Exploration of the Role of Extended Producer Responsibility for the circular economy in the Netherlands

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Building a better working world

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1 Introduction

Already in the '70s and '80s, the Netherlands have positioned themselves as frontrunners in the management of waste and secondary resources. A combination of policy ambitions, private entrepreneurship and high population density, has fostered innovation in the treatment and valorization of waste. The Netherlands are now aiming to sustain this leading role in the transition towards the circular economy. The circular economy aspires to transform the typical linear economic model in which resources are extracted, consumed and disposed to a circular model where resources are used in closed circles. In order to achieve its objective, the circular economy concept focuses on eco-design, prevention, re-use, remanufacturing, refurbishment and high-value recycling of products.

Dutch regulations have implemented Extended Producer Responsibility (EPR) for a variety of products and waste streams: packaging, consumer electronics, batteries, vehicles, tyres and float glass. EPR means that producers become responsible, in a financial or operational way, for the end-of-life stage of products sold to consumers. In most EPR schemes, the main objective has up to now been the collection and recycling of waste. However, EPR also aims to foster eco-design and reuse of products as highlighted by the OECD definition (2001):

- EPR shifts the costs for waste management from public actors to producers. This shift induces an internalization of costs that previously were external for producers and consumers of waste-generating products.
- By internalizing the costs of waste management, producers receive incentives to prevent waste. One of the key channels to prevent waste is eco-design of products.

Taking into account that EPR has been successful in enhancing collection and recycling, policy makers are now increasingly looking at the role of EPR in order to enhance eco-design and other circular economy aspects. More specifically, Dutch policy makers have the intention to leverage two upcoming events that can foster the circular economy. First, the long-term National Waste Plan will be published in the coming months and will lay out the main priorities for the following years. Second, from 2016 the amendments in the EU Waste Directive will be negotiated. This offers an opportunity to look more closely at the options for strengthening the instrument of EPR.

In order to support and inspire Dutch policy makers and stakeholders, this report discusses potential pathways to extend EPR with respect to eco-design and other aspects of the circular economy. The report draws upon insights of international literature and a review of EPR schemes in France, Belgium (Flanders) and the Netherlands. Also, some insights from Denmark and Sweden are used but the reviews of EPR in these two countries have only a narrow scope. Moreover, three well-known producers that have extensive experience with EPR in different countries (IKEA, Philips and C&A) have contributed to this report by giving their reflection on the identified pathways via in-depth semi-structured interviews (see Appendix for interview reports).

One of the challenges of EPR assessment is the disparity of EPR schemes in Europe and worldwide. Differences in scope, structure, reporting practices and consumer behavior make comparison between countries difficult. Therefore, comparison between countries should be interpreted with care. In addition, since EPR is often implemented in combination with interacting policy measures such as waste bans or disposal taxes, there is an overall lack on quantitative data to assess the efficiency and effectiveness of EPR schemes. Therefore, in line with most assessments, this report uses qualitative and descriptive arguments to explore the role of EPR.

Since the approach is exploratory, the report focuses on identification of pathways rather than on in-depth assessment. Importantly, identification of a potential pathway does not automatically imply that the benefits of the pathway are sufficient to justify implementation. Indeed, extending EPR induces can induce a significant administrative burden for the involved market actors. Moreover, the design of EPR schemes needs to include compliance and enforcement procedures that are beyond the scope of this study. Therefore, this exploration is a first step but follow-up studies should prioritize, assess and elaborate the pathways in consultation with stakeholders before implementation can be considered.

The study is structured as follows:

- The next chapter discusses key elements of EPR and three potential routes to strengthen EPR in a circular economy perspective;
- The three following chapters each discuss one route using examples from other European countries as illustration;
- The last chapter summarizes the findings and highlights the following steps needed to go from exploration to design and implementation of policy measures;
- The appendices contain a concise overview of the reviewed EPR schemes in the different countries, reports of the interviews and the feedback on the report from VPN (Vereniging Producentenverantwoordelijkheid Nederland – association of Producer Responsibility Organizations – communication in Dutch).

2 EPR & routes for optimization

To facilitate further discussion, this chapter discusses three key elements of EPR implementation in Europe and the Netherlands. In addition, we lay out the routes to enhance the impact of EPR.

A first typical element of EPR concerns the take-back targets: producers have to achieve targets for the collection and the recycling of consumer waste. For example, in European Member States, battery producers will have to collect 45% of all spent batteries in 2016 and ensure that the collected batteries are well recycled. Similarly, car producers have to set up collection, dismantling and recycling schemes for end-of-life vehicles to ensure that 85% of the weight of an end-of-life vehicle is recycled and an additional 10% is valorized via energy recovery.

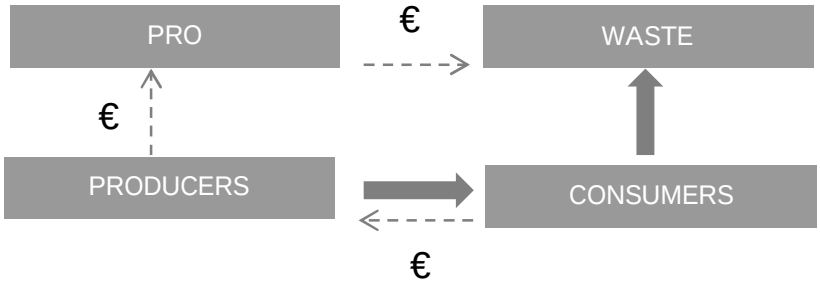

Figure 1: Producer Responsibility Organizations (PROs) play a key role in the implementation of Extended Producer Responsibility. The dotted lines refer to financial flows and the arrows to physical flows.

A second recurring element of EPR schemes is the central role of Producer Responsibility Organizations (PROs) as highlighted by Figure 1. Owing to economies of scale in collection and recycling, producers typically organize themselves in a sector-wide way to achieve the legal take-back targets in a cost-efficient manner. More specifically, producers outsource the set-up and management of an operational recycling scheme to a PRO. In order to finance its activities the PRO receives fees from producers for each product put on the market.

A third important element of EPR is the definition of a producer. The term “producer” refers to the actors putting products on the national market. More specifically, EPR legislation concerns importers and distributers of products rather than production sites. Taking into account that export is exempted from PRO fees and importers have to pay a fee, EPR induces a level playing field for all producers regardless of their origin. Consequently, the competitive position in the international markets of Dutch producers is not negatively affected by new EPR regulations.

In order to strengthen the incentives from EPR for eco-design and other circular economy aspects, Dutch policy makers can opt for the following three routes:

1. Extend the scope of EPR regulation to new products and waste streams
2. Deepen the scope of EPR within regulated streams
3. Strengthen the financial EPR incentives for eco-design

In the following three chapters, each of these routes will be discussed using, where possible, implemented examples of other European frontrunners.

3 Extend the scope of EPR regulation to new products and waste streams

European regulation imposes EPR systems for streams such as packaging and batteries but Member States can implement EPR for additional streams. By applying EPR to new products, collection and recycling of Dutch waste can be enhanced.

The first subsection reviews waste streams that are regulated by EPR in neighboring countries but not in the Netherlands. The second subsection puts forward criteria to assess the suitability of EPR for a waste stream. The third subsection uses the suitability criteria to investigate, in a preliminary way, the potential relevance of EPR in the Netherlands for the streams identified in the international review and streams put forward by Dutch policy documents as priority streams.

3.1 EPR in neighboring regions

EPR in the Netherlands currently applies to packaging, consumer electronics, batteries, vehicles, tyres and float glass. The overview in Table 1 highlights that neighboring countries have also shifted responsibility to producers for other streams. The table not only refers to the typical EPR with take-back targets but also includes collaboration agreements that leave the initiative with producers.
As countries and policies are disparate, the table should not be interpreted as an exhaustive inventory of all policy initiatives in the selected countries.

Products	Countries or regions
Expired medication	France[i], Flanders[ii], Sweden[iii]
Needles	France[iv], Flanders[v], Sweden[vi]
Agricultural packaging & Phytopharmaceutical products	France[vii], Flanders[viii]
Furniture	France[ix]
Textiles, domestic linen and shoes	France[x]
Domestic chemical products	France[xi]
Mobil homes	France[xii]
Graphic paper	France[xiii]
Lubricants	Flanders[xiv]
Frying oils	Flanders[xv]
Mattresses (under consideration)	Flanders[xvi]
Construction & demolition materials (C&D)	Flanders[xvii]
Specific waste streams: printer cartridges[xviii], fluorinated refrigerants[xix], diapers[xx], float glass[xxi]	

Table 1: The overview lists, in a non-exhaustive way, products that are regulated via EPR in other countries but not in the Netherlands. The inventory is not limited to EPR schemes with take-back targets but also contains other engagements of producers.

Table 1 highlights that neighboring countries have used EPR or agreements with producers for a wide array of products and waste streams. We will discuss EPR implementation for the listed streams in a concise way. The assessment of the relevance of these waste streams for the Netherlands will occur at a later stage.

If EPR for expired medication applies, pharmacists or pharmaceutical companies organize and finance the collection. Consumers can, without payment, return the expired goods to the pharmacy that will

pass it on to a centralized collection scheme. The medication is then sent to incineration to avoid further health hazards. In the Netherlands, a discussion is ongoing about the management of expired medication. Most pharmacies accept expired medication for free from households. The treatment and financial management of the collected expired medication differs however per municipality. Some municipalities collect the expired medication at the pharmacies and have it disposed for free while other municipalities ask a fee. The implementation of EPR regulation would imply that producers (either the main pharmaceutical companies or the pharmacies) would become responsible in an operational and financial way for the disposal of expired medication. Operational responsibility would mean that producers can choose between working together with municipalities that collect the expired medication at each pharmacy or opt for reverse logistics to collect the expired medication at a regional or national level such that it can be transported and treated in a cost-efficient way. Financial responsibility means that producers finance the costs for waste management, i.e. if producers opt to work with municipalities, the municipality is a service provider that should be paid for its efforts. Importantly, considering that residual waste in the Netherlands is already incinerated with energy recovery, there is little environmental gain by bringing medication back to the pharmacy compared to disposing it in the mixed waste bin. The use of collecting and treating expired medication separately should therefore be assessed critically. However, there is an environmental gain in disposing expired medication (including fluids) in the mixed waste bin or via the pharmacy compared to disposing it in water sinks because expired medication will pollute sewer systems and rivers.

Another medical stream concerns the collection of used needles. Considering that used needles pose a health risk for garbage collectors, there is a clear motive to collect this waste stream in a separate way. Importantly, once collected the needles will be disposed via landfill or incineration but will rarely be recycled due to health hazards. Therefore, the benefit from collecting used needles in a separate stream avoids health hazards at collection, but does not lead to an environmental benefit. As it is impossible to control if individual users return their needles, separate collection should be cheap or even free for consumers in order to incentivize needle returns via pharmacies. From an EPR perspective the cost of collection and treatment should be borne by producers: pharmaceutical companies that put needles on the Dutch market or pharmacies that sell the needles. In the Netherlands, Belgium and Sweden, producers already contribute to awareness while in France producers have, via EPR, the legal obligation to organize and finance such a scheme.

In neighboring countries, producers and governments have signed collaboration agreements for the collection of agricultural packaging, residues of fertilizers and phytopharmaceutical products. Using reverse logistics, producers set up collection and recycling processes to valorize the material streams. Indeed, farmers can easily dispose of residues in water sinks or on land which may pollute groundwater and rivers. Shifting costs towards the point of purchase and organizing user-friendly facilities via reverse logistics can therefore contribute to higher collection rates. In Flanders, the producer initiative Agrirecover takes back agricultural packaging and residues. In addition, the producers of agricultural films have pledged to increase their efforts with respect to eco-design (thinner plastic films) in a collaboration agreement. France has imposed legal take-back targets.

France has recently implemented EPR with take-back targets to foster the recycling of furniture. The scope includes among others couches, tables, seats, kitchen closets, mattresses, bath room furniture and office desks. Producers have to improve collection quantities and have to reach 45% recycling and 80% valorization (recycling + energy recovery) in 2017. The volume of this stream is significant and amounts up to 20 kg per inhabitant per year in France.

Owing to concerns about waste management, social jobs and economic sorting activities, France has implemented EPR with take back targets on textiles, domestic linen and shoes. The producers will have to collect 50% of the volumes put on the market. More than 20% of the collected materials have to be recycled and more than 95% have to be valorized (recycling + energy recovery). Although the target for collection has not yet been achieved, the recycling and valorization objectives have been easily met.

