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# MANUAL ON EXTENDED PRODUCER RESPONSIBILITY

October, 2017



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## 1. Introduction

The Waste Management Code (WMC) of Georgia, adopted in December 2014, aims at establishment of the modern waste management system at national level. Georgia has approved National Waste Management Strategy (2016-2030) and Action Plan (2016-2020) for the implementation of the legal requirements in the waste management sector (Governmental Decree N 160 01.04.2016).

Introduction of the system of extended producer responsibility (EPR) at the national level is required by the WMC, according to which this mechanism should be established in the country from December 2019. The National Waste Management Strategy and Action Plan also contain strategic targets and specific actions for the implementation of EPR to tackle the management of the following waste streams (Table 1):

**Table 1: National minimum targets for the following waste to be managed:**

	2020	2025	2030
Batteries	20 %	50 %	80 %
Waste Oils	50 %	75 %	90 %
Packaging waste	40 %	75 %	90 %
WEEE	20 %	50 %	80 %
Tyres	50 %	70 %	90 %
Accumulators	60 %	80 %	90 %
End-of-life vehicles (ELV)	20 %	50 %	80 %

At the international level, Georgia is a Party to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes. Hence, Georgia's national policy framework needs to create favourable conditions for environmentally sound management of hazardous and other wastes. EPR is one of mechanisms, strongly recommended by the documents of Conferences of Parties of Basel Convention and which can facilitate this process by incentivising producers to collect and/or process generated wastes at the end of life. Effectiveness of the EPR is recognised by the Organisation for the Economic Cooperation and Development (OECD) also.

Considering the recommendations of Basel Convention and OECD documents as well as legislative regulation in European Union and experience of other countries, Georgia has the ambition to implement EPR as a tool for effective management of chosen waste streams.

This manual seeks to explain the principles of EPR, the approaches and types of its implementation in various countries, its advantages and challenges, the role of stakeholders and state regulation, as well as financial models. It is not possible to apply a one-size-fits-all model to all waste streams in every country and when proposing a suitable model it is therefore necessary to consider also national approaches and the prevalent situation of the target country as well as historical and cultural pre-conditions.

The manual describes international practice and does not cover the situation in Georgia. Nevertheless it can be instrumental for increasing overall understanding on EPR mechanism and defining the appropriate scheme for the practical implementation of the EPR system in Georgia.

The presented manual can serve as the first general information on EPR for all stakeholders. It will be useful to prepare other more specific guidelines and information documents tailored to specific stakeholder interests that will help them to be prepared for new obligations.

## 2. Terminology

**Clearinghouse** – A clearinghouse is a third-party assurance agency which can take up informative and coordinative roles in the EPR system.

**Deposit-Refund-System** – System in which certain products or containers have a special front-end surcharge (price premium or deposit) placed on them by producers. This surcharge is then refunded to the consumer when he or she returns the containers or products for recycling or proper disposal.

**Disposal** - Deposit into or on to land, Incineration on land, permanent storage and other operations defined by the WMC.

**Distributor/Retailer** - Any natural or legal person in the supply chain, who makes a product available on the market.

**Environmental limits and targets** – Quantitative and qualitative values of waste product separate collection, treatment, recovery and / or recycling given by legislative regulation.

**Extended Producer Responsibility (EPR)** – Environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. In practice, EPR involves producers taking responsibility for collecting end-of-life products, and for sorting them before their final treatment, ideally, recycling.

**EPR compliance scheme** - Any system comprised of one or several producers to implement the EPR principle. It can be an individual system (or individual compliance scheme) where a producer organises its own system (see IPR), or a collective system (collective compliance scheme) where several producers decide to collaborate and thus transfer their responsibility to a specific organisation (a Producer Responsibility Organisation, see PRO).

**EPR Centre** – An EPR Centre is a central state-run entity responsible for waste product management and meeting legislative targets under the EPR system in the country. It organises the collection and recycling of end-of-life products. The EPR Centre collects recycling fees from producers for financing the waste management.

**Hazardous waste** - Waste which displays one or more of the hazardous properties defined by the Waste Management Code (e.g. explosive, flammable, oxidizing, irritant, harmful, toxic, etc.).

**Individual Producer Responsibility (IPR)** – Producers are individually responsible for the collection and disposal of waste originating from their own products.

**Orphan products/historical waste** – Product put on the market before an EPR legislation entered into force.

**Producer** – Any natural or legal person who, manufactures, processes, treats, sells or imports products that at the end of its life-cycle becomes specific waste and are covered under the EPR system.

**Producer Responsibility Organisation (PRO)** – Collective entity typically funded by producers or through legislation, which becomes responsible for meeting the collection and disposal obligations of the producers.

**Product** – The defined group of products which is covered under the EPR system (also “EPR product”).

**Putting on the market** – The first supply of a product to the market from local production, import, lease or in other way on the market on the customs territory of Georgia excluding free industrial zones , in the course of a commercial or non-commercial purposes, whether in return for payment or free of

charge. Each subsequent supply of the product is not considered as placing on market.

**Recovery** - Any activity the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function; Recovery includes recycling.

**Recycling** - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It does not include energy recovery.

**Recycling Fee** – Price paid by a producer to have its products dealt with through a Producer Responsibility Organisation. Other terms that may apply are WEEE Compliance fee or Advanced Recycling Fee. Oftentimes this fee is added to the price of the product sold to customers.

**Re-use** - Re-use of products and/or components before they become waste for the same purpose for which they were conceived.

**Stakeholders** – All actors involved in the value chain of a product that have a stake in its production and end-of-life management: producers, retailers, consumers-citizens, local authorities, public and private waste management operators.

**Waste** - Any substance or object which the holder discards or intends or is required to discard.

**Waste facility** – Any company dealing with waste management (collection, transportation, recycling or any other type of recovery and disposal).

**Waste management** - Collection, temporary storage, pre-treatment, transport, recovery and disposal of waste, including the supervision of such operations and the after-care of disposal sites.

**Waste treatment** - Recovery or disposal measures according to Annex I and II, including pre-treatment prior to recovery or disposal.

### 3. Goals and objectives of EPR

Increased consumption leads to the exhaustion of natural resources and produces increasing amounts of wastes. The necessity of finding new resources for materials, especially metals, calls for new tools which can support the recycling of materials from wastes<sup>1</sup>.

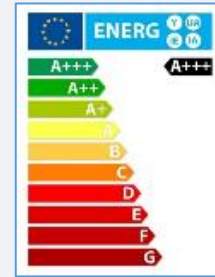
Extended Producer Responsibility is a tool which ties the waste management to the design and production of products and seeks to close material loops at the end of life.

