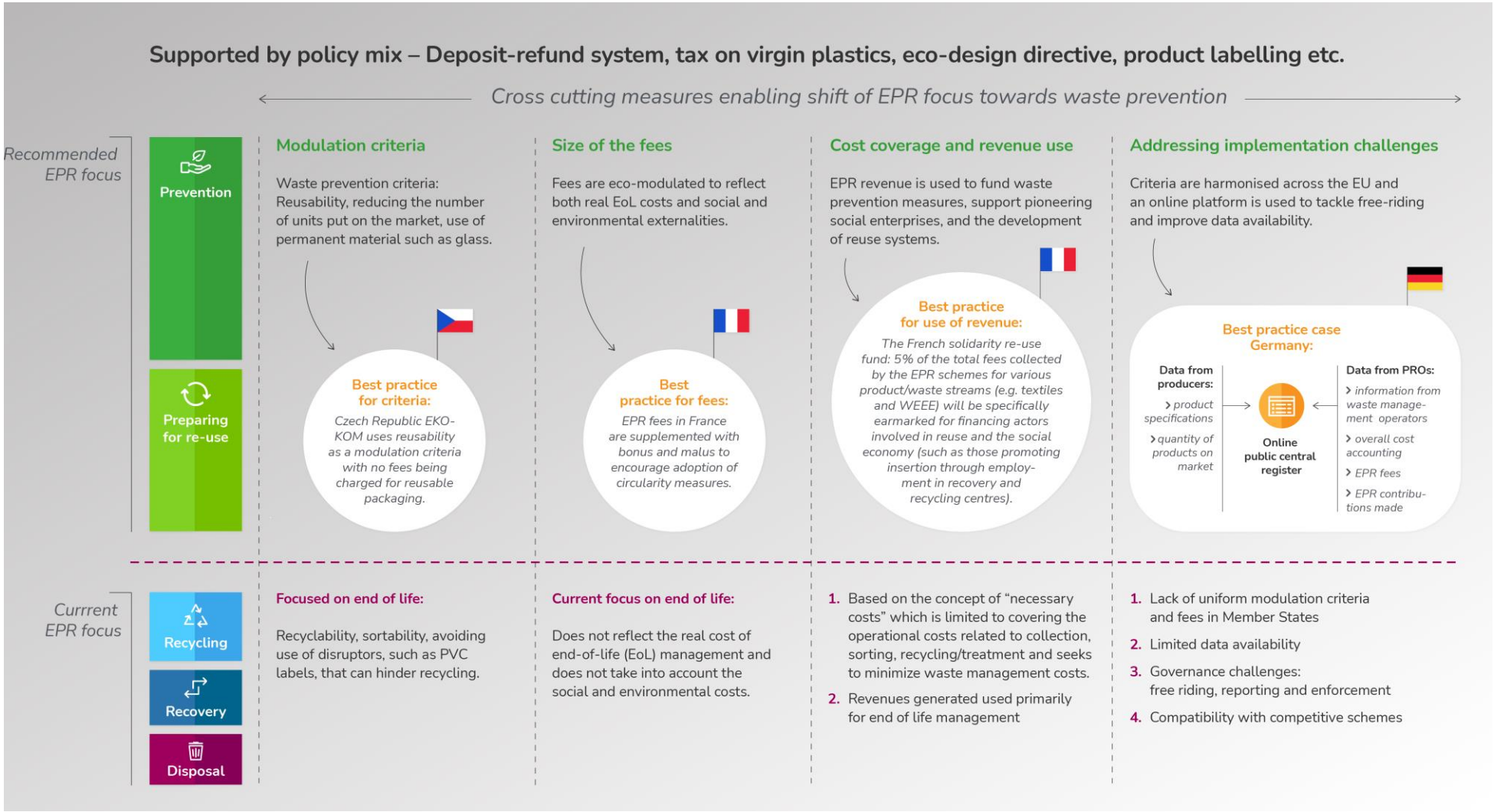
Area of recommendation	Recommendation	Products addressed by recommendation
Modulation Criteria	Harmonisation of criteria across Member States defined according to the waste hierarchy	
	Bridging EU-wide eco-design criteria with modulation criteria	
Smartly setting the size of the fees	Cover real EoL and social and environmental costs	
	To influence consumer choices - Increasing the magnitude of EPR fees including modulation for products with low EPR fees as compared to product's price - Visible fees to indicate the amount paid by consumers towards EoL management and to cover social and environmental costs - Providing information on environmental performance such as "repairability index" in France for products which have low EPR fees to influence consumer's choices	
	Fixed level (as flat rate not as percentage of EPR fees) of bonus and malus for competitive schemes	
Cost coverage and revenue use	Expanding the scope of cost coverage to include waste prevention such as reuse	
	Earmarking of revenue towards activities such as R&D, development of reuse systems, supporting social economy actors etc.	
Addressing implementation challenges	Implementing a public online register	
EPR as a policy mix	Eco-design Directive, Sustainable Product Initiative, Deposit refund schemes, green public procurement	

3.2. Highlights and Way Forward to Packaging EPR

In an effort to move away from single-use packaging to reusable packaging – thereby decreasing the total number of packaging items put on the market (hence, serving waste prevention) – there is an imperative need of systematic shift in the focus of EPR system from recycling to reuse. This calls for a reformed EPR system, which aims to develop and increase efforts towards waste prevention measures by developing a reusable packaging system. This section offers a starting point for this discussion, which will need to be further developed and advanced with further research.

The renewed EPR focus towards increasing reuse rates for packaging can be realised by introducing cross-cutting measures, which supplement each other, along the four thematic areas: modulation criteria, size of the fees, cost coverage and revenue use and addressing implementation challenges. The Figure 7 shown below explains how identification and introduction of measures in each of the above mentioned areas will supplement each other with an aim to develop reusability as a focus for EPR packaging. Due to the existing recycling targets at the EU level, there is a regulatory framework in place to achieve recycling targets. The recycling targets can be supplemented with reuse targets which will provide a regulatory basis for stakeholders involved in an EPR system to develop reuse systems. This would require to expand the scope of cost coverage and “necessary costs” to include costs required to build a value chain for reusable packaging. To meet the new cost coverage to achieve reuse targets, EPR fees will have to be increased, which will increase the revenue generated. However, care should be taken while increasing EPR fees. Following the principle of waste hierarchy and ecomodulation, EPR fee should be increased for packaging which is single use and is not reusable. Reusable packaging on the other hand should be incentivised through lower or no fees for producers to shift from single use packaging to reusable packaging. The increase in revenue generated will further need to be utilised to develop logistical infrastructure required to ensure the reusable packaging reaches back to the producers for reuse. This would need sound governance, more data and increased transparency, which can be met by a centralised online public register.

Figure 7 Way forward for packaging EPR



Source: Ecologic Institute, 2021

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