The amount of textiles put on the market is significant: more than 9 kg per inhabitant per year in France. Although Belgium (Flanders) does not have EPR for textiles, there is a market for secondhand textiles that induces high collection and recycling rates. According to the federation of textile recyclers, Coberec (2015), 70% of all textiles in Belgium are selectively collected, 55% of the selectively collected clothes are re-used as clothes and 37% is recycled. Dutch policy makers have concluded a “green deal” with textile producers in 2012 in order to halve the amount of textiles in the residual waste. The inventory from FFact (2014) indicates that in 2012 only 40% (90 kton) of all end-of-life textiles in the Netherlands (235 kton) were selectively collected with the aim of reuse or recycling. The remaining fraction was collected jointly with residual household waste and incinerated. Comparison of data between countries should however be interpreted with caution due to the disparate frameworks, data sources and measurement methodologies.

In order to ensure a safe treatment and in order to shift costs from public actors to producers, France has also implemented EPR for domestic chemical products with toxic and environmental damaging properties. The regulation concerns for example hydrocarbons, glues, paints, solvents, biocides and fertilizers. Producers have recently set up a collection scheme that should collect more than 0.5 kg/inhabitant/year. The collection scheme collaborates with municipalities (or groups of municipalities) and compensates costs for infrastructure and services. Belgium and the Netherlands do not have such EPR obligations but impose obligations to waste holders of hazardous products and provide collection facilities to ensure safe disposal.

A collaboration between producers has induced an EPR scheme for mobil homes in France. The recycling fee of €100 per purchased mobil-home allows the free acceptance and recycling of end-of-life mobil homes. In 2013, the EPR scheme achieved its recycling target of 75% for collected mobil homes. Evidently, the challenges for end-of-life mobil homes are closely related to the challenges of end-of-life vehicles.

France has an EPR scheme with take-back targets for graphic paper. The current EPR scheme recycles about 52% and will have to increase recycling rates up to 60% in 2018. The legal obligations improve the monitoring of the material cycles and enhance recycling ambitions. However, considering that used graphic paper has a positive market value, i.e. waste collectors pay to obtain the “waste”, waste collectors already have a financial incentive to collect as much used graphic paper as possible. Therefore, other countries such as Belgium leave the recycling market to private actors. Denmark has a collaboration agreement that will only be activated if used paper prices would fall under zero due to price volatility[xxii]. In the Netherlands a similar collaboration agreement[xxiii] between the paper industry and the municipalities exists that guarantees a minimum price. In addition the agreement foresees a one-time small contribution of €3 per ton of paper put on the market for the period from 2015-2018 to finance administrative costs and staffing for the monitoring. A crude comparison between countries highlights that, in the presence of positive market prices for secondary resources, the presence of an active PRO does not necessarily lead to higher recycling rates. Indeed, the recovery of graphic paper in the Netherlands is more than 80% (PRN 2013) which is significantly higher than in France.

Several European Member States such as Belgium have used EPR to further the collection and treatment of spent lubricants. In order to compensate the collection costs, the PRO pays an additional incentive for collection of small quantities. However, since the spent lubricants have a positive price (collectors pay to come and collect the 'waste'), the absence of an EPR scheme does not imply that collection and recycling does not occur. Indeed, even without EPR treatment companies will actively explore the market in order to acquire more oil. The policy benefits of an EPR scheme for lubricants are therefore limited to a better understanding of the structure of the waste market and additional incentives for small quantities.

In 2004, the different Belgian regions have imposed collection and recycling targets on producers of frying oils and frying fats. After its launch, the Belgian PRO, Valorfrit, has actively fostered high-value recovery of collected streams. However, due to the demand for bio-based waste oils for energy or fuel production, the price of this "waste" stream is now positive, i.e. collectors are paying in order to collect the waste. Therefore, no additional financial incentives are needed to enhance the collection of used frying oils. Consequently, Flanders is planning to abolish its obligations with respect to producers.

Flanders is considering to implement EPR for mattresses in 2018. Currently, mattresses are either collected by municipal waste collection facilities (recycling parks) in the bulky waste fraction or via reverse logistics from distributors at the purchase of a new mattress. After collection these mattresses are typically sent to an incinerator for disposal. However, after shredding most materials could be recycled or valorized: metals, latex, PUR, textiles. Since several technical solutions exist, preparatory studies are ongoing that assess environmental and economic effects of the collection and treatment options for an EPR scheme. Considering that mattresses could be part of the wider "furniture" scope, these two topics will be discussed jointly below.

For Construction & Demolition (C&D) waste, no EPR schemes with take-back targets are imposed in neighboring countries. However, Flanders has set up collaboration agreements with producers in order to recycle construction and demolition (C&D) waste. More specifically, producers of several smaller material streams have initiated pilot projects, set up logistic schemes or invested in infrastructure in order to collect post-consumer materials as input for new materials: gypsum, autoclaved aerated concrete, bituminous roofing, PVC and mineral wool. Selective collection of the concerned post-consumer waste streams not only allows high-value material recycling, but also reduces the impurities when construction and demolition waste is used as granulates for load-bearing construction applications. The recent Dutch policy report on C&D (IM 2015) highlights the need for additional actions in order to incentivize high-value recycling of C&D waste. One of the suggested pathways is the introduction of a recycling fee (disposal fee) that is equivalent to the introduction of an EPR scheme. Actually, the Dutch EPR scheme for float glass that will be discussed below showcases that EPR schemes for C&D waste can work efficiently. Importantly, more than 90% of all C&D waste is already recycled in the Netherlands. EPR should therefore focus on valorizing the remaining fraction or improving the sorting such that the secondary resources can be used in higher-value applications.

Printer cartridges are sometimes also included in EPR overviews in France. However, no coordinating PRO is set up and management of waste streams is left over to the market. Considering that electronic printer cartridges fall under the scope of the WEEE directive (2012/19/EU), collection happens under the umbrella of the Belgian WEEE collection scheme, Recupel. In addition, some producers of printer cartridges such as HP, Canon and Ricoh have set up voluntary take-back schemes at the global level. Owing to the positive value of some types of printer cartridges, there are also private recycling companies that collect the refillable printer cartridges for free. Notwithstanding these facilities,

households and companies dispose of a significant fraction of all cartridges via the residual waste bag due to a lack of awareness. Moreover, most recycling companies only collect the valuable cartridges while ink tubes and bottles typically have to be disposed of.

Although fluorinated refrigerants have been incorporated in overviews of EPR in France, no coordinating PRO is set up and management of waste streams is directly regulated. Actually, all European countries have strict regulations on fluorinated refrigerants.

Flemish EPR legislation also refers to a collaboration agreement on diapers. The waste stream makes up to 8% of residual household waste. Collection and recycling of disposable diapers has been tested in different pilot projects. However, both economic and environmental studies indicate that recycling of disposable diapers is currently not efficient. Therefore, the collaboration agreement remains inactive. In the Netherlands a stakeholder dialogue on diapers (NVRD-IM 2015) has been launched last year to inventorize potential pathways for diaper prevention or recycling. However, the dialogue has not yet resulted in policy recommendations.

Interestingly, the Netherlands are the only country that have an EPR scheme for float glass. It is therefore one of the few fully operational EPR schemes with a PRO for construction materials in Europe. The EPR scheme applies an environmental fee of €0.5/m^2 for new double-glazed windows in order to finance the collection and recycling of end-of-life float glass. Actually, pure float glass shards have a positive value which means that glass recyclers are paying to collect large volumes of selectively sorted end-of-life float glass. Thanks to the positive price of float glass shards collection and recycling also occurs in neighboring countries such as Belgium. Therefore, the main contribution of the Dutch EPR scheme is situated in improved monitoring of the material flow and more intensive collection of small quantities.

3.2 Criteria for EPR implementation

OECD (1996), OECD (2001) and Smith (2006) highlight that the efficiency and effectiveness of EPR schemes depend on elements such as the characteristics of a waste stream, the policy ambitions and the local framework conditions. Table 2 lists five key criteria that can be used in a preliminary stage to assess the local relevance of EPR policies for a product or waste stream. The sub-criteria specify elements that have to be taken into account for the interpretation of the criteria.

Criteria	Sub-criteria
1. The level of control at the end-of-life stage	• Amount of producers versus consumers • Regulatory oversight and control at end-of-life stage • Regulatory oversight and control at the point of purchase versus the waste stage
2. The environmental scope for improvement	• Potential disposal damage or potential resource savings from recycling • Scope for cost internalization, eco-design or re-use • Volume of waste/product stream
3. Existing incentives for end-of-life treatment	• Value of the waste stream • Effectiveness of already existing policy measures • Effectiveness of ongoing voluntary initiatives
4. The availability of alternative policy instruments	• Market-based instruments • Command & control measures • Green deals
5. Political priorities	• Budget constraints & international competitiveness • Ambitions with respect to the circular economy • Lobbying

Table 2: Five key criteria (and their subcriteria) that can be used to assess the local relevance of EPR policies for a product or waste stream

Economic scholars stress that the lack of control at the end-of-life stage of goods is a main argument to implement EPR. Due to the amount of consumers, ensuring compliance of households and firms with sorting prescriptions for waste is challenging. Moreover, financial incentives such as high waste collection fees can be circumvented by escape routes such as fly tipping or dumping. Consequently, EPR shifts the cost for waste management from the end-of-life stage to the purchase of a good via the PRO fee because policy makers typically have more control at the point of purchase. Indeed, other taxes such as VAT or import duties already apply at this stage such that control measures on the price and sold volumes are already in place. The level of control at the end-of-life stage depends on the waste stream and local conditions. For example, controlling the waste streams of a restricted amount of industrial companies can be feasible without excessive administrative costs for the government while controlling large amounts of individual consumers is practically infeasible. Consequently, EPR is well suited for streams where control on the waste stage is challenging and control on the point of purchase feasible.

The environmental scope for improvement of EPR depends on several stream-specific elements:

- EPR with take-back targets can only induce environmental gains if products can be recycled or contain hazardous materials that pose a risk if improperly treated;
- Both the downstream gains of recycling (less disposal of end-of-life products) and upstream gains of recycling (resource savings for new products) should be taken into account. For example, float glass can be disposed without significant downstream risks owing to its inert nature, but recycling allows significant energy and resource savings for the production of new float glass. By recycling rather than disposing end-of-life goods, the environmental impact of the whole life cycle can be improved;
- The volume of the waste flow determines the overall potential gains. For tiny waste streams the environmental gains from recycling may not be worth the complexity from an additional EPR scheme.

The need for additional policy initiatives and therefore also the potential impact of new EPR schemes depends on the existing incentives for end-of-life treatment.

- A first element that determines the incentives for collection is the value of a waste stream. Indeed, homogeneous waste streams such as metal scrap with positive market prices do not require EPR regulation because the waste collectors have sufficient incentives to collect and recycle the waste. However, EPR can still offer an added value for end-of-life goods with positive value if they contain components with significant environmental benefits from recycling or hazardous properties. For example, end-of-life vehicles have a positive value which means that collection on its own does not require additional policy incentives. Nonetheless, considering that actions such as treating fluids, dismantling materials prior to shredding and recycling residues after shredding, bring significant environmental gains, EPR has an important contribution regardless of the value of an end-of-life car;
- If existing policy instruments fully internalize external costs and give efficient incentives for sustainable materials management, the additional gains of EPR will be limited. More specifically, Dutch policy makers have already implemented a wide array of policy instruments such as landfill taxes, incineration taxes, support for recycling infrastructure, waste disposal prohibitions, waste disposal obligations, municipal collection facilities and green deals. The added value of EPR to the existing situation has to be clarified before considering implementation.
- Third, ongoing voluntary initiatives may already fill the place of EPR. For example, print cartridge producers such as Ricoh, HP and Canon have voluntary take-back processes. EPR should complement these actions by focusing on their black spots rather than substituting these actions.