EPR effectively shifts the responsibility for waste management activities onto producers and incentivises them to change. Doing so has several advantages. First of all, placing clear responsibility on one group of actors (i.e. producers) avoids the situation where everyone's responsibility becomes no one's responsibility. Second, the majority of environmental impacts are pre-determined when producers design their products. Therefore, EPR can provide incentives for manufacturers to embrace Design for Environment (DfE), Design for Disassembly (DfD) and Design for Recycling (DfR) at the development stages. Third, assigning responsibilities to producers eventually incentivises them to be physically involved in end-of-life management or entered into a dialogue with downstream actors, thus fostering information exchange between actors and creating positive spill-over effects for the waste management system as a whole.

Therefore, the role of the producer is fundamental, as **producer can influence**:

- **The product design**

The approach of the producer can be voluntary, when producer himself is directly interested to produce his products constructed in such a way that the treatment and disposal of the waste generated from the product after its lifetime is the cheapest as possible. The second approach is obligatory, when governments (by the means of legislative regulation) can influence the design or content of some materials in the product.<sup>2</sup>



Energy labels help consumers choose energy efficient products. The labelling requirements for individual product groups are currently created under the EU's Energy Labelling Directive, a process managed by the European Commission. Products are labelled on a scale of A+++ (most efficient) to G (least efficient).



The European ENERGY STAR Programme is a voluntary energy labelling scheme for office equipment. Under EU law, central governments and EU institutions must purchase office equipment with energy efficiency levels at least equivalent to ENERGY STAR.

<sup>1</sup> Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the regions. Closing the loop – An EU action plan for the Circular Economy. COM(2015)614final, 2 December 2015

<sup>2</sup> e.g. Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council or Directive



Already in 2001 the Organization for Economic Cooperation and Development (OECD) concluded that one of the most important steps in designing an effective EPR scheme is the establishment of clear policy goals and programme objectives. Objectives include but are not limited to:

- Increasing waste prevention, reuse of products and recycling of materials;
- Closure of materials use loops;
- Reducing final disposal and incineration of waste;
- Internalizing costs of waste management into the price of the product;
- Developing cleaner production and products,;
- Design of more environmentally compatible products, reducing use of natural resources and/or raw materials; and reducing use of certain toxic substances and/or other potential hazardous components.

- **Content of hazardous materials in the product**

In this case also the approach to the environmental protection and prevention connected with the product can be voluntary or obligatory.<sup>3</sup>

- **Consumers' behaviour**

The producer influences the consumers' behaviour through advertising environmentally friendly products. Labelling the products<sup>4</sup> is also a very effective tool to influence consumers' behaviour.

### **Objectives of EPR**

In the context of all abovementioned the objectives of EPR can be summarised as follows:

- a) Design improvements of products, e.g. to promote design for disassembly, enhance recyclability or reduce the contents of hazardous materials contained within
- b) High utilisation of product and material quality through effective collection, treatment, and re-use or recycling in an environmentally friendly and socially desirable manner.

According to the EU, EPR is seen as a mechanism which can help internalise the end-of-life management costs and provide incentives to producers to take environmental considerations into account along a products' entire lifecycle.

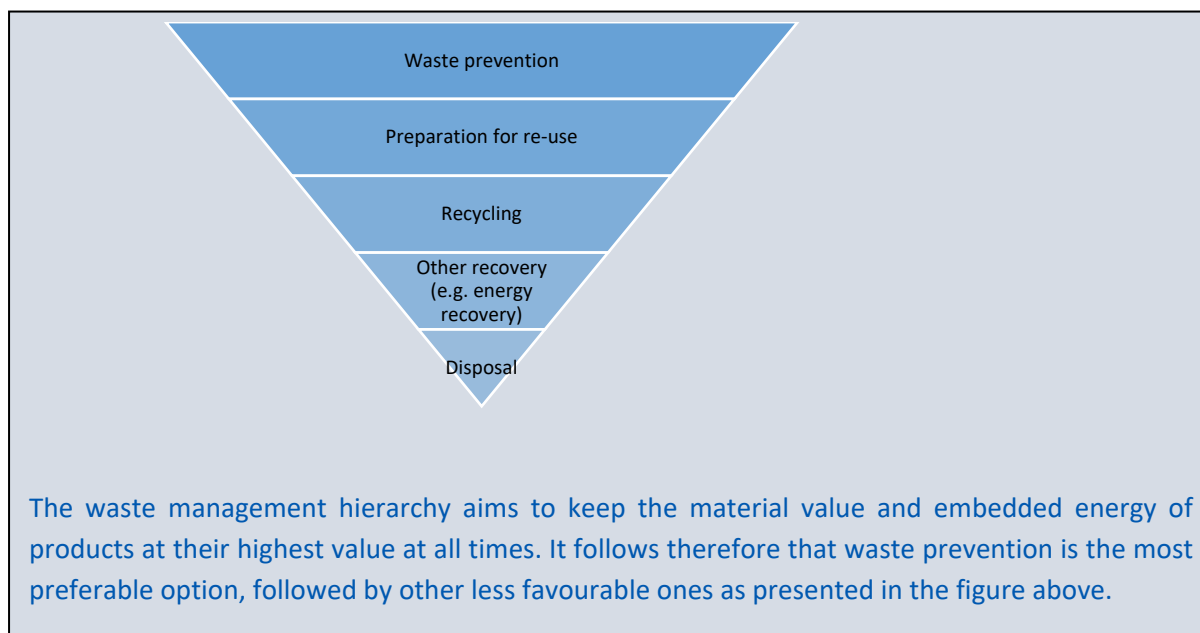
As such, EPR aims at supporting the waste management hierarchy and emphasising waste prevention, followed by (in order to relative importance) preparation for reuse, recycling, other recovery (e.g. energy utilisation) and disposal.

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2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC

<sup>3</sup> e.g. Directive 2011/65/EU of the European Parliament and of the Council of 27 January of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)

<sup>4</sup> e.g. Directive 2010/30/EU of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products

**Box 1. Waste management hierarchy**

Further, EPR may not only increase the environmental performance of waste management system but can also mobilise the required financial resources to provide for separate collection, treatment, recycling, reuse and/or disposal of wastes. Financial aspects are among the main challenges of establishing the proper waste management system including the development and operation of sufficient waste infrastructure. The polluter pays principle is an important cornerstone of environmental policy and EPR is one of the potential funding mechanisms in this context.

In countries with less developed waste management systems, EPR can provide a way to facilitate private investments into the waste sector infrastructure. There is international evidence that the introduction of EPR schemes is conducive for the functioning of a country's waste management system and can create new job opportunities for all types of work – from simple mechanical work convenient for disabled to management posts or educational jobs.

**Box 2. Potential funding mechanisms under the polluter pays principle**

**Direct payment-** This model is usually applied in industrial and private sector. The waste producer as industrial facility, service providing company, etc., pays for waste transport and disposal /recovery directly to the waste management operators. This model is easy to understand, easy to realise and easy to inspect. The waste producer gives effort to waste prevention by the reason to minimise costs of waste management. On the other hand risk of this model is illegal waste handling in an effort to decrease the costs of waste management.