Considering that all policy instruments have strengths and weaknesses, the suitability of EPR for a specific application depends on the benchmark and availability of alternative policy instruments. The efficiency, effectiveness, and complexity of EPR should be compared to market-based instruments (e.g., waste disposal taxes, product taxes, sorting subsidies and differentiated tariffs for collection of household waste), command & control measures (e.g., landfill prohibitions or obligations) and voluntary collaboration agreements (e.g., green deals). Although an extensive benchmark of policy instruments falls beyond the scope of the study, we discuss some key differences between EPR and the limited set of six policy instruments that have been mentioned in this paragraph to highlight some of the characteristics of EPR:

- Considering that disposal taxes such as incineration are close to the externality (air emissions), they can give efficient incentives for waste management. However, such downstream incentives typically fail to reach the upstream decisions makers. Indeed, producers and consumers are hardly affected by incineration taxes because municipalities absorb most of the burden. In addition, disposal taxes may handicap national producers or recyclers while EPR ensures a level playing field for all producers regardless of their origin (assuming that illegal free riding can be kept under control);
- Product taxes can give efficient incentives for prevention by reducing the consumption of waste-generating goods. In addition, they can generate revenues for government while EPR is a budget-neutral exercise for the government. However, product taxes do not create incentives for recycling;
- Sorting subsidies can incentivize sorting and are typically popular with all stakeholders. However, subsidies do not internalize external costs. Indeed, by making waste management cheaper, subsidies obstruct incentives to prevent waste. Moreover, subsidies require government funding which is typically unavailable;
- Differentiated tariffs for collection and recycling of household waste can give incentives for sorting. However, due to the political unpopularity and the availability of escape routes such as littering and fly-tipping, the typical tariffs are far from the full cost of waste management which undermines the effectiveness;

- Prohibitions and obligations of disposal have similar constraints when control and enforcement are not credible. For example, prohibiting consumers from putting chemicals in the residual waste bin is difficult to control. Idem for disposing fluid residues such as spent lubricants or frying oils via the sewage system. In contrast, EPR with take-back targets puts the burden of waste collection on producers that put into place facilities and incentives to raise collection rates;
- Voluntary initiatives may create the right environment for innovation and collaboration. However, due to the non-binding nature, the effectiveness of voluntary initiatives is often limited as only soft measures are put into practice[1].

The implementation of EPR will ultimately depend on the political priorities. The following issues may matter from a political point of view:

- If a government aims to foster recycling in a budget-neutral way, EPR is a well suited instrument. However, if the aim is to generate revenues for the government, product and disposal taxes are better candidates;
- Considering that EPR applies to all producers and importers in the country, while exported volumes are exempted, EPR should not disturb the level playing field or generate international competitive handicaps for companies located within the country. However, free riders (via for example uncontrolled e-shopping or informal parallel imports) that do not pay the PRO fees can have an undue competitive advantage if control and enforcement of EPR obligations is weak. Also, consumers that shop across the border can escape national PRO fees;
- As will be highlighted below, EPR can contribute, up to a certain extent, to circular economy aspects such as eco-design, re-use and recycled content. Clearly, these aspects will only matter if the Dutch policy makers aim to take up a leading role in the transition towards a circular economy;
- Lobby groups for producers, consumers, waste companies and municipalities affect decision making. Considering that political decisions need support from stakeholders, the implementation of EPR will depend on the position of local stakeholders with respect to EPR and their influence on policy makers.

3.3 Relevance of new EPR obligations in the Netherlands

This subsection uses the five criteria from Table 2 to assess the relevance of EPR in the Netherlands for a limited set of streams. The set is constituted by the following products:

- the streams from the international review listed in Table 1
- the priority streams of the Dutch policy for the life cycle of materials: diapers, mattresses, textiles, food waste, furniture, household chemicals, cardboard packaging and hard plastics. Only, cardboard packaging is not taken into account in this subsection as it is part of the already existing EPR scheme on packaging and will therefore be discussed in section four.
- after consultation with the Dutch authorities, abandoned small-sized leisure boats and abandoned bicycles were added, owing to the growing public awareness on the issues[xxiv]. Abandoned boats mainly have a negative visual impact but can also lead to water pollution via motor fluids. Abandoned bicycles induce public nuisance in city centers and abandoned batteries of e-bikes may lead to environmental pollution. Both leisure boats and bicycles contain materials such as metals, plastics and rubber that can be recycled or reused.

1 See for example Hickle (2013) and Nash and Bosso (2013) that review in a critical way voluntary EPR and Product Stewardship programs in North America.

Table 3 illustrates how the criteria can be applied on the selected streams. The table only takes into account arguments that are specific to the concerned products. Moreover, the discussion below is only a preliminary exercise that should be further validated and elaborated using detailed stream-specific data, environmental analysis, economic modelling and stakeholder consultations.

+	motivation to implement EPR	-	no motivation to implement EPR
+-	arguments in favor and against EPR	/	no specific relevance of this criterion

Product/waste stream	Control end-of-life	Environmental scope	Existing incentives	Alternative policies	Political priorities
Expired medication	+	-	-	/	/
Needles	+	+	+-	/	/
Agro-packaging & residues	+	+	-	/	/
Furniture including mattresses	+-	+	+-	/	+
Textiles & shoes	+	+	+-	/	+
Chemicals	+	+	+-	/	+
Mobil homes	+-	+	+	/	/
Graphic paper	+	+	-	/	/
Lubricants	+	+	-	/	/
Frying oils	+	+	-	/	/
C&D materials including float glass	+-	+	+-	+-	+
Printer cartridges	+	+-	+-	/	/
Diapers	+	+	+	-	+
Food waste	+	+	+-	/	+-
Hard plastics	+-	+	+	-	+
End-of-life leisure boats	+-	+	+	/	/
End-of-life bicycles	+	+-	+-	/	/

Table 3: Preliminary application of the criteria to evaluate the relevance of EPR in the Netherlands for a limited set of products and waste streams.

Table 3 highlights that the control at the end-of-life stage on almost all listed streams is weak. Enforcement of sorting guidelines and prohibitions is challenging since households can easily use the residual waste bag or sewage system to dispose of waste fractions. However, some control can be exerted for the following waste streams: bulky furniture such as mattresses, mobil homes, construction & demolition (C&D) materials, bulky products made of hard plastics and end-of-life leisure boats. Due to their bulky nature, fly-tipping of mattresses and bulky products made of hard plastics is highly visible which increases the social barrier for illegal disposal. For C&D waste, disposal via the residual waste bag is hardly an option due to the volumes involved. Abandoned end-of-life mobil homes and boats are not

only highly visible but can sometimes be retraced to their owners what makes it more risky to dispose illegally.

The environmental scope is significant for almost all listed waste streams owing to hazardous properties, potential disposal damage, potential resource savings upstream, volumes involved, eco-design potential or external costs for waste management. More specifically, needles, agro-residues, chemicals, lubricants and electronic printer cartridges have hazardous or environmentally damaging properties. Agro-packaging, furniture, textiles, graphic paper, frying oils, C&D materials and hard plastics are available in significant volumes that can induce significant resource savings upstream when recycled. Abandoned bikes mainly cause non-environmental externalities such as public nuisance. In addition, by recycling the metals and rubber of bikes or reusing components, resource savings upstream can be achieved. Diapers and food waste constitute a substantial fraction of the residual mixed waste such that EPR can improve cost internalization and potentially prevention. Mobil homes and end-of-life leisure boats are limited in amount but considering that they have similar recycling benefits as end-of-life vehicles including these two streams in an EPR scheme is coherent with other policies. The environmental gain of recycling non-electronic printer cartridges (containers with ink) seems limited taking into account the small volumes involved and the lack of hazardous properties. Table 3 also highlights the lack of environmental benefit from collecting expired medication. The volume of the waste stream is limited and, as discussed earlier, expired medication will be incinerated even when it is collected in a selective way. Therefore, the environmental impact of separate collection will be similar to disposal via the residual waste bag. Actually, the environmental impact of disposal of expired medication via the residual waste bag may be even lower owing to the need of additional logistical movements in case of separate collection.

Since the Netherlands are one of the frontrunners in waste management, many initiatives already exist to foster waste management. Therefore, new EPR schemes should complement rather than substitute existing incentives. For needles collaboration agreements between municipalities and pharmacies already exist. However, the financial burden is not always carried by producers but often by municipalities. Considering that reverse logistic schemes exist for agro-packaging and agro-residues, the added value of new EPR regulation seems limited. Municipal facilities accept furniture (including mattresses) in the public recycling facilities and support reuse. However, significant volumes are incinerated or landfilled as bulky waste rather than recycled or reused. Although there is a vibrant market for secondhand textiles and recycling of fibers, disposed fractions are still significant. The Dutch green deal is a good initiative, but more binding objectives may be needed to realize substantial improvements. The regulation and facilities for chemical products are already into place. However, the financial burden for household waste is mostly carried by municipalities rather than producers. Considering that ambitious EPR legislation is put into place to enhance recycling of end-of-life vehicles, a similar scheme for mobil homes seems a logic next step. Since the value of waste streams from graphic paper, spent lubricants and frying oils is positive, private companies already collect considerable volumes. It is unclear how EPR would further enhance collection and recycling. The example of float glass in the Netherlands highlights that C&D waste streams can be effectively regulated by EPR. Considering that the bulk of C&D waste is already recycled, EPR should however only focus on smaller waste streams that pollute the bulk streams or contain significant potential for high-value recycling. Electronic printer cartridges already fall under the scope of the WEEE directive and can therefore be easily regulated via the existing EPR scheme. For example, in Belgium collection of electronic printer cartridges is organized via the PRO for WEEE, Recupel. In addition, private companies collect the reusable printer cartridges owing to the positive value. Notwithstanding these incentives, the fraction of printer cartridges disposed of without reuse or recycling remains significant. The current stakeholder

dialogue on diapers is a good way to inventorize potential pathways for improvement. However, the success of current initiatives for prevention, collection and recycling is limited. Food waste is related with packaging. Notwithstanding the substantial efforts invested in the context of EPR regulation for packaging, the volumes of food wasted remain significant. The initiatives for hard plastics and end-of-life leisure boats are limited at the moment, which implies that EPR can contribute to more efficient and effective waste management practices. Considering that most bicycles contain substantial fractions of metals, private metal recyclers already have financial incentives to collect end-of-life bicycles. Consequently, a clear assessment of the barriers for collection of abandoned bicycles is needed before EPR implementation can be considered. The batteries of e-bikes can be easily regulated by the existing EPR scheme for batteries. For example, the Belgian PRO for batteries, Bebat, recently introduced an EPR fee of 12 € for each e-bike sold.

Before considering EPR implementation, the benefits and costs of EPR should be compared to potential alternative policy instruments. Although this benchmark is relevant for all streams, Table 3 draws the attention to three streams. First, in order to upgrade the quality of C&D waste, the sorting of smaller material streams (such as gypsum, autoclaved aerated concrete, float glass, bituminous roofing, PVC and mineral wool) via selective demolition (also called de-construction or dismantling) is key.
By imposing EPR for these smaller C&D streams, the concerned producers will have to provide additional incentives to dismantle in a selective way. In this case, the financial burden falls upon the producers. Alternatively, the Dutch government could also impose the obligation on owners of houses to dismantle all construction materials in a selective way. Such an obligation should be combined with an extensive third-party audit to inventorize the material streams prior to demolition and proof of selective dismantling via recycling certificates after the demolition. Such a regulatory approach puts the financial burden with the owner of the house rather than with the producer of construction materials. Considering that both EPR and the regulatory approach can achieve similar environmental benefits for C&D waste, a detailed assessment of both instruments is needed.

Second, considering that recycling of disposable diapers is currently not an interesting option from both an environmental or economic perspective, EPR with take-back targets is not suitable for this waste stream. If policy makers want to stimulate prevention, eco-design or cost internalization, a better instrument would be a product tax (also called eco-tax or advance disposal fee) on the sale of disposable diapers. Indeed, such an upstream product tax could shift the cost of waste management from municipalities to the producers/consumers of the waste-generating products. Third, EPR starts from a product-centric perspective, i.e. in order to bestow responsibilities on producers it is key to identify a specific group of producers. Conversely, the policy focus on hard plastics starts from a material-centric perspective, i.e. it focuses on a wide variety of products that are related to each other via their material composition. In addition, the material 'hard plastics' covers plastics with totally different actors and recycling processes (PE, PP, PET, PVC, …). For example, for PVC a voluntary recovery scheme, Recovinyl, exists and some companies are already collecting post-consumer PVC as feedstock for new products[2]. For other hard plastic streams other framework conditions apply. Consequently, this stream should be further subdivided in order to investigate whether EPR is the best instrument to foster recycling. Ultimately, the political priorities determine which policies are implemented. From a general perspective, the principles of EPR suit the current political priorities well considering that it internalizes costs by shifting tasks away from municipalities, is a budget-neutral policy instrument for national policy makers and does not induce competitive handicaps for local producers. Focusing on the individual streams, we observe that both the Dutch government and the European Commission (in the circular

2 See for example http://www.deceuninck.be/fr/deceuninck-recycling.aspx

economy package) have put forward food waste, textiles and furniture including mattresses as priority streams for the circular economy. However, implementing EPR or taxes on food producers may be in conflict with other policies and stakeholder interests in the food chain. The European Commission also highlighted the key role of C&D waste which is already a focal point of Dutch policy makers for two decades. Other waste streams of the table that are a priority in the Netherlands are chemicals, diapers and hard plastics. Assessing the contribution of EPR for these waste streams would be coherent with stated policy ambitions in the Netherlands and Europe.

Overall, the international review and preliminary analysis suggest that EPR can be extended to a wide variety of streams. EPR can foster circular economy activities for priority streams such as furniture including mattresses and textiles. EPR can also contribute to the valorization of C&D waste but other policies may have similar effects. Implementation of EPR for food waste is possible to internalize costs but other policy priorities may intervene and impede implementation. Other streams where EPR can enhance recycling in the Netherlands are print cartridges, mobil homes and end-of-life leisure boats. Considering that for streams such as needles and chemicals many measures have already been taken, the role of new EPR obligations would be limited to cost internalization. Due to a lack of environmental benefits, EPR regulation seems less relevant for expired medication. Also, existing legislation and positive resource prices already induce recycling for agro-packaging & residues, graphic paper, lubricants and frying oils. For diapers, other policies such as a product tax may be more suitable to internalize waste management costs owing to the difficulty to recycle this waste stream. The focus on hard plastics should be further clarified with respect to concerned products before the suitability of EPR can be assessed.

Importantly, the preliminary analysis focuses on identification of potential pathways rather than on in-depth assessment. Such an in-depth assessment of the suitability of EPR requires extensive, stream-specific research and consultation with stakeholders that falls beyond the scope of this exploratory study.

4 Deepen the scope of EPR within regulated waste streams

The second route to enhance the impact of EPR is to deepen the scope within regulated products or waste streams. For the Netherlands, the current EPR schemes are related to packaging, consumer electronics, batteries, vehicles, tyres and float glass. Table 4 presents potential pathways that can be imposed by governments but can also be taken by producers and PROs on a voluntary basis.

- Increase EPR take-back targets
- Combine static take-back targets with product taxes for non-collected waste
- Focus on environmental footprint (including critical materials) rather than on weight
- Introduce targets related to prevention, eco-design, recycled content or reuse
- Introduce targets related to downcycling and upcycling
- Extend the role of producers in waste-related challenges such as littering
- Extend the role of producers to secondhand goods exported to developing countries
- Extend the role of PROs to support innovation and R&D

Table 4: Potential pathways to further the circular economy by EPR within regulated waste streams.

Considering the explorative scope of the study, the potential pathways should be interpreted with caution, since further assessment is needed to evaluate the viability for individual waste streams. Indeed, implementing additional EPR measures entails a cost that will be (fully or partially) shifted towards consumers. Therefore, further research should assess the costs and benefits of each measure in consultation with the relevant stakeholders.

A straightforward way to close material loops is to raise the legal EPR take-back targets beyond the European minimum. For example, Flanders already had a collection target of 45% for spent batteries years, before it had been imposed by Europe. Clearly, by imposing higher targets the producers are obliged to do additional efforts. For example, the new European directive on WEEE significantly raises the minimum collection rates in 2019 to 65% of all consumer electronics put on the market or 85% of all WEEE. For comparison, in 2010 reported WEEE collection in the Netherlands only amounted up to 7,5 kg per inhabitant (28% of the weight of products put on the market) (Huisman et al. 2012). Producers and PROs are already investigating which additional actions are needed to reach these new legal targets.

In order to achieve higher targets, producers will not only have to strengthen collection efforts, but also reporting tools. Indeed, since some metal-containing waste streams such as WEEE or car batteries have a positive value, private companies collect and recycle the end-of-life goods. Although these private companies often treat the waste in line with legislation, they do not report their volumes to producers unless an obligation is imposed or a financial incentive is provided. Another reporting issue relates to the hoarding of, for example, batteries in households. Since households keep batteries, they only become available for collection after several years which reduces the current statistical collection rates in function of batteries put on the market. Consequently, higher EPR targets should concur with better reporting.

On the basis of Corporate Social Responsibility, Producers and PROs can also take voluntary initiatives that increase collection beyond the legal target. For example, the collection of WEEE in Belgium is about 10 kg/inhabitant which significantly exceeds the historical target of 8 kg per inhabitant. Considering that increasing take-back targets is an exercise that requires extensive research, in-depth consultation of stakeholders and significant political courage, policy makers typically prefer to encourage producers to take additional voluntary measures.

Another way to incentivize producers to collect waste beyond the collection target is to combine the take-back target with a tax on non-collected (or non-recycled) waste fractions. For example, in 2010 the Dutch EPR scheme for packaging collected 283.000 tons of waste plastics which corresponds to almost 50% of all plastic packaging put on the market. Although this result already exceeds the Dutch legal target of 42%, it also implies that about half of all plastic packaging (the non-collected fraction) is disposed without recycling. However, due to the static collection target packaging producers have no incentive to collect more in the future. In addition, take-back targets are typically static (i.e. are difficult to change) due to vested interests and the detailed information needed to determine targets. Static take-back targets combined with a lack of incentives to go beyond the target leads to a stationary situation without drive for innovation. Policy makers can change the incentives in such a situation by imposing a product tax that is related to the amount of waste that is not collected for recycling. The tax per product put on the market should be high if collection rates are low and should decrease if producers succeed in collecting and recycling more waste. Such a tax would internalize the treatment costs of non-collected (or non-recycled) waste and would give producers sustainable incentives to increase collection without the data-intensive policy exercise needed to determine the level of increased take-back targets. Importantly, the tax on non-collected waste fractions will only give incentives if it relates to the amount of waste collected and recycled, i.e. the tax should not be fixed but should decrease if producers succeed in increasing collection. Clearly, if non-collected waste fractions are taxed, calculation and reporting of non-collected volumes have to be improved. The Belgian EPR for packaging already pays a contribution of €0.5 per inhabitant as general compensation for all the packaging waste that it is not captured by their scheme. However, as it is a fixed amount, such a contribution will not create incentives for more collection. In a similar way, the French PRO for graphic paper provides a (partial) compensation for the waste paper that municipalities find in the mixed waste. Imposing a product tax for non-collected waste fractions to complement static take-back targets, could further internalize costs for waste management in the Netherlands and could give financial incentives for additional collection.

Current EPR targets are typically weight-based. The target to collect and recycle WEEE in 2019 is 65% of the weight of all waste put on the market (or 85% of all waste arisings). However, weight is not necessarily a good indicator of environmental footprint. For example, the contribution of rare earths, precious metals and plastics to the environmental potential for recycling far exceeds their relative weights in the overall WEEE stream. Consequently, in order to achieve the legal targets, recycling heavy products such as washing machines with steel and concrete is more important than small sophisticated products that contain plastics and precious metals such as consumer electronics. This shortcoming could be circumvented by determining product-specific take-back targets if environmental assessments indicate that the environmental potential for recycling of a product is significant.

Considering that the extraction and refining of virgin resources generates significant upstream externalities, the use of secondary resources, i.e. the recycled content, can improve the environmental footprint of a product (Damgaard et al. 2009, Acuff and Kaffine 2013). As already suggested by OECD (2001), EPR can enhance the use of secondary resources by imposing recycled content standards. Such standards should leave sufficient flexibility to producers to improve their cost efficiency, i.e. producers that are able to include recycled content at low cost should be incentivized to do so, while producers that can only increase the recycled content of their products at high cost should not be obligated to take such costly measures. As will be discussed more in detail in section 5, the EPR schemes in France have introduced financial incentives to increase the recycled content for packaging, graphic paper and textiles. These financial incentives induce investment in recycled content while leaving flexibility to improve the efficiency of the recycled content measures. However, currently the financial incentives are

connected to one single threshold, i.e. it is all or nothing. For example, textiles with a recycled content of more than 15% have to pay less to the PRO. Increasing the recycled content beyond 15% brings no further financial gain. The insertion of different thresholds would make the incentives more dynamic. For example, if a textiles producer includes 30% recycled content, his financial incentive would be doubled.

The scope of EPR schemes can be extended by including prevention targets. For example, the French PROs for packaging, Eco-Emballages and Adelphe, had to achieve a prevention target of 100,000 tons of packaging between 2010 and 2012. In a similar way, the French PRO for furniture, Eco-mobilier, has to reduce the end-of-life arisings of furniture by 3% by 2017 via prevention and eco-design. Clearly, such targets require detailed information on the material flows and an objective measurement methodology. One of the elements that can contribute to objective measurement is the EN 13428 norm that determines a procedure to assess eco-design and prevention.

Reuse, refurbishment and remanufacturing are central topics in the circular economy debate. Dutch EPR schemes for consumer electronics and French EPR schemes for textiles already state the objective to foster reuse. In addition, reuse is defined in a legal way in the European Waste Framework Directive and the waste hierarchy. Moreover, in the circular economy package, the European Commission recently repeated the proposition to foster reuse by quantitative objectives. An example of such a quantitative objective is the legal target of the French PRO, Eco-mobilier, to foster reuse so that the total volume of reused goods increases with 50% by 2017. A more exotic example comes from Colombia where the producers of consumer electronics have to achieve a reuse or refurbishment rate of 30% of all collected end-of-life appliances (Ley 1215 2010, Ministry of Environment 2014).

Academic research and policy discussions increasingly refer to the concept of downcycling (also called open-loop recycling). Downcycling implies that waste is recycled in a low-value application, rather than being recycled back into the original application (closed-loop recycling or upcycling). For example, mixed waste plastics do not achieve the same purity as virgin plastics but can be used in specific applications such as street furniture or flower pots. Also, mixed construction and demolition waste is not landfilled anymore in advanced regions such as Flanders, but used as a low-value filler under roads. Although downcycling would typically be better for the environment than landfilling or incineration, it still leads to a degradation of materials without closed loops. Notwithstanding the intuitive appeal of these concepts, implementation of EPR targets for upcycling and downcycling in the Netherlands seems challenging in the short run because no legal definitions are available. Indeed, the waste hierarchy does not contain references to either upcycling or downcycling. In addition, the environmental evaluation of downcycling vs upcycling requires further research to ensure that the energy needed for upcycling does not exceed its gains compared to downcycling. If Dutch policy makers aspire to go forward on this topic, they need to provide both a national legal definition of downcycling and thorough environmental assessments of the environmental effects.

Although EPR is typically associated with collection and recycling targets, the responsibility of producers can also apply for other waste-related issues such as littering. Actually, the European Commission (2014) already proposed to include the concern for littering as a minimum requirement for EPR regulation in the Member States. Two key principles apply: internalization of costs and liberty for producers. First, by extending the role of producers to setting up anti-littering campaigns, producers will internalize costs and possibly come up with innovative solutions for eco-design or littering prevention. Second, shifting the responsibility for littering to producers also implies giving sufficient liberty to producers to organize litter management, i.e. a shift in costs also implies a shift in leadership. For example, the Belgian packaging industry has recently put forward a strategy to reduce littering. It

concerns an ambitious plan that focuses on five pillars: participation, enforcement, awareness, infrastructure and the overall environment. For packaging in the Netherlands, there currently is an obligatory deposit-refund scheme. Fully applying the EPR concept would imply transferring more operational and financial responsibility for littering to producers while at the same time allowing the producers the liberty to use deposit-refund schemes or not in order to improve the efficiency of their efforts.

In the Netherlands and Western Europe, significant volumes of secondhand goods are exported to developing countries. Each year, about 80.000 Dutch secondhand cars are directly exported outside of the EU and even more indirectly via other countries (Mehlhart et al. 2011). Actually, only about 50% of all cars sold in the Netherlands will also be dismantled and recycled in the Netherlands. Similarly, more than 2 kg per inhabitant of used consumer electronics from the Netherlands are exported to developing countries (Huisman et al. 2012). Most secondhand goods are effectively used in the developing countries but will reach their end-of-life some years after the export. Clearly, at that point the quality of waste management with respect to environment and health, risks to be low, certainly compared to the ambitious EPR targets for dismantling and treatment in the Netherlands. Indeed, Dutch producers are only responsible for the end-of-life products dismantled or recycled in the Netherlands. Products that are sold in the Netherlands and afterwards exported as secondhand goods fall beyond the scope of current EPR regulations.

EPR is about internalizing costs that are related to the consumption of sold products. From the perspective of cost internalization and global efficiency, it would be more coherent to give producers also responsibility for the end-of-life management of products sold in the Netherlands but afterwards exported as secondhand goods. Clearly, tracking the exported secondhand cars or consumer electronics after export is not feasible. A more pragmatic approach is needed that fulfills the responsibility by upgrading recycling practices in developing countries while keeping monitoring straightforward and functioning efficient.

One example of such a pragmatic approach comes from Recupel, the Belgian PRO for WEEE. Since 2012, Recupel is supporting the not-for profit organization, Worldloop, that organizes the collection of WEEE components with hazardous elements or critical resources in Africa. The collected components are then either dismantled and treated in certified recycling plants that live up to high standards or sent back to specialized companies in Europe. Thanks to this voluntary initiative more than 1500 tons of WEEE have been treated in a sustainable way in Africa. A project with similar objectives for the export of cars is currently under research in Flanders[xxv]. EPR policies in the Netherlands could incentivize similar efforts for cars and consumer electronics.