**Payment through public funds (state, municipality) -** This model is successfully applied on the financing of management of municipal wastes produced by households. The households pay taxes or fees to the state budget or to specialised authorities or municipalities which provide for waste management. This model is successfully applied in all European countries. The disadvantages of the model are low level of waste prevention, low financial effectivity and political influences.

**Extended Producer Responsibility (EPR) -** This model is the most effective for selected waste streams but cannot be applied for all waste streams. The principle of the model is that the costs of waste management are pre-paid in the price of the product at its purchase and the

responsibility of waste management moves from waste producer to the product producer. EPR scheme aims to make producers responsible for the environmental impacts of their products throughout the products chain, from design to the post-consumer phase.



**Picture 1: Sorting of waste packaging in FCC Environment Zohor, Slovakia**

## 4. EPR System

This chapter describes the general concept of EPR system, flow of waste, finances and information, roles of stakeholders as well as EPR processes and applied policy instruments for effective functioning of the system.

EPR system is functional only when the roles of all key stakeholders are clearly defined and well communicated. The activities of stakeholders must be regulated by legislation and state authorities must establish an effective monitoring and enforcement system. Therefore, the assumptions of the effective EPR system are:

- simple, clear and strict legislation and
- regular inspection and enforcement by state authorities

### 4.1. Interconnectedness of stakeholders in the EPR system

The EPR system involves several stakeholders: producers and importers of EPR products, Producer Responsibility Organisations (both PROs or an EPR Centre if any), distributors of products covered under EPR, waste facilities (companies dealing with collection, treatment, recycling or disposal of wastes), municipalities, state authorities (central environmental authority, local environmental authorities, state supervision bodies, police, customs, etc.).

Potential waste and financial flows in the EPR system are shown in a simplified scheme below (Figure 1).

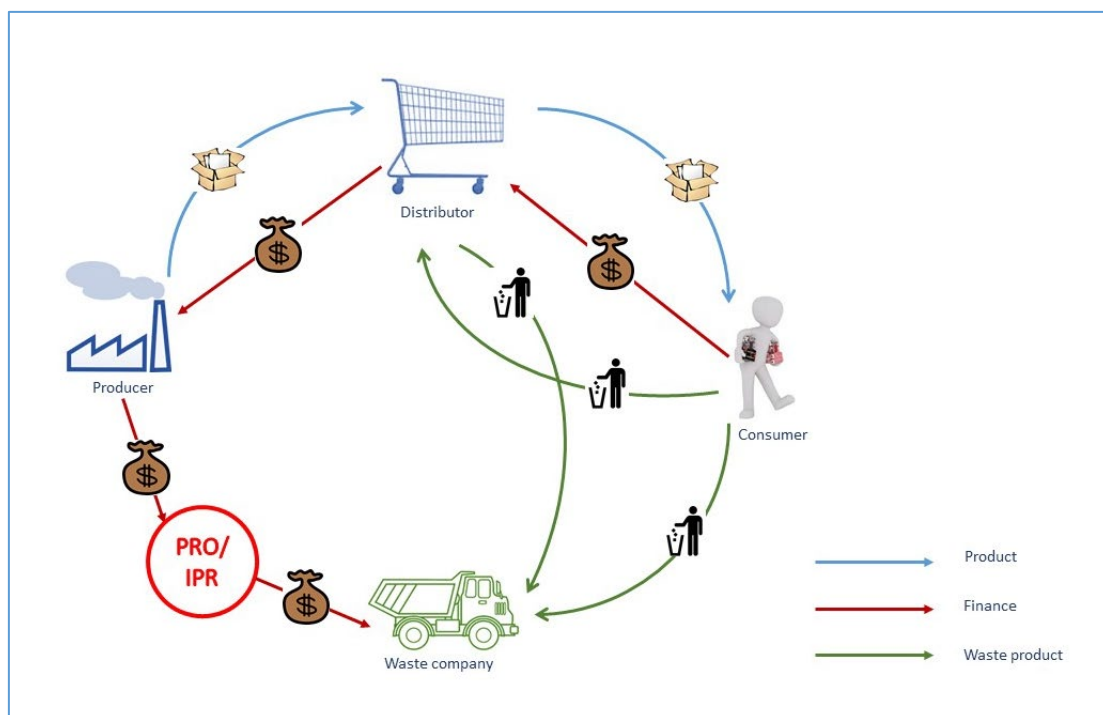


Figure 1: Waste and financial flows in the EPR system

Producer/importer<sup>5</sup> sells products to consumers through his distributors/retailers. Consumer after the life cycle of the product has the possibility to deliver the waste product to the distributor which may provide a take-back system (when selling a new product to take over the waste product on one-to-one basis), or consumer can utilise the municipal waste collection system to deliver the waste product directly to the waste facility operating in the municipality. Take-back system is successfully applied for waste electrical and electronic equipment, waste batteries and accumulators or end-of-life vehicles. The system utilising separate collection system in municipalities is usually applied for packaging waste. There is a possibility to combine take-back system and separate collection system in municipalities or waste treatment facilities.

The distributor in cooperation with the relevant entity of the EPR scheme delivers waste products to waste facility which provides for environmental sound management of waste products and has the permit for these activities from the state authority. How the take-back is organised depends on the scheme that the respective producers of the products have set up.

Producers can take care of their end-of-life products through a third-party organisation taking care of waste management on behalf of the producer, a so-called Producer Responsibility Organisation (PRO); or individually following the principle of Individual Producer Responsibility (IPR) stipulating that a producer himself takes care of the (end-of-life) products that he has put on the market; or a government-run EPR Centre that organises end-of-life product collection and management for all producers covered under EPR legislation.

Producer by the means of his EPR scheme (PRO / IPR / EPR Centre) has the responsibility for a functional system and is obliged to finance the system. For successful operation of the system the basic condition is the exchange of information. The simplified scheme of information flows in the EPR scheme is shown in Figure 2.

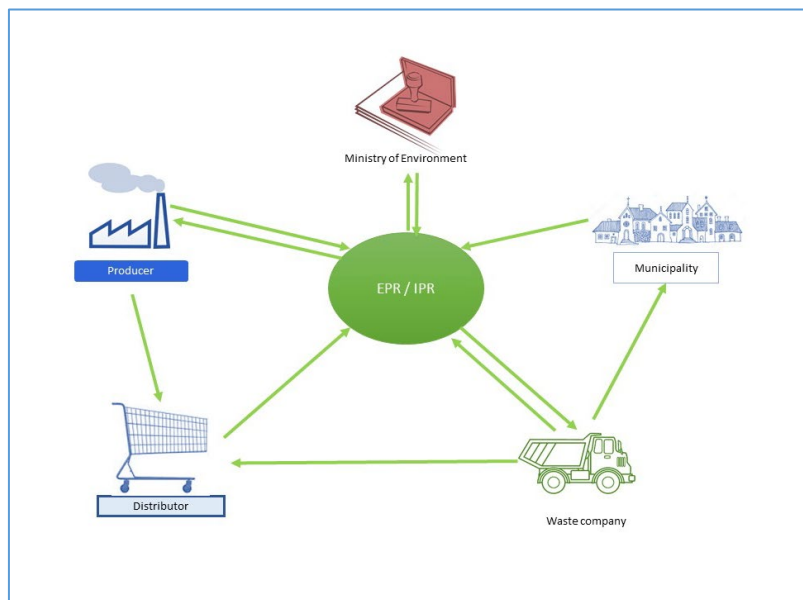


Figure 2: Information flows in EPR system

The producer gives the information on amounts and types of products put on the market in dedicated period, usually once a quarter to the relevant entity in the EPR system. In case of using a PRO the

<sup>5</sup> If the term producer is mentioned in the subsequent parts of the document it also comprises the term importer

producer informs the PRO which informs the relevant public authority and the waste management company that he has contracted. If a producer fulfils his EPR obligation through IPR he himself informs the relevant public authorities and waste management companies.