EPR can contribute to a more circular economy by supporting innovation in several ways. First, many PROs have interactive websites, awards and other communication mechanisms to highlight the importance of waste management. The role of eco-design is also typically stressed in these communication mechanisms. For example, the producer of consumer electronics in Sweden have signed a collaboration agreement that states explicitly that producers should foster eco-design. The French PRO for wine and alcoholic beverages, Adelphe[xxvi], also contributes to conferences on eco-design of packaging for wine. However, since such communication remains non-binding, the impact on product design remains limited.

Second, the Belgian packaging PRO, Fost Plus, provides several tools for producers and designers in order to assess the environmental impact of products[xxvii]. In addition, it provides recommendations and

best practices to design products in a more environmentally friendly way. Similarly, the French PRO for furniture, Eco-mobilier, provides a 'materials library' with details on recycling outlets for materials[xxviii]. Also, the French PROs for WEEE have jointly set up tools and support for eco-design[xxix]. Adelphe even offers a free audit on site to stimulate eco-design and green production efforts. Such hands-on tools help companies that aim to improve the environmental impact of their products. Dutch PRO schemes could provide similar tools.

Third, PROs can dedicate part of their budget to R&D related to eco-design or waste management as argumented by Didier and Sittler (2014) in a French policy document on EPR. For example, in line with the legal requirements stated in the Terms of References for collection of textiles and shoes, the French PRO, ECO-TLC, has a dedicated budget of €500,000 per year to foster innovative projects. These projects include among others: 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. Similarly, the French PRO for furniture, Eco-mobilier, spends more than one million euros (1% of its budget) for research on topics such as the recovery of wood fibres; on the production of bio-ethanol from furniture waste; and on the recycling of foam. Dutch policy makers could negotiate or impose similar support mechanisms for innovation in the Netherlands.

5 Strengthen the financial EPR incentives for eco-design

The third and final route to strengthen the impact of EPR with respect to the circular economy is to enhance the incentives for eco-design from PRO fees. Indeed, if greener products have lower fees, producers have a financial incentive to invest in eco-design of products. Moreover, the financial incentives help to communicate environmental design priorities. Therefore, fees modulated in function of an environmental aspect can foster eco-design.

- Weight
- Design for recycling
- Presence of hazardous components
- Durability (lifetime) of products
- Prevention of consumption
- Reparability of products
- Recycled content

Table 5 Encapsulates different eco-design aspects that can be incentivized via EPR fees.

Eco-design is a broad design concept that aims to reduce the environmental impact of products across the life cycle. As highlighted by Table 5, in this paper, eco-design refers to products with reduced weight, design for recycling, design for disassembly, more mono-materials, less hazardous materials, longer life cycles, containing replaceable and reusable components and more recycled content. The following subsections give examples of modulated fees for each of the eco-design aspects.

In order to effectively incentivize eco-design, the modulation of fees has to be significant relative to the sales price. In order to prevent material consumption, France stimulates the use of standardized chargers for mobile and smart phones. Therefore, smart phones put on the market with a brand-specific charger are penalized financially because the PRO fees double. Although this modulation gives a clear message, the overall financial impact remains limited because the PRO fee is still only €0,02. Clearly, the absolute value is insignificant compared to the sales price of a smart phone. In a similar way, Schroten et al. (2010) stress that only high product taxes (or PRO fees) for packaging will induce prevention and eco-design incentives.

The eco-design incentives should be in line with the environmental impact of products. For some aspects, this is straightforward. Making products or packaging more lightweight without changing the material composition, reduces the amount of materials and the environmental impact. It is clear that the financial incentives should foster lightweight products, i.e. the PRO fees for lightweight products or packaging should be lower. However, for complex multi-material goods, assessing the environmental impact of products and brands is challenging. For example, some washing machines use iron as stabilizer rather than concrete. This characteristic makes the washing machine significantly heavier but also facilitates recycling in the end-of-life stage. Determining PRO fees in function of weight would lead to a perverse effect. Therefore, comparing the environmental footprint of complex products such as smart phones, refrigerators or washing machines requires an in-depth Life Cycle Analysis (LCA). A LCA does not only require detailed data but also uses assumptions that can significantly affect the results. Considering that the burden to make a LCA for every model and product is substantial, the benefits of modulation have to be balanced against the costs for detailed environmental assessment.

Producers or PROs can initiate the modulation of fees but policies can also impose a minimum level of modulation. Indeed, in Belgium efficient allocation of costs between producers is the driver for

modulated fees while in France regulation is the main driver. More specifically, via the legal Terms of Reference for PROs, French policy makers put forward the necessity to modulate PRO fees in function of waste management and environmental costs. The PROs that want to be active on the French market have to include modulated fees in their submission to be registered.

The level of modulation can be determined in different ways. A first example is the modulation from the French PROs for batteries, Screlec and Corepile. They quantify the volumes, assess the average composition of battery types and monetize the environmental impact of different battery types using environmental footprint databases. In addition, they integrate aspects such as re-use cycles of rechargeable batteries and safety risks that affect the image of the sector[xxx]. A second way that is often used in French schemes is more pragmatic. The modulation is based on key environmental impacts and is determined by stakeholder consultations and negotiations with policy makers. Although such a pragmatic approach is easier than a detailed scrutiny, it also risks to be more arbitrary and further away from the envisioned cost internalization. A third example, is to impose a prevention target (e.g., the 100,000 tons for the French packaging industry as discussed above) such that the producers will determine the financial incentives based on their effectiveness to achieve the target.

In the circular economy package, the European Commission indicated its support for modulation of EPR fees. However, since imposing or negotiating modulated fees is the authority of the European Member States, every country will have to investigate the environmental impact of products on its market. The lack of European coordination does not only lead to disparate policies across borders but also induces a duplication of research efforts. The European Commission could harmonize and facilitate the modulation of fees in EPR schemes by drafting guidelines for modulation, an inventory of harmful products (penalization – high PRO fee) and green products (low PRO fee). European Member States can then determine how to implement the guidelines depending on local circumstances.

Giving incentives for eco-design to competitive producers requires the determination of objective criteria and control on reported cases. For example the French PROs for packaging Eco-emballages and Revipack have set up a technical committee Cerec to elaborate technical guidelines and to identify hazardous materials in paper or cardboard packaging applications[xxxi]. A similar technical committee, Cotrep, focuses on plastic packaging[xxxii]. These technical committees bring together recycling specialists and will recommend which products should be awarded penalties or fee reductions. Also, OCAD3E (2015) provides detailed instructions on the determination of the fraction of recycled content in a product. In order to receive the bonus for recycled content, producers have to provide certificates coming from their suppliers and ensure minimum traceability. If producers cannot present certificates or justify their eco-design efforts, the standard rate will apply rather than the reduced fee. The packaging PRO, Eco-emballages, provides a similar detailed description of the application procedure for boni in case of an eco-design innovation[xxxiii]. Also standards can help to make the modulation more transparent and objective. For example, Eco-emballages uses the standard EN 13428 for eco-design to allocate its bonus for weight reduction.

Overall, modulation can incentivize eco-design but has a cost due to its added complexity. Indeed, the fragmented fees reduce the transparency and comparability of EPR schemes. As highlighted by the recent review of the French Cour des Comptes (2016), modulated fees should only be imposed where the environmental benefits outperform the negative effects of fragmented fees

5.1 Weight

For mono-material streams, weight is a good indicator for the amount of material (and future waste) put on the market. The fees from the Belgian packaging PRO, Fost Plus, highlight in Table 6 that fees for packaging are typically in kg per type of material used. Consequently, reducing the weight of products or packaging is financially rewarded.

Packaging material	Weight-based fee (€/kg)
Glass	0.0227
Paper – cardboard	0.0167
Aluminium	0.0371
PET	0.1064
Mixed – can be valorized	0.2593
Mixed – to be disposed of	0.4084

Table 6: weight-based PRO fees for packaging materials in Belgium (Fost Plus, 2014).

The French PRO for packaging, Eco-Emballages, gives a further incentive to make packaging lightweight by lowering the fee in case of a weight-reducing innovation.

Incentive	Requirement
Fee reduction of 8%	Weight reduction of more than 2% without changing the packaging material or function

Table 7: lower fees apply in France for weight-reducing changes in packaging design (Eco-emballages, 2015)

Table 8 illustrates that weight-based pricing is also applied for consumer electronics or batteries. Putting lighter batteries on the market or smaller batteries that keep the same level of performance is therefore incentivized.

Battery type	Weight-based fee (€/kg)
Alkaline	0,365
Saline	0,550
Button alkaline, Silver oxide, Zinc air	3,6
Primary lithium	2,4

Table 8: weight-based PRO fees for batteries in France (Screlec, 2015).

5.2 Design for recycling

Incentivizing design for recycling means that products that are easier to recycle receive lower fees. Evidently, mono-material products are easier to recycle than mixed products. Table 6 highlights that the Belgian PRO fee for mono-material packaging is lower than for multi-material products. Moreover, the mixed fraction that cannot be valorized has almost twice the fee of the mixed fraction that can be valorized.

Table 9 illustrates that French producers are penalized if they use packaging that will pollute or reduce the price of the collected waste fractions.

Incentive	Requirement
Fee increase of 50%	Glass packaging with ceramic cap
	Paper/cardboard Packaging for liquids with less than 50% of fibres
	Reinforced paper/cardboard packaging
	PET bottles that contain PVC or silicones with density more than 1
Fee increase of 100%	Non-recyclable packaging materials, e.g., ceramics
Fee reduction of 8% (applicable in the first year of the innovation)	Substituting multi-material packaging (e.g., a blister) by mono-material packaging

Table 9: EPR incentives for design for recycling of packaging in France (Eco-emballages, 2015).

The current pricing mechanism of the Dutch "Afvalfonds Verpakkingen" that manages packaging waste in the Netherlands already contains an incentive for plastics that can be composted or bio-degraded. From 2016, bio-plastic packaging that is certified in line with the EN 13432 standard has a reduced fee of €0.02/kg while other plastic packaging is subject to a fee of €0.64/kg.

As illustrated by Table 10, also the PRO fees for graphic paper can be modulated to incentivize design for recycling.

Incentive	Requirement
Fee increase of 5%	The presence of elements that hamper the recyclability: fiber color, inks, glue and non-fibrous elements such as varnish or plastics (cumulative presence of inhibitors can lead to a 15% fee increase, i.e. €60 instead of €52 per ton)

Table 10: EPR incentives for design for recycling of graphic paper in France (Ecofolio, 2015).

Table 11 gives an example of modulating the PRO fees for furniture in order to incentivize design for recycling.

Incentive	Requirement
Fee reduction of 20%	Mono-material furniture from wood with a certification of a sustainably managed forest
	Furniture made from more than 95% metal

Table 11: EPR incentives for design for recycling for furniture in France (Eco-mobilier, 2016).

5.3 Presence of hazardous materials

Hazardous materials can induce significant environmental damage in case of improper disposal. In addition, their presence can drive up the cost of recycling due to the pollution of other waste streams. Products with hazardous materials should therefore pay higher PRO fees in order to incentivize eco-design.

Since ionic smoke detectors can emit low levels of radio-active radiation in the waste stage, their cost in the waste stage is significantly higher than the treatment cost of optical smoke detectors. Consequently, the Belgian PRO, Recupel, made the fee for ionic smoke detectors tenfold the cost of optical smoke detectors as shown in Table 12.

Product	Fee (€/unit)
Optical smoke detector	2.7
Ionic smoke detector	€30

Table 12: Penalization of ionic smoke detectors in Belgium (Recupel, 2013).

The different PROs for WEEE in France have coordinated the modulation of their fees in order to make the incentives for eco-design more coherent (OCAD3E, Ecologic, Eco-Systèmes, Recylum). Table 13 depicts the fees from Eco-systèmes that penalize the presence of hazardous materials.

Incentive	Requirement
Fee increase of 20%	Vacuum cleaners with plastic components > 25gr containing brominated flame retardants (€0.5 instead of €0.42 per unit)
	Portable computers or tablet with brominated flame retardants (€0.3 instead of €0.25 per unit)
	TV with brominated flame retardants (€0.5 instead of €0.42 per unit – depending on the weight: > 25 kg: €8 instead of €6.67, > 13 kg: €4 instead of €3.33, > 7 kg: €2 instead of €1.67, < 7 kg: €1 instead of €0.83)
	Game console with brominated flame retardants in the plastic hull
	Refrigerator with cooling fluids that have a global heating potential >15

Table 13: Incentives to avoid hazardous materials in consumer electronics in France (Eco-Systèmes, 2015).

5.4 Durability (lifetime) of products

Durable products with long life cycles reduce the need for extraction of materials and waste management. Products with long life cycles should therefore have lower fees in order to incentivize eco-design. Table 14 highlights that the motivation to have a low fee for LED lighting does not only refer to the absence of mercury but also to the long life cycle of LED lights.

Incentive	Requirement
Fee reduction of 20%	LED Lightning (€0.12 instead of €0.15 for conventional lightning bulbs) owing to the absence of mercury and the long life cycle

Table 14: EPR incentives to lengthen the lifetime of lightning in France (Récylum, 2015).

5.5 Prevention

By preventing material consumption and reusing materials, less waste is generated. Table 15 illustrates how PRO fees can be modulated to incentivize the prevention of packaging waste.

Incentive	Requirement
Fee reduction of 8%	Applies to producers that organize additional prevention campaigns
	Applies to companies that develop rechargeable packaging

Table 15: EPR incentives to prevent packaging waste in France (Eco-Emballages, 2015).

Table 16 illustrates that EPR can also generate financial incentives for the prevention of waste from consumer electronics.

Incentive	Requirement
Fee increase of 100%	Mobile phones without a standardized charger (€0.02 instead of €0.01 per unit)

Table 16: EPR incentives to reduce material extraction and waste management for consumer electronics in France (Eco-Systèmes, 2015).

5.6 Repairability

From a circular economy perspective, repairing and reusing products is key to optimize the use of materials and energy. Table 17 illustrates how EPR can stimulate these actions for consumer electronics.

Incentive	Requirement
Fee increase of 20%	• Refrigerators, vacuum cleaners and drills without technical documentation for reparation OR • Unavailable spare parts
	• Game consoles without technical documentation of reparation OR • The absence of spare parts OR • The presence of brominated flame retardants in the plastic hull
Fee decrease of 20%	Washing machine or dish washer with spare parts available up to 11 years OR • Post-consumer recycled content > 10%
	• Coffee machines and kettles with spare parts available up to 5 years AND • Availability of technical documentation for reparation
	• Computers with standard peripherals including memory card and readers • Absence of paints and covers that complicate recycling and reuse and • Recycled content of post-consumer plastics > 10%
	• Printers that can be fully dismantled with standard equipment AND • Availability of spare parts for up to 5 years

Table 17: EPR incentives to improve the reparability of durable goods in France (OCAD3E, Ecologic, Eco-Systèmes, Recylum, 2015).

5.7 Recycled content

By integrating recycled materials in new products, the extraction of new materials can be reduced. In addition the demand for secondary resources will foster recycling efforts. Therefore, lower PRO fees for products that contain more recycled content can incentivize eco-design. Table 17 already contained several examples of modulated PRO fees that incentivize recycled content in consumer electronics. Table 18 illustrates how PRO fees can be modulated for packaging.

Incentive	Requirement
Fee reduction of 10%	Paper/cardboard packaging with more than 50% of recycled content

Table 18: EPR incentives to increase the recycled content in packaging (Eco-Emballages, 2015).

Table 19 highlights how modulated PRO fees can incentivize recycled content in graphic paper.

Incentive	Requirement
Fee reduction of 10%	Publications with more than 50% of recycled content (€47 instead of €52 per ton)
Fee increase of 5%	Use of primary fibers from forests without eco-management labels

Table 19: EPR incentives to increase the recycled content for graphic paper in France (Ecofolio, 2015).

Table 20 gives an example of a modulated fee that incentivizes recycled content in textiles and shoes.

Incentive	Requirement
Fee reduction of 50%	Products with more than 15% recycled fibers/materials (€/unit depending on size – small: 0.00242 instead of 0.00484, medium: 0.00363 instead of 0,00726, Large: 0.0242 instead of 0.0484)

Table 20: EPR incentives to increase the recycled content in textiles and shoes in France (Eco-TLC, 2015).

6 Conclusions and following steps

Policy makers in the Netherlands and elsewhere are looking into different options to foster the circular economy. Taking into account the proven effectiveness of Extended Producer Responsibility (EPR) with respect to collection and recycling of waste, the instrument may also offer significant potential for other circular economy aspects. Therefore, this study explores how EPR in the Netherlands can be further enhanced with respect to eco-design and the circular economy.

Based on a review of international literature, a review of EPR initiatives in neighboring countries and interviews with key stakeholders, this exploration identifies potential pathways. Considering the explorative scope, further research and stakeholder consultations are needed to assess and elaborate the pathways before implementation can be considered.

Structurally, three routes are available to widen the scope of EPR:

- Extend the scope of EPR regulation to new products and waste streams
- Deepen the scope of EPR within regulated streams
- Strengthen the financial EPR incentives for eco-design

First, the review of EPR initiatives in neighboring countries highlights that EPR can be used for a wide variety of waste streams. The suitability of EPR for a limited set of streams is analyzed, in a preliminary way, using five key criteria: the level of control at the end-of-life stage, the environmental scope for improvement, existing incentives for end-of-life treatment, the availability of alternative policy instruments and political priorities. The analysis suggests that EPR would be well suited for priority streams such as furniture (including mattresses) and textiles. EPR would also be suited for streams such as mobil homes and end-of-life leisure boats. Moreover, EPR can contribute to the valorization of C&D waste but other policies such as rigorous and binding demolition inventories may have similar effects. Implementation of EPR for food waste would be possible to internalize costs but other policy priorities may intervene and impede implementation. Considering that for streams such as needles and chemicals already many measures are in place, the role of new EPR obligations would be limited to cost internalization. Since electronic printer cartridges and batteries of e-bikes already fall under the scope of the European directives for WEEE and spent batteries respectively, collection can be easily organized via the existing EPR schemes. Due to limited environmental benefits, EPR regulation seems less relevant for expired medication and non-electronic printer cartridges. Also, taking into account that existing legislation and positive resource prices already induce recycling incentives for agro-packaging & residues, graphic paper, lubricants, frying oils and abandoned bicycles, the added value of new EPR obligations is unclear. For diapers, other policies such as a product tax may be more suitable to internalize waste management costs owing to the difficulty to recycle this waste stream. The focus on hard plastics should be further clarified with respect to concerned products before the suitability of EPR can be assessed.

Second, the study identifies several pathways to deepen the scope of EPR within regulated streams. The most straightforward way to enhance the impact of EPR is to impose higher take-back targets. Other alternatives to go beyond the current take-back targets is to negotiate voluntary initiatives with producers or to impose product taxes for non-collected waste fractions. Moreover, policy makers can introduce quantified targets for prevention, eco-design, recycled content and reuse. In contrast, introducing targets with respect to upcycling and downcycling first requires a better understanding and a suitable legal definition. In line with the objective of cost internalization, the concept of EPR can apply to all costs related to waste-generating products. Therefore, producers and Producer Responsibility

Organizations (PROs) can play an active role in aspects such as littering, the export of secondhand goods to developing countries and R&D for eco-design or waste treatment.

A third route to strengthen the circular economy and eco-design incentives of EPR, is to modulate the PRO fees that producers have to pay. If the environmental impact of different products can be assessed in a straightforward way and if the difference in impact is significant, PRO fees can be modulated. However, the benefits of additional eco-design incentives should be balanced with the additional complexity from fragmented fees. The report highlights that neighboring countries (especially France) extensively apply modulated fees for following eco-design aspects: lightweight, design for recycling, presence of hazardous materials, durability of products, prevention of material consumption, reparability of products and recycled content.

Three well-known producers that have extensive experience with EPR in different countries (IKEA, Philips and C&A) have shared their insights on EPR via semi-structured interviews. The interviews highlight the overall support of producers with respect to EPR. However, producers also stress that EPR generates significant administrative costs. Additional EPR obligations should therefore only be applied if the environmental gains are substantial. Moreover, multinational producers are in favor of more harmonization between the EPR schemes in Europe. Especially if EPR fees will be modulated more intensively in the future, the disparity between schemes in different European countries risks to obscure the transparency of the incentives. Finally, producers stress that EPR should not perturb the level playing field between competitors. Control on reporting and freeriders is an essential element of a functional EPR scheme.

Owing to the focus on new pathways for EPR, this report has barely touched upon the challenges for EPR implementation such as freeriders, administrative costs, assessment of environmental benefits, disparate policies, loss of transparence, market power and the level playing field. As highlighted in the introduction, the identification of a potential pathway does not automatically imply that the benefits of the pathway are sufficient to justify implementation. Further in-depth assessment is needed to assess whether the advantages of extending EPR are more important that the disadvantages.

Clearly, EPR is only one of the instruments needed to foster eco-design. Other key instruments that need to be used in parallel are: awareness campaigns, innovation awards, integration of eco-design topics in education and training of designers, labels and certificates to distinguish products with a more ecologic design, practical design tools, eco-efficiency scans, toolkits, research, alternative business models, showcasing inspiring success stories, blogs, networking conferences, knowledge sharing, … In addition, to deal with hazardous materials, direct command & control measures may sometimes be better suited. For example, a ban on asbestos was appropriate due to the high health hazard. Also, RoHS and REACH are flagship instruments to phase out hazardous materials in Europe. Furthermore, the European Commission has recently given a mandate to the European standardization organizations to develop a standard for material efficiency for electronics. The development of these standards is an important step towards eco-design of products because, up to now, the Ecodesign Directive 2009/125/EC has mostly focused on energy use due to a lack of coherent metrics on material efficiency.

This report identifies several key pathways to use EPR for the transition to a circular economy. Before considering implementation, Dutch policy makers have to take additional steps to evaluate the potential costs and benefits of the identified pathways. In order to transform the insights of this preliminary exploration into policies, detailed stream-specific data, environmental analysis, economic modelling and

stakeholder consultations are needed. Indeed, an ex-ante assessment of the economic effects and environmental gains, will improve our understanding of the overall outcome of the potential policy measures.

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8 Appendix 1: interviews

The pathways identified in this study have been submitted to a limited set of leading companies that are present in the Netherlands and that are already confronted with EPR in different countries. More specifically, the companies IKEA, Philips and C&A are active in, among others, the product categories packaging, electronics, lightning, batteries, textiles and furniture. These interviews aim to put forward priorities for the follow-up stakeholder consultations that will be needed to go from exploration to implementation.

8.1 IKEA

Interview Paul Rotteveel (Product Requirement & Compliance Specialist IKEA Nederland)
Meeting notes, January 8, 2016, approved version

IKEA endorses the principle of producer responsibility and puts it in practice in by implementing high environmental product standards and working on continuous improvement. For LED lighting IKEA is working on ways to replace parts of LED lights to facilitate repair. Another example is the project for collection of used mattresses. Buyers of new mattresses can have the old mattress collected when they get the new one delivered. So far, the success of the project has been limited since less than 1% percent of the customers uses this service[4].

IKEA currently pays 2.5 million euros per year for the existing EPR systems in the Netherlands.

8.1.1 Experiences at IKEA France

The informal contacts with IKEA France indicate that the EPR scheme for furniture induces significant additional administration and additional complexity due to the fee calculation per plant/regional headquarters. Furthermore, the goals of the EPR system would be unclear since recycling is not taking off despite the recycling goal of 45%.

8.1.2 Environmental benefits

Considering the existence of a lively secondhand market for furniture and the long life-cycle of furniture, the environmental impact of furniture waste is unclear. In addition, an EPR scheme may negatively affect solutions, such as online trading platforms for second hand goods.

8.1.3 Question marks

IKEA has doubts about the implementation of EPR systems for all types of furniture. However, EPR for mattresses might work.

Quality of the materials sourced

Installing a system for take back and recycling of products makes sense if the recovered resources are valuable and suitable for high-value applications. It is unclear if this will be the case for furniture. Design at IKEA is oriented at reducing weight and reducing material, e.g., by replacing wood by cardboard. This may not create attractive recycled resources. Moreover, due to the demanding health and environmental standards of IKEA for materials, recycled materials may not be sufficiently pure. If recycled materials can only be used for low-end applications, recycling business models will not be lucrative.

Reverse logistics via stores

Taking back furniture at the stores will use a large amount of (store) surface and will affect logistics. Therefore, municipal waste collection may be more efficient. In addition, due to the voluminous nature of furniture and the variety of materials used in furniture, recycling may not be profitable.

4 http://www.ikea.com/ms/nl_NL/customer_service/ikea_services/matrasretourrecycleservice.html

Administrative load

The effects of an EPR scheme have to be monitored and reported. As the example of France highlights, developing EPR for furniture will increase the administrative burden for companies.

Effect on consumer prices

EPR induces additional costs for clients/consumers. The client will however understand and accept the need.

Finally, IKEA asks that sector organizations (e.g., Raad Nederlandse Detailhandel) should be consulted in an early stage of the decision process.