The relevant institutions of the EPR system (PRO, producers themselves, EPR Centre) communicate with the state authority (usually Ministry of Environment) on different issues: the relevant actor initiates the registration of producers in central registers and reports the amounts of products put on the market as well as the amounts of wastes collected, treated and recycled. Often the central state authority asks for other information (e.g. on financing of the system...).

The distributor may be obliged to implement take-back system and communicates with the relevant entity of the EPR system (PRO/producer/EPR Centre) on conditions of transport of collected waste to waste treatment facility. The producer communicates with distributor on recycling contribution which is included in the product price. The relevant actor of the EPR system (PRO/producer/EPR Centre) communicates with waste facility dealing with transport of waste products, as well as with waste treatment and / or recycling facility. If the waste products are collected in the system of separate collection of wastes in municipalities, municipalities communicate with the relevant entity of the EPR system (PRO/producer/EPR Centre) to provide for transport of waste products to waste treatment facility. Producer is obliged to supply information on product design and content of hazardous materials to waste treatment facility in order to ensure environmentally friendly treatment of wastes.

## 4.2 Distribution of responsibilities

Detailed roles and functions of all key players in the EPR system are described as follows:

### 4.2.1 Producers of EPR products

According to the principle of EPR, producers (according to the definition of producers this term includes also importers) are primarily responsible for the collection, treatment and disposal of generated wastes. It follows that producers of products need to fulfil certain obligations which must be anchored in legislative regulations.

Producers can be obliged to:

- ensure that each product is designed and produced in a specific regulation facilitating its disassembly and recovery, particularly its reuse and recycling,

- ensure that no product contains restricted materials or substances<sup>6</sup>,
- label the product by specified manner described in the legislation,
- ensure take-back and separate collection of waste products at the end of life,
- preferentially reuse waste products collected as a whole (if possible and approved by legislation),
- ensure that waste product which cannot be reused are channelled to authorised treatment facilities,
- treat waste in accordance with minimum standards,
- ensure environmental sound disposal of those wastes which cannot be recycled or recovered,
- ensure that the separate collection, transportation and treatment of waste are carried out in an environmental friendly way according to the legislative requirements,
- meet minimum limits for separate collection, reuse and recycling of waste products, if such limits are set down by legislation,
- provide all information necessary for environmentally sound treatment of waste products at waste treatment facility, particularly with regards to components and materials contained in products,
- create consumer awareness on how to correctly dispose of products at the end of life and the social/environmental consequences of improper disposal,
- register in the central Register of producers operated by central state authority; registration is not only bureaucratic step but the moment when producer / importer claims its legal obligations in EPR scheme, keep records and report data on products put on the market and data on waste products separate collection, recycling and recovery to the state authority.

#### 4.2.2 Distributors of EPR products

Although in theory, EPR obliges producers to take care of generated wastes, products are often put on the market by other entities, most commonly distributors (i.e. retailers). Hence, the final brand on the product immediately prior to its retail sale is a key criterion for identifying the responsible producer.



#### Separate collection of municipal waste in Stockholm (Sweden)

In Stockholm the separate collection of municipal waste has a long tradition. There are operated several collection points where inhabitants of the city can bring their WEEE, waste batteries and accumulators, paper, plastics, glass, metals, textile and other waste streams and the wastes are transported by ships to the treatment facilities. People can also bring their wastes directly to ships according to the published timetable.



<sup>6</sup> e.g. Directive 2000/53/EC of the European parliament and of the Council of 18 September 2000 on end-of-life vehicles as amended

Distributor is connected with producer on the basis of business relation. Distributor in cooperation with product producer can provide take-back systems in connection with deposit-refund-schemes for returnable products at the end of life.

A distributor can be obliged to

- carry out take – back of waste products usually free of charge in the facilities intended for selling of products,
- deliver waste products collected through take-back system to producer, PRO or to a waste treatment facility authorized to collection or treatment of wastes which cooperates with producer or PRO under an agreement.

Distributors are usually exempt of bureaucratic duties as registration, permitting or keeping records.

#### 4.2.3 Waste facilities

A waste facility provides physical activities of waste handling, including waste collection, transport, treatment, recovery, recycling and / or disposal. Waste management facilities can be obliged to

- receive the licence (permit) of state authority for its operation and to follow the requirements of the licence<sup>7</sup>;
- handle wastes in order to protect environment and human health and take other measures to reduce negative impacts on environment;
- put into operation and operate machines and appliances in compliance with ordinary documentation and conditions defined by permit of state administration authority;
- take remedial measures imposed by appropriate state administration authority of waste management;
- keep operating documentation and records and on the basis of the record to report data to state authority;
- weigh accepted wastes and keep records on amount of accepted wastes;

### SuperDrecksKëscht

is the Luxembourg waste facility operating in the city of Luxembourg. It operates special vehicles for the treatment of valuable and dangerous substances in the companies as well as on the mobile and stationary collection sites. Inhabitants of the city bring all their house-hold wastes (with the exception of mixed municipal waste) directly to the vehicle and put them to special containers placed in the vehicle. The vehicle comes to the designated place in designated time according to published timetable. The company uses these vehicles also for hazardous wastes and hazardous wastes needing special handling as propane / butane gas bottles or chemical substances. The staff of the vehicle is only one person – driver and communicator in one.

more:  
<https://www.sdk.lu/index.php/en/>



<sup>7</sup> Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, art. 4



- deliver wastes arisen from the waste treatment process only to facility with valid state licence for waste recovery or disposal; and
- meet recovery or recycling targets if they are given by legislation.