8.2 Philips

Interview Eelco Smit (Sustainability Director at Philips Consumer Lifestyle, responsible for WEEE in EMEIA)
Meeting notes, January 15, 2016, approved version

Already about 95-98% of the materials used by Philips fall under EPR regulation: electronics, batteries, packaging. Philips endorses the concept of Extended Producer Responsibility, as the legislation has supported the sector wide implementation of collection systems in Europe.

General remarks on improvement opportunities for EPR

The opportunities to stimulate eco-design are probably overestimated: the financial incentives imposed by EPR are just not high enough. Indeed, design change is costly and design decisions are based on a large number of factors. Moreover, it takes long (>7 years) before the products are recycled and the benefits pay off. In addition, the benefits are shared by the collective and not returned to the individual manufacturer.

More than deepening or strengthening EPR, enforcement of current agreements needs attention. For example, the quality of the reporting (Mededeling) by individual participants is sometimes low. Also, the problem of free riders is not addressed appropriately.

8.2.1 Extending the scope of EPR

Considering that already more than 95% of the materials used by Philips, are covered by EPR, extending EPR to new categories will not have a substantial impact. However, to introduce EPR for new products, following elements are key:

- Products should be easy to identify
- The product category should have a substantial volume
- Implementing EPR should result in a substantial environmental benefit

8.2.2 Deepen the scope within regulated waste streams

Current EPR schemes focus on the producer while the market for collection and recycling is much larger. The collection and recycling companies/stakeholders should be integrated in the EPR agreements and regulation.

Waste streams that are not covered or collected through the official EPR channels should be included in a larger picture on sustainable materials management. However, monitoring of waste streams outside EPR should remain the task of governments.

Philips believes that it is important to share knowledge with recyclers and participates in several platforms that facilitate such an exchange.

If reuse and refurbishment targets are introduced, the actors that are experienced in this domain (other than producers) should be included.

On the role of producers to export to developing countries: Philips is involved in a voluntary initiative in setting up local collection systems in Africa together with Dell and Microsoft (focus on Nigeria). Local importers are defined as producers in order to try to keep collection and recycling efforts uniform within the Nigerian market.

For targets on upcyling/downcycling: a clear definition is needed before going deeper into the debate.

Strengthen the financial EPR incentives
Philips is in favor of modulated fees. However, other companies seem to fear the increase of the already considerable administrative costs.

Philips endorses stronger financial incentives for eco-design, under the following conditions:

- Implementation should be on the European level rather than the national level
- Criteria should be the same in all EU countries (harmonized)
- Criteria should target a selection of priority issues that are updated every several years
- The process should be coordinated by a standardization organization through a multi-stakeholder process

The aim of modulation should be to change the distribution of costs and benefits across the industry, not to increase the overall revenues of EPR. Moreover, the differences between the modulated fees should be more substantial than in the current situation (with exception of the smoke detectors) in order to have a significant effect.

Using financial incentives for recycled content is good idea. Actually, Philips is already using the opportunities given by the French EPR to reduce its fees for packaging.

The eco-design directive might offer more opportunities for design for recycling.

Durability seems too hard to measure, other than the example of LED lights where a product is replaced by a new, more innovative product.

8.3 C&A

Interview Charline Ducas (Manager Product Sustainability at C&A)

Minutes, April 7 2016, approved version

Circular economy is a key focus area in the sustainability strategy of C&A. The company aims to take up a leadership role by ensuring that the rate of recovered textiles further increases without compromising the quality or value of the collected materials. Reducing textile waste and closing material loops is a challenge for the whole industry that requires open and transparent collaboration. Therefore C&A is involved in several industrial initiatives that set up working groups for both knowledge and technology development.

8.3.1 Collection points in the Netherlands

In 2012 C&A was the first fashion retailer in the Netherlands that opened collection points in its stores (http://press.lindenbarbosa.nl/press/ca/kleding-2e-leven). Customers can deposit their old clothes in exchange for a voucher of 5% reduction on the next purchase. C&A works together with I:CO for logistics and recycling. All 133 stores in the Netherlands have a collection point and about 250 customers per week hand in in used textiles.

Currently, C&A is exploring how to implement recycling programs in other stores inside and outside Europe. The collection of used textiles is in itself straightforward. The challenge is to involve consumers in a way that is not perceived as greenwashing or driven by commercial motives. Another challenge is to find the right partners (for collection and recycling) that align with the C&A company values and that can offer the appropriate business models for the specific country.

8.3.2 Experiences with Eco TLC in France

C&A has been closely involved in Eco TLC , the French EPR for textiles. The main aims of this EPR are to increase the collection rate from 30 to 50% and to increase the value of textile waste. The EPR fees create a fund of 15 million euros per year.

To stimulate collection a lot of effort is invested in increasing awareness among citizens and in engaging local communities. An example is the development of a national app and a website that guide citizens to textile collection points nearby. The current approach sends a clear and consistent message to French citizens. In addition, to increase the value of waste recycling innovations are financially supported and sharing of best practices (P2P learning) between companies is facilitated. The central coordination contributes to the overall transparency of the efforts.

Every company pays an equal contribution (EPR fee) based on the amount of items sold. Items with recycled materials receive a discount. However, since collection points are not financially incentivized, not all the retailers provide collection services which may have a competitive impact. C&A considers that collection should not be a competitive issue (every store should have a collection point).

A drawback of the French EPR scheme is the complicated administration and the resulting additional costs for the companies and their clients. In addition, the system is not transparent for citizens and the citizens pay twice for recovery: at purchase and at disposal through local waste taxes (fixed fee per household). Actually, citizens are often unaware because they are not informed and do not know what they pay for.

Finally, improvements are slow. The increase of the collection rate is expected to be only 2% per year.

Introducing EPR in other countries

EPR can be one of the instruments to foster a circular textiles industry because efforts are better coordinated and transparency improves. However, the following issues are important for developing EPR for the sector:

- The objectives EPR should be clear and cost efficiency (suitable business model) is key.
- EPR should be more than a taxing system. It should stimulate all actors in the industry to take up responsibility without disrupting the level playing field.
- The approach should be harmonized on a European level (not 28 different models), with the possibility for customization to local circumstances and needs.
- The issue of charging the citizen twice should be addressed.

9 Appendix 2: countries

9.1 Netherlands

Waste Stream	Producer Responsibility Organisation	Website
WEEE – Brown Goods[5]	Brown Goods Foundation	http://www.nvmp.nl/over-nvmp/stichting-bruingoed.html
WEEE – White Goods	White Goods Foundation	http://www.nvmp.nl/over-nvmp/stichting-witgoed.html
WEEE – ICT Equipment	ICT Environmental Foundation	http://www.nederlandict.nl/?id=8270
WEEE – Lighting Equipment	LightRec Foundation	http://www.lightrec.nl
WEEE – Boilers, water heaters, sewing machines, electr(on)ic toys, medical equipment, measurement and control equipment, vending machines and electr(on)ic musical instruments	Foundation Metalektro Recycling	http://www.nvmp.nl/over-nvmp/stichting-metalektro-recycling.html
WEEE – Ventilation Equipment	Foundation Recycling Central Fans	http://www.nvmp.nl/over-nvmp/svcv.html
WEEE – Electrical Tools	Foundation Removal Electrical Tools	http://www.nvmp.nl/over-nvmp/sveg.html
WEEE	WEEE Nederland	http://www.weee.nl
WEEE – Professional/B2B	RTA (Recycling Technologische Apparatuur)	http://www.stichtingrta.nl/
WEEE – Photovoltaic panels	PV CYCLE	http://netherlands.pvcycle.org
WEEE – Photovoltaic panels	Foundation Solar Energy Recycling Netherlands	http://www.stichtingzrn.nl/
Batteries/Accumulators[6]	Stichting Batterijen/STIBAT	http://www.stibat.nl

5 Regulation of the Minister of Infrastructure and the Environment, February 3, 2014, no. IENM/BSK-2014/14758, laying down rules concerning waste electrical and electronic equipment

6 Regulation of the Minister of Housing, Spatial Planning and Environment of September 9, 2008, no. K & K 2008088170, containing rules regarding waste management and the use of certain hazardous substances in batteries and accumulators

Waste Stream	Producer Responsibility Organisation	Website
End-of-life vehicles[7]	Auto Recycling Nederland ARN	http://www.arn.nl
Tyres[8]	RecyBEM	http://www.recybem.nl
Packaging[9]	Packaging Waste Fund	http://www.afvalfondsverpakkingen.nl
Sheet glass[10]	Foundation Vlakglas Recycling Nederland	http://www.vlakglasrecycling.nl

7 Regulation of May 24, 2002, implementing Directive no. 2000/53/EC of the European Parliament and of the Council of the European Union of September 18, 2000 on end-of-life vehicles (OJ L 269)

8 Decree of December 9, 2003, laying down rules concerning the management of vehicle tyres and amending certain acts (Management of car tyres)

9 Decree of March 24th, 2005, containing rules for packaging, packaging waste, paper and cardboard (Decree on the management of packaging and paper and cardboard)

10 Algemeen verbindend verklaren van de Overeenkomst inzake de verwijderingsbijdrage voor vlakglas

9.2 Belgium

Waste Stream	Producer Responsibility Organization	Website
Lubricants	Valorlub	http://www.valorlub.be
Tyres	Recytyre	http://www.recytyre.be
Automotive batteries	Recybat	http://www.recybat.be
Portable and industrial batteries	Bebat	http://www.bebat.be/
WEEE	Recupel	http://www.recupel.be
Household Packaging Waste	Fost Plus	http://www.fostplus.be
Industrial and commercial packaging waste	VAL-I-PAC	http://www.valipac.be
Frying oils and fats	Valorfrit	http://www.valorfrit.be
PVC in construction	Recovinyl	http://www.recovinyl.com/
Agro-packaging & phytosanitarian residues	AgriRecover	http://www.agrirecover.eu
Gypsum	/	http://gypsumtogypsum.org/
Roofing	/	http://www.derbigum.be/nl/over-derbigum/recyclage
PVC for windows	/	http://www.deceuninck.be/nl/deceuninck-recycling.aspx
Aerated autoclaved concrete	/	http://www.xella.be/nl/content/actueel_3874.php

9.3 France

Waste Stream	Producer Responsibility Organisation	Website
All WEEE except categories 5 and 11	Eco-systèmes	http://www.eco-systemes.fr
	Ecologic	http://www.ecologic-france.com/
	ERP France	http://www.erp-recycling.fr/
WEEE – category 5 (lighting equipment)	Récylum	http://www.recylum.fr
WEEE – category 11 (photovoltaic panels)	PV Cycle	http://www.pvcycle.org
Batteries & Accumulators	COREPILE	http://www.corepile.fr
	SCRELEC	http://www.screlec.fr
Household packaging waste	Eco-emballages	http://www.ecoemballages.fr
	Adelphe	http://www.adelphe.fr
	Cyclamed	http://www.cyclamed.org
Unused pharmaceuticals (destined for personal human consumption)	Cyclamed	http://www.cyclamed.org
Tyres	Aliapur	http://www.aliapur.fr
	Avipur	http://www.sicr.re
	AFIP/GIE FRP	http://www.gie-frp.com
Graphic paper	Écofolio	http://www.ecofolio.fr
Textiles, household linens and shoes	ÉCO-TLC	http://www.ecotlc.fr
Healthcare activities and infectious waste (related to patients in self-treatment)	DASTRI	http://www.dastri.fr

Waste Stream	Producer Responsibility Organisation	Website
Chemicals	ECODDS	http://www.ecodds.com
Household furniture	Éco-mobilier	http://www.eco-mobilier.fr
Professional furniture	Valdelia	http://www.valdelia.org
Agrochemical product packaging	Adivalor	http://www.adivalor.fr
Unused professional agrochemical products	Adivalor	http://www.adivalor.fr
Mobile homes	Éco Mobil homes	http://www.ecomobilhome.fr

9.4 Denmark (narrow scope)

Waste Stream	Producer Responsibility Organization	Website
WEEE[11]	elretur	http://www.elretur.dk
	ERP Denmark	http://www.en.erp-recycling.dk
	RENE AG	http://www.rene-europe.com/en/rene-compliance-schemes/denmark.html
WEEE - category 5 (lighting equipment)	LWF Light sources	http://www.lwf.nu
Batteries/Accumulators[12]	Returbat	http://www.returbat.dk
	ERP Denmark	http://www.en.erp-recycling.dk
	RENE AG	http://www.rene-europe.com/en/rene-compliance-schemes/denmark.html
	elretur	http://www.elretur.dk
End-of-life vehicles[13]	Refero	http://www.refero.dk
Packaging[14]	/	/
Tyres[15]	/	/

11 Statutory Order n°130 of 6 February 2014 on placing on the market of electrical and electronic equipment and management of waste electrical and electronic equipment

12 BEK nr 1186 af 07/12/2009 - Bekendtgørelse om batterier og akkumulatorer og udtjente batterier og akkumulatorer, Miljøministeriet

13 The legislation takes offset in EU Directive 2000/53/EC on End-of-Life Vehicles (ELV).
In Denmark the directive has been implemented by Statutory Order no. 1312 of 19 December 2012.