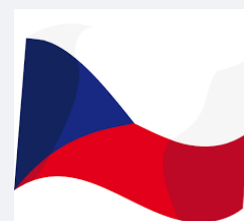
#### 4.2.4 Producer Responsibility Organisation (PRO) and EPR Centre

The PRO is an entity established with the aim to fulfil legislative obligations connected with EPR. The entity can be established either voluntarily by a group of producers / importers of products, by the third party (on a business model) or by legislation (usually by Waste Management Act /Code). The form of the entity can be a business company (Ltd. or joint-stock company), (non-profit) association, NGO or co-operative society. Usually operating on the basis of an agreement with producers, the main role of the PRO is to provide for waste collection (take-back or separate collection), transport to waste facility, treatment, recovery, recycling and disposal of waste products put on the market by clients. These services are often provided on the basis on agreement with waste facilities and / or municipalities. PROs receive recycling fees from producers.

PROs can carry out the following tasks:

- fulfilment producers' obligations in the range of the mutual agreement;
- collection of financial contributions from producers/importers based on the amount of products put on the market during the stated period ;
- separate collection of waste products, often in close coordination with service providers;
- recycling, recovery and disposal of waste products collected in close coordination with service providers (where necessary); if in the country of origin does not operate recycling facilities, PROs ensure environmental sound transport of wastes to facilities abroad according to the Basel Convention<sup>8</sup>;
- meeting targets for separate collection, recycling and recovery;
- information campaigns to enhance consumer awareness in accordance with the obligations put on producers;

In the Czech Republic 16 PROs for WEEE, 2 PROs for batteries and accumulators and 1 PRO for packaging are operated.



In the Slovak Republic from 2001 when the legislation firstly designed the simplified model of EPR introduced, 96 authorised facilities for treatment and recycling of WEEE, waste batteries and accumulators, end-of-life vehicles and waste mineral oils have been established. It is estimated that in these facilities over 2500 people are employed. This statistics does not include the staff dealing with separate waste collection and transport.



<sup>8</sup> Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

- effective management of financial resources;
- collaboration with bodies performing government supervision for inspection of operations;
- keeping of records on the basis of which information is reported to the dedicated state authority.

PROs often delegate some tasks as waste collection, transport, treatment to (municipal) service providers on behalf of producers so that collection targets are met. Hence, there is close coordination needed between PROs and producers as well as PROs and service providers respectively.

A special case of a PRO is the EPR Centre. An EPR Centre has more or less the same tasks and responsibilities as a PRO. The difference between the two is that an EPR Centre is the only PRO in a system and is in many cases a (semi-)public organisation. PROs in contrast usually compete with other PROs in the EPR system and are privately run.

#### 4.2.5 State administration

The EPR system requires the close involvement of various authorities – central, regional and local. Each authority has its own role and responsibilities. Distribution of responsibilities is given by the conventions and legal background of authorities and it changes from one state to another. For successful implementation of EPR system the cooperation of all state authorities is absolutely necessary.

##### **A) Central state authority (usually Ministry of Environment):**

- states legislative regulation, limits and targets of separate collection, recovery and recycling of waste products,
- operates and updates the Registers of producers and Registers of PROs (often through its subordinate subject, e.g. environmental agency),
- draws up record on producers of EPR products and PROs to the Registers,
- determines targets for separate collection, recovery and recycling of waste products,
- gives permits to waste facilities (not per se, in some countries this responsibility is given to regional or local authorities),
- keeps records on data reported by producers, PROs and waste companies,
- ascertains the proportion of producers of EPR products on the market annually,

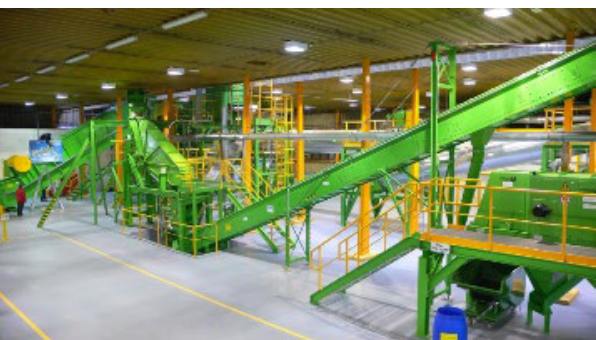
- decides whether products are subject to the EPR legislation (not per se, in some countries this responsibility is given to subordinate subject, e.g. environmental agency, other state authority, e.g. Ministry of Economy / Commerce or sector business associations).

#### B) Environmental Inspectorate:

- is the state supervision authority and inspects producers, PROs and waste companies,
- imposes fines
- can also take up the role of a clearinghouse; under this role they would have the following responsibilities (that may coincide with the responsibilities attributed to the central authority above):
  - o aggregating data and inspection of data quality (functioning as a registry);
  - o ensure compliance with legal prescriptions (e.g. by identifying free-rides);
  - o verifying the work done by Producers Responsibility Organisations (PROs, see above) in line with legal obligations; and
  - o determining market shares and corresponding collection targets for producers or PROs.

#### C) Other inspectorates (tax, business...) or state control bodies (customs offices):

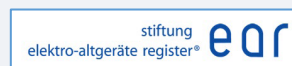
- check if distributors realise take-back system of EPR wastes free of charge,
- check tax documentation of producers (importers) of EPR products including amounts put on the market,
- check documentation of PROs,
- check if products put on the market are distributed after registration of its producer (importer) in the Register of producers.



Picture 2: Technology for treatment of waste cooling appliances in company ElektroRecycling, Slovenská Ľupča, Slovakia

#### 4.2.6 Municipalities

The role of the municipality is principal in the separate collection of



#### Clearing House in Germany

In Germany, the national clearing house for waste electric equipment (stiftung ear) was founded by producers as a consequence of transposing the European WEEE Directive into national law. The establishment of stiftung ear was stipulated by the national Electrical and Electronic Equipment Act (ElektroG). Provided with sovereign rights by Germany's Federal Environment Agency (UBA), stiftung ear registers producers of electrical and electronic equipment, coordinates the provision of containers for public exchange facilities and the pick-up of e-waste at public waste disposal authorities across Germany.





Picture 3: Eco-education of children organised by PRO Natur-pack, Slovakia (more: <http://www.naturpack.sk/obce/vzdelavanie-/>)

waste products from households. Municipality cooperates with producers or PROs in establishment and operation of systems of separate collection of waste products inside the EPR system as its essential part. The role of municipalities can comprise to:

- establish an effective system of separate collection of waste streams in designated facilities or via kerbside collection with regards to local conditions, culture and habits;
- provide an appropriate area for separate collection of waste from producers or PROs;
- educate inhabitants on environmental behaviour and environmental handling with household wastes, particularly with regards to separation of wastes;
- inform its inhabitants about details on separate collection of waste products and about the ban of disposal of waste products in dumps and landfills;
- control the ban of burning of waste products, especially waste packaging, in house furnaces;
- cooperate with producers and PROs to organise kerbside collection of waste products;
- report data on the system of separate collection of waste products in municipality to the state authority.

### 4.3 Policy instruments

There is a range of applicable policy instruments which can support the implementation of an EPR scheme, such as administrative, economic and informative measures. With regards to administrative instruments, options can include restricted substance list (e.g. as in the EU Restriction of Hazardous Substances Directive<sup>9</sup>), collection targets (as proposed by the EU WEEE Directive)<sup>10</sup> and treatment standards (for instance EU treatment standards for e-waste<sup>11</sup>). Further, restrictions on treatment and disposal may be necessary where operations are found to pose a risk to public health and the environment. In addition minimum recycled content standards (as illustrated by European packaging legislation<sup>12</sup>) and product norms can be useful instruments to implement EPR schemes.

Informative instruments mandate stakeholders to share information. For instance, producers can be obliged to report to designated authorities on a regular basis (e.g. quarterly) regarding the amount of products put on the market. Further, the use product labelling can inform consumers about how and where to dispose off wastes responsibly. Environmental product declarations can help conveying detailed product properties to interested parties while leaflets targeted at consumers can provide them with additional information.

Economic instruments pertain to a wider range of measures, such as material/product taxes for components that ought to be excluded and subsidies to provide incentives for the choice of materials. Advanced recycling fees (ARF) and deposit-refund systems (DRS) are commonly used instruments; while ARF refers to a fee paid by producers to finance the collection and treatment of obsolete products, DRS is a price premium paid by producers which is refunded when the product is brought back to producers at the end of life. Other market-based

#### EU legislations for WEEE and RoHs in EEE

Waste of electrical and electronic equipment (WEEE) is a complex mixture of materials and components which, when poorly managed, can cause major environmental and health problems due to their hazardous content. An improved mechanism of collecting and treating these materials is vital for enhancing the resource efficiency and improving the environmental management. Therefore, as part of its Environment legislation the EU has instated two directives – the WEEE Directive and the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive).<sup>1</sup>

Introduced in 2012, the recast WEEE Directive proposed a collection target of 45% of electronic equipment sold since 2016 and from 2019, a target of 65% of equipment sold, or 85% of WEEE generated<sup>1</sup>. Member States are obligated to report to the European Commission on the achievement of the targets for WEEE collection and are provided with custom calculation tools<sup>1</sup>. The European Standardization Organisations have also developed standards for the treatment of WEEE which also encompass aspects of marking and logistics<sup>1</sup>.

Besides restricting the use of hazardous substances like lead, mercury, cadmium and a few others, the RoHS Directive requires heavy metals and flame retardants to be replaced by safer alternatives<sup>1</sup>. The RoHS2 Directive, a recast of its predecessor, came into force in 2011 which details the scope of the legislation, restricted substances and exemptions, if any<sup>1</sup>. In response to it, the industry is expected to and supports the enforcement of producers being responsible for proving that they take all necessary measures to comply with the directive<sup>1</sup>.

<sup>9</sup> e.g. Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)

<sup>10</sup> e.g. Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (recast)

<sup>11</sup> e.g. Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and repealing Directive 91/157/EEC

<sup>12</sup> e.g. European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste (as amended)

instruments can be considered such as tradable recycling credits which are used to fulfil recycling targets and encourage investments at the optimal societal cost; yet, these appear are less common.

If such policy measures are used to implement EPR, their performance should be measured by their contribution to an effective EPR system. Last but not least, policy instruments should also address the management of orphan products, i.e. those that have been put on the market prior to the introduction of an EPR scheme.

The following two examples illustrate how policy can shape the design and features of an EPR system.

### Box 3. Cases from Sweden and France

#### Swedish recycling system for plastic bottles and metal cans

In Sweden, it is necessary to include the plastic bottles and metal cans in an approved recycling system before being marketed. The recycling system is expected to be specified on the label in addition to the amount paid for returning the container. One such example is of the deposit on aluminium cans set between 1.0 and 1.2 SEK by Returpack, a recycling system governed by the Swedish Board of Agriculture and used by most Swedish enterprises. The deposit includes the handling fee and the law requires cans to be labelled with this amount.<sup>13</sup> The annual fee borne by importers and producers is SEK 10,000. Individual stores importing and selling the products are exempted from this annual fee.

The labelling indicates if a product is included in an approved recycling system. Unless they have an exemption, products not governed by the recycling system are not supposed to be sold or given away. Violation of this rule could invite a fine of up to SEK 50,000. An exemption from being included in the labelling system can only be due to specific reasons regarding the shape or the material of the container which are certified by Returpack or any other approved recycling system. But again, such an exemption is time bound and not a long term solution. To avail this exemption, in addition to the recycling system issued certificate, an application containing specified product and business details should be submitted to the Swedish Unit of Trade and Markets. In the long term, manufacturers must switch the container to one that can be included in an approved recycling system.

All the aforementioned rules apply to plastic bottles and metal cans with beverages ready for consumption. Products consisting mainly of dairy products or juice from vegetables, fruits or berries are exempted from the rules. Beverages in glass bottles are not included in this system but governed by Swedish Glass Recycling (Svensk Glasåtervinning AB).<sup>14</sup>

#### EPR on the Clothing, Linen and Footwear in France

In compliance with the European environmental standards on sustainable waste management, an Extended Producer Responsibility scheme for the clothing, linen and footwear producers, distributors or importers was set up in France in 2008. This regulation seeks to make businesses consider end of life of their products when putting them on the market. Some of the items that are exempted include full

<sup>13</sup> Beverage Container Legislation in Sweden. (2016, June 22). Retrieved October 12, 2017, from <http://www.bottlebill.org/legislation/world/sweden.htm>

<sup>14</sup> Intervention. (2016, December 14). Retrieved October 10, 2017, from <https://www.jordbruksverket.se/swedishboardofagriculture/engelskasidor/trade/petbottlesandmetalcans.4.584a812513a8740bea18000916.html>

leather clothing, medical and orthopaedic items, technical sports items, etc. The responsible companies can either set their own internal collecting and recycling programme through Individual Producer Responsibility (IPR) which is approved by the French Public Authorities, or pay an annual contribution to Eco TLC, the one company which is accredited to manage the sector's waste.

Being the preferred choice of many producers, Eco TLC channels the collected funds for sorting the organisations as adherents and non-adherents of the regulation, researching on new recycling solutions and make consumers aware of waste sorting. Going beyond its mandate, Eco TLC also provides communication kits and measuring tools to stakeholders following the IPR. The contributions received by Eco TLC are based on the volume and size of products put on the market by the companies. Categorized as items that are very small to ones that are identified as large, the clothing and household linen contribution per item, excluding VAT, ranges from €0.00132 to €0.0528. Similar rates are announced for footwear too. Additionally, there are incentive-based schemes wherein producers can avail discounts on their contributions for those products which are manufactured using recycled fibre.<sup>15</sup>

## 4.4 Processes in the EPR system

### 4.4.1 Separate collection of waste products

Separate collection of waste products is the fundamental condition for environmental sound management of wastes and retrieving secondary raw materials from them. The separate collection method depends on the waste producer, whether it is a household or legal entity. The methods of separate collection can be:

#### A) Individual collection and shipment of wastes from waste producer to treatment facility

This method is suitable for waste producers – legal entities (offices, banks, private companies, schools, etc.). The responsible person of the producer ensures shipment of waste arisen in the producer's facilities (objects) to the waste treatment facility nearest to the facility (object) in order to optimise the transport distances with the aim to lower the transportation costs and minimise environmental threats. The costs of shipment and waste treatment are paid by producer on the basis of agreement. The record document is invoice. The state administration does not enter the process; its role is only to inspect the legal waste management (collection, transport and delivering of waste to authorised treatment facility) and ensure compliance with all legal prescriptions.