14 Environmental Protection Act - Statutory Order N° 619 (June 2000). There is no producer-responsibility scheme in Denmark; instead, the packaging waste management costs are internalized by the state, rather than setting up an industry-run funding system

15 Danish Environmental Protection Law (Art. 53). Statutory Order on a Fee on Tyres and Recovery Subsidy (issued in 1995, amended in 2000). Producers have financial responsibility for used tyre management (including collection and treatment) and are obliged to pay a fee on tyres they place on the Danish market, to the Danish Environmental Protection Agency (EPA) via the Central Customs & Tax Authority.

9.5 Sweden (narrow scope)

Waste Stream	Producer Responsibility Organization	Website
WEEE[16]	El-Kretsen	http://www.el-kretsen.se
	Elektronikåtervinningsföreningen (EÅF)	http://elektronikatervinning.com
Batteries[17]	BlyBatteriRetur	http://www.blybatteriretur.se
	El-Kretsen	http://www.el-kretsen.se
	Elektronikåtervinningsföreningen (EÅF)	http://elektronikatervinning.com
End-of-life vehicles[18]	BilRetur	http://www.bilretur.se
Packaging[19]	FTI – the Packaging and Newspaper Collecting Service (Förpacknings- och Tidningsinsamlingen)	http://www.ftiab.se
Glass packaging	Swedish Glass Recycling (SGA) (Svensk GlasÅtervinning)	http://www.glasatervinning.se/
Beverage containers (cans & PET bottles)	Returpack-Pet Svenska AB	http://www.pantamera.nu
Newspapers/printed paper[20]	PressRetur/Papperskretsen	http://papperskretsen.se
Tyres[21]	SDAB: the Swedish Tyre Recycling Organisation	http://www.svdab.se
Agro-packaging[22]	SvepRetur (Svensk Ensilageplast Retur AB)	http://www.svepretur.se

16 Ordinance on producer responsibility for electrical and electronic products issued on 14 April 2005

17 Förordning (2008:834) om producentansvar för batterier

18 Förordning (2007:185) om producentansvar för bilar

19 Förordning (2014:1073) om producentansvar för förpackningar

20 Förordning (2014:1074) om producentansvar för returpapper

21 Danish Environmental Protection Law (Art. 53)

22 Voluntary initiative

10 Appendix 3: feedback of VPN (in Dutch)

PRODUCENTEN
verantwoordelijkheid
Nederland

Memo

Aan: Ministerie van IenM / Hans Spiegeler
Van: Vereniging Producentenverantwoordelijkheid Nederland
Ond: Reactie verkenning EY EPR
Datum: 17 mei 2016

Geachte heer Spiegeler,

Inleiding

In dit memo is de reactie opgenomen van de Vereniging Producenten-verantwoordelijkheid Nederland (VPN) op het door EY uitgevoerde onderzoek "Verkenning EPR" zoals dat is uitgevoerd in opdracht van het Ministerie van IenM.

In de eerste plaats wordt hierbij dank gezegd voor de aan VPN en aan andere stakeholders geboden gelegenheid een reactie te geven alvorens een definitieve versie van het EPR rapport wordt opgesteld. Het vroegtijdig kunnen participeren in beleidsvorming van de overheid door betrokken partijen en organisaties uit de sector draagt naar onze mening bij aan de kwaliteit en aan het draagvlak van te nemen maatregelen en uitvoeringsbesluiten.

Het wordt om die reden ook op prijs gesteld indien alle (formele) reacties op het rapport door uw ministerie op een actieve wijze openbaar en toegankelijk worden gemaakt. Uw reactie op dit verzoek wordt graag vernomen.

Van u is begrepen dat de eindversie van het rapport wordt betrokken bij het opstellen van LAP 3. Door VPN wordt in verband hiermee een kopie van dit memo verzonden aan IenM / RWS ter attentie van mevrouw Marlou Gerrekens.

Opbouw reactie VPN

In de eerste plaats wordt in algemene zin gereageerd. Aansluitend volgt VPN in zijn reactie het rapport van EY langs de lijnen van verbreden, verdiepen en versterken. De reactie wordt afgerond met enige aanbevelingen en conclusies.

Reactie in algemene zin

- Het is een goed initiatief van het Ministerie van IenM om het rapport op te laten stellen. Het biedt overzicht en inzicht en dient mede als bouwsteen voor LAP 3;
- Van het rapport is met belangstelling kennis genomen. Er is waardering voor de kwaliteit van het rapport en de erin opgenomen analyses zijn interessant;
- Tegelijkertijd wordt gewezen op het gevaar om voor deze complexe materie, vanuit een Europese context, in algemene zin beleidsconclusies te ontwikkelen voor de toekomstige inzet van EPR in Nederland;
- De ervaring heeft VPN geleerd dat het vergelijken van EPR resultaten tussen landen bijzonder moeilijk, zo niet onmogelijk is vanwege de aanwezige verschillen in cultuur, maatschappij, logistiek, infrastructuur en niet in de laatste plaats vanwege de verschillen in wetgeving en (mate van) toezicht en handhaving;
- Het is daarom niet aan te raden om de producentenverantwoordelijkheid voor een materiaalstroom van het ene land 1:1, dus op een 'koude wijze', over te zetten (of uit te breiden)naar een ander land, ook al is dat gebaseerd op de blote feiten dat in het andere land het 'resultaat' beter is;
- Zo dient rekening te worden gehouden met een aantal (negatieve) effecten van overheidshandelen die gelden voor de situatie in Nederland, welke niet zijn meegenomen in het rapport. In dit verband wordt het als een omissie ervaren dat in het rapport geen aandacht is besteed aan het effect van toezicht en handhaving (*free riders* en lekstromen) als kritische succesfactor en randvoorwaarde. In de aanpak van het dossier toezicht en handhaven kan in Nederland wellicht meer winst worden behaald, dan kan worden bereikt met nieuwe regelgeving en / of de inzet van nieuwe instrumenten;
- In algemene zin wordt daarom geadviseerd voorzichtig en zorgvuldig te zijn met het inzetten van nieuwe 'instrumenten', omdat hierbij tegelijkertijd sprake kan zijn van negatieve en / of onbeheersbare (neven) effecten die 'alles opgeteld' meer kwaad dan goed doen;
- Eén en ander neemt niet weg dat door VPN met instemming wordt geconstateerd dat het rapport de toegevoegde waarde onderschrijft van EPR als instrumentele toepassing om de ambitie van Nederland mede in te vullen op weg naar een Circulaire Economie;
- Hiermee wordt impliciet het succes bevestigd van het beleid en de uitvoering op het gebied van producentenverantwoordelijkheid zoals die de afgelopen 15 jaar door de leden van VPN (de PRO's) in Nederland zijn ingevuld;
- In het rapport worden de mogelijkheden verkend naar verdere verbreding, verdieping en versterking van EPR. Deze beleidsrichting wordt in algemene zin ondersteund – kansen die kunnen leiden tot meer efficiëntie en / of een grotere effectiviteit om te komen tot een Circulaire Economie dienen te worden benut;
- Voor een succesvolle inzet van EPR geldt – zo leert de ervaring in Nederland - dat naast het invullen van een aantal generieke randvoorwaarden, per materiaalstroom 'maatwerk' geleverd dient te worden;
- VPN en / of de afzonderlijke leden zijn graag bereid zich in te spannen om met uw ministerie en andere stakeholders mee te denken over de toegevoegde waarde en / of het maatschappelijk nut van voorstellen op het gebied van verdiepen en versterken van EPR vanuit de reeds bestaande PRO's;
- VPN en / of de afzonderlijke leden zijn voor het uitwerken en het inrichten van toekomstige nieuwe EPR systemen en / of PR-Organisaties graag bereid een adviesrol in te vullen.

Reactie op verbreden

- Geconstateerd wordt dat, met enige nuanceringen, EPR en de inzet van PRO's worden gezien als nuttig instrument dat wellicht breder kan worden ingezet dan thans het geval is;
- In de ogen van VPN zal het dan uitsluitend moeten gaan om materiaalstromen, waarvan de integrale kostentoerekening in de keten (inzamelen, recyclen en vermarkten) leidt tot een financieel tekort.

- De insteek van het rapport is te verkennen om PRO's te ontwikkelen voor:

  - Meubels
  - Matrassen
  - Pleziervaartuigen
  - Caravans (mobil homes)
  - Hard plastic

- VPN en/of de afzonderlijke leden zijn voor het uitwerken en het inrichten van toekomstige nieuwe EPR systemen en / of PR-Organisaties graag bereid een (al dan niet betaalde) adviesrol in te vullen. Zo bestaat reeds betrokkenheid bij het dossier 'Matrassen'.

Reactie op verdiepen

- Waar het gaat om EU harmonisatie op het gebied van EPR systemen, schema's en targets bestaat op zich geen bezwaar hiernaar te willen streven;
- Wel wordt verwezen naar de opmerkingen die in algemene zin zijn gemaakt over de (unieke) omstandigheden en randvoorwaarden, waaronder EPR op de verschillende nationale niveaus wordt ingevuld – met de daarbij behorende verschillende resultaten;
- Target differentiatie wordt onderschreven. Opgemerkt wordt dat EPR niet alleen of bij uitzondering gaat over stromen met een significant volume / kg. Ook kleine hoeveelheden (zowel in aantallen als in gewicht) kunnen een grote impact hebben op het milieu, bijvoorbeeld 'rookmelders'.

Reactie op versterken

- Het wordt niet verstandig en verantwoord geacht te denken aan het uitbreiden van terugname-doelstellingen (take back targets) van bestaande EPR – PRO's. Het is bekend dat de huidige doelstellingen als pittig en stevig worden ervaren;
- Om een beter resultaat te behalen wordt meer gezien in het gezamenlijk met stakeholders invulling geven aan op de consument / burger gerichte communicatie, die beoogt bij te dragen aan gedragsbeïnvloeding en –verandering. VPN en RWS organiseren hierover samen een symposium op 30 juni 2016;
- Het toepassen van terugname-doelstellingen kan naar onze mening overigens niet zomaar worden gehanteerd voor nieuwe materiaalstromen of producten. Wellicht als beginsel, maar dan wel 'werkende weg te ontdekken' ;
- Aan een betere monitoring wordt graag bijgedragen. Als randvoorwaarde geldt dan wel dat wordt verwacht dat er beleidsruimte en middelen beschikbaar zijn om interventies te kunnen plegen op de uitkomsten van betere monitoring;
- Geadviseerd wordt te beginnen in kaart te brengen welke inspanningen op het gebied van R & D reeds zijn en worden geleverd door de in Nederland actieve PRO's. Dit beeld zal naar verwachting geen aanleiding geven hiervoor nadere maatregelen te willen stellen.

Conclusies en aanbevelingen

Op basis van de kennis en ervaring van VPN is het gekend dat de huidige doelstellingen op het gebied van EPR in Nederland als pittig en stevig worden ervaren – maar niet als onmogelijk. Het behalen van de doelstellingen kan volgens de VPN alleen worden bereikt indien wordt voldaan aan de onderstaande vier randvoorwaarden. Dat is thans (nog) niet het geval en deze worden van harte aanbevolen.

1. De mate waarin door of namens een PRO controle kan worden uitgeoefend heeft de hoogste prioriteit. Er kan geen verantwoordelijkheid worden genomen zonder een adequaat controleniveau. In de keten van een EPR / PRO zijn alle actoren (schakels) verantwoordelijk, waarbij de coördinatie in handen is gesteld van de producenten. Ook het EY rapport geeft aan dat voor bijna alle materiaalstromen de controle bij het *end-of-life-stage* zwak is;
2. Zonder adequaat toezicht en handhaving dan wel door (instanties van) de overheid dan wel (privaat) rechtelijk door een PRO kan de producenten-verantwoordelijkheid niet anders dan onvoldoende worden ingevuld;
3. Een EPR-operatie is intrinsiek een operatie waar 'geld bij moet'. Het kunnen beschikken over een solide en duurzaam financieel system dat hierin voorziet is een 'conditio sine qua non';
4. De beste resultaten met EPR systemen in Europa en wellicht in de wereld zijn gestoeld op transparante en zichtbare financiële bijdragen – welke niet afkomstig zijn van producenten.

Namens de leden van
Vereniging Producentenverantwoordelijkheid Nederland

ir. Arie de Jong
voorzitter

Baarn, 17 mei 2016
VPN IenM EPR memo 051716 EY EPR LAP3

Notes

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