Picture 4: Kerbside collection of waste packaging from households, Slovakia

#### B) Kerbside collection

This method is suitable for separate collection of wastes from households. The close cooperation of producers with municipalities and service providers is necessary. The producer addresses the

<sup>15</sup> EcoTLC Metteurs en Marché. (n.d.). Retrieved October 10, 2017, from <http://www.ecotlc.fr/page-297-information-in-english.html>

municipalities to publish (by means commonly used in the very municipality) the date of separate collection of waste. The citizens can bring their wastes either in front of their house (this is not recommended because of steal of components or utilizable parts by poor people or resellers) or to designated places (square, in front of office, pub or church) where operator takes over the brought wastes (usually directly to the vehicle) and delivers wastes to authorised treatment facility nearest to the municipality. The producers can either keep their own vehicles, employ their own operators and drivers, or they can sign agreement(s) with service providers dealing with shipment of hazardous wastes. The producers share the costs of WEEE collection, shipment and treatment. Convenience for citizens is a huge advantage as they do not have to drive to designated recycling areas. Kerbside collection is suitable for small municipalities in countryside, because this collection system is more expensive than other collection systems.

### C) Collection points

In municipality the fenced area with solid isolated (asphalt or concrete) surface is built up. The area is opened during its opening hours and a guard / operator during the opening hours is necessary to avoid thievery and to control the quality incoming waste. The operation of collection points is connected with operational costs that can be paid either by producers (if the collection points are established exclusively for EPR waste streams) or by municipality (if collection points are established for various waste streams such as metals, construction and demolition wastes, green wastes...) through waste fees or environmental taxes. The establishment of collection points has the following advantages:



Picture 5: Collection point in village Chocholná – Velčice, Slovakia (Photo: Priatelia Zeme- SPZ)

- controlled waste collection avoids the establishment of uncontrolled dumps;
- awareness raising of citizens (citizens are getting used to bring their wastes to controlled place and not to bring wastes into dumps);
- financial income for municipality when selling the secondary raw materials (metals, paper, plastics, glass).

Collection points have also disadvantages, as they:

- Need operational costs
- require space,
- are inconvenient to consumers as they need to drive to collection centres to dispose of wastes.

Collection points are suitable for bigger municipalities (cities or villages), but are not suitable for thinly populated areas as people are not willing to bring their wastes to long distance.

One of the most used systems of separate collection of municipal wastes is the system of stationary collection stations. These are formed by several containers dedicated for some waste streams as paper, glass, plastics or metals, in some countries also for small waste electrical and electronic equipment or waste batteries and accumulators.

### D) Waste take-back system (in-shop take-back systems)





Picture 6: Returnable bottles automat

Another option is that distributors provide an in-shop service for separate collection of wastes. The distributor will take back products at the end of life free of charge. This approach has been successfully applied to reusable bottles and is typically supported by a deposit-refund scheme where the consumer pays a price premium at the point of purchase. The consumer is reimbursed when the product is returned at the end of life. In-shop take-back systems require a proper storage area (e.g. a container or separate storage facility inside the building). A registration by state authority can be asked. Usually no permits are required.

In EU for some waste products as waste electrical and electronic equipment or waste batteries and accumulators the take-back system is obligatory for distributors. When supplying a new product, distributors are responsible for ensuring that waste product can be returned to the distributor at least free of charge on a one-to-one basis.

The similar system is often applied in other types of distributors as motor-car repair shops or gas stations.

The distributor will communicate with the relevant entities of the EPR scheme to deliver the waste collected by distributor to the authorised waste treatment facility. The costs connected with take-back system and with shipment of waste are financed by the producer (directly, through the PRO or the EPR Centre). It is suggested to motivate the distributors by financial contribution based on the amount (weight) of waste collected paid by the EPR scheme (the PRO; the producers themselves if they opted for IPR; or the EPR Centre). Consumers are satisfied because they can get rid of the waste easily and free of charge and they behave environmentally friendly. Separation of wastes is ensured mechanically when the products are returned at the end of life.

#### 4.4.2 Treatment of wastes

Waste treatment refers to any activity after the waste has been handed over to a facility for sorting, depollution, disassembly, shredding, recovery or preparation for disposal and any other operation carried out for the material or thermal utilisation. Depending on the types of wastes, treatment processes are either physical, chemical or biological in nature. In practice usually the treatment of waste products consists of five steps, which are shown in Figure 3.

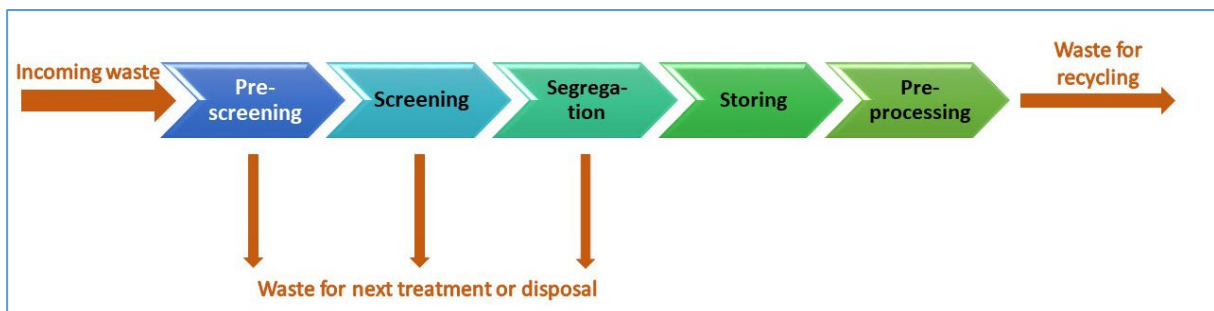


Figure 3: Waste treatment processes

These steps include:

1. Pre-screening: waste weighting, sorting and storing before other activities;
2. Screening: removal or reduction of unwanted or determined by legislation substances and components from waste;
3. Segregation: sorting of materials, components and preparations according to composition and consecutive handling (recycling, landfilling) which can be done manually, automatically or combined;
4. Storing: storing of sorted components or materials prior to pre-processing,
5. Pre-Processing: pressing and packaging for transport and processing (recycling or disposal).

The financing of waste treatment facility is usually multi-sourcing:

- a) The producers pay for their amount (weight) of waste delivered to the treatment facility. The price can be i) flexible on yearly basis projected into agreement or ii) fixed by legal regulation.
- b) The treatment facility can earn supplementary financial returns by selling off recycled raw materials after the treatment processes.
- c) Waste treatment facility can also receive funds from social programs (inclusion via employment of handicapped people, reintegration of long-term unemployed into the job market, rehabilitation of prisoners etc.) from the sources of state authority in the field of labour and social politics.

#### 4.4.3 Recycling of wastes

Every waste stream needs special technology for recycling. Metals, glass, paper and cardboard, batteries and oils are materials that can be recycled by the means of technological reworking. Facilities for recycling of secondary materials are operated all around Europe. Metals are recycled in smelting plants, paper and cardboard are recycled in paper mills, glass is recycled in glassworks, and waste mineral oils are regenerated to produce furnace oils. New technologies for recycling of plastics, waste tyres and other special waste streams are being developed and successfully operated.

#### Re-use

Re-use is the important tool of waste prevention. In many European countries the second-hand shops are becoming popular. The operators who have the specific permits of state authorities accept used products (clothes for children, sport equipment, old furniture, pictures in frames, household utensils etc.), sort them, if necessary repair and the products are sold in special shops. Such facilities are usually not profitable and they are supported by state or local society (municipality, regional government, etc.).



Several manuals and tools for waste prevention by the means of re-use can be found in the webpage of the CERREC project:

<http://cerrec.eu/>.



Picture 7: Manual sorting of plastic foils, FCC Environment, Zohor, Slovakia

The waste recycling should meet the standards of environmental sound waste management; therefore the recycling facility must be inspected by state authorities in the frame of legislative requirements. Every facility dealing with waste needs a permit of the state administration body (e.g. Ministry of Environment, District Authorities or Environmental Inspectorate depending on the

distribution of competencies of authorities in the very country) for handling of wastes (accumulation, transport, recycling)<sup>16</sup>. The facility has to meet some minimum environmental requirements in the field of water, air or soil protection as well as protection of human health.

The recycling facility shall provide wastes arisen from recycling processes only to facilities with adequate permit of state administration bodies (that is authorised sanitary landfills or other licensed foreign waste facilities), keep records and report to state administration data on wastes received, treated and produced, keep operating documents of installation (technological regulations, operating order, logbook, commercial and supplier contracts concerning waste handling, granted consents, statements and opinions by the state administration and self-government authorities) and fulfil other requirement of national legislation.

#### 4.4.4 Recovery of wastes

In order to choose the optimal technology for waste recovery, the right combination of economic and environmental performance criteria need to be considered. If material recycling results in adverse environmental impacts (e.g. air pollutants or contamination of soil and waste), the economic benefits of waste recycling may be negated by the environmental follow-up costs of this technology. In those cases other recovery activities can be applied, such as thermal recovery in waste-to-energy plants or co-generation of heat and power in for instance, cement kilns.

#### 4.4.5 Environmentally sound disposal of wastes

Each waste management system will inevitably produce wastes that cannot be recycled or recovered. Sometimes these are hazardous in nature and need to be disposed of responsibly so as to ensure that they do not contaminate the environment and pose a threat to human health. Hence, disposal practices must meet strict environmental requirements, e.g. by disposing of such wastes in controlled and authorised sanitary landfills.

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<sup>16</sup> Directive 2008/98/EC of the European parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

## 5. Approaches of EPR systems

Extended Producer Responsibility can be implemented by different approaches. One approach is represented by a close control of the system by the state (usually the responsible authority is Ministry of Environment, specialised office / fund / state institution); another approach is market-based system.

### 5.1. Centralised EPR system

The approach of the centralised system is based on the establishment of a specific institution – an EPR Centre controlled by state administration. The name of the centre can be chosen according to the national and historical conveniences. An EPR Centre is responsible for waste product management and meeting legislative targets in the country. The EPR Centre collects recycling fees from producers for financing the waste management. A centralised EPR system can be set up in various forms and needs to account for the specific allocation of responsibilities among stakeholders; one potential set-up of a centralised EPR scheme is presented in a simplified manner in Figure 4 below.

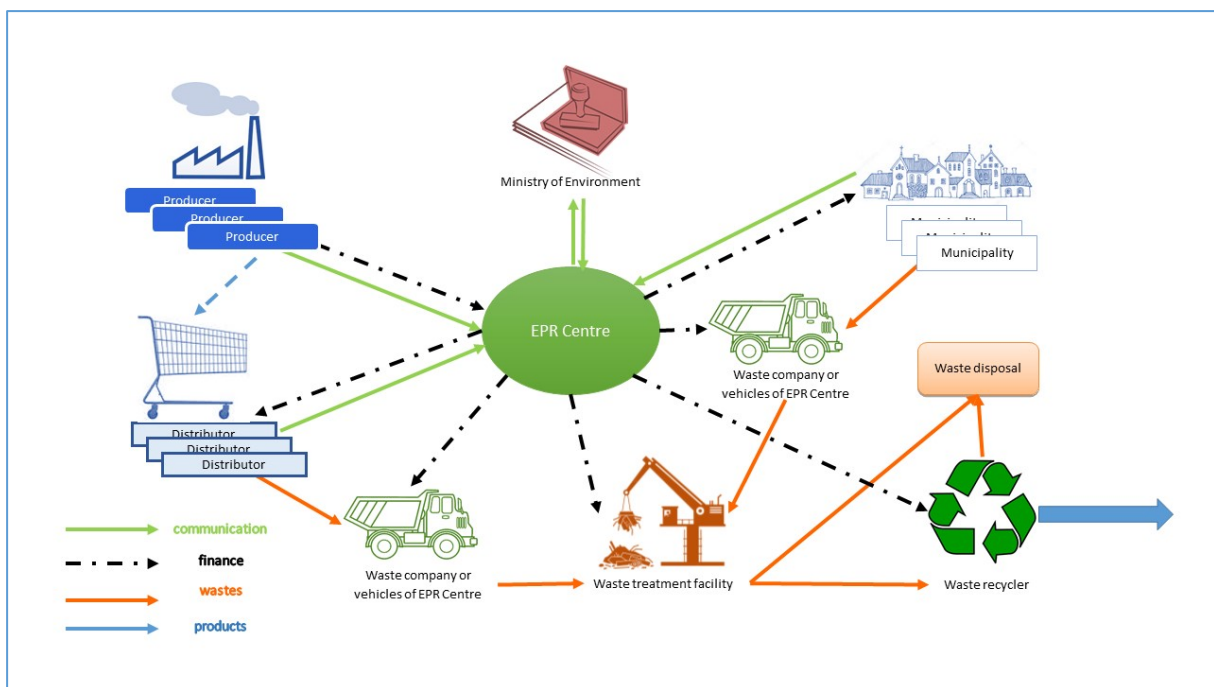


Figure 4: Scheme of centralised EPR system

In this approach the EPR Centre is established as a state non-profit institution responsible for EPR dependent or independent of the central authority (e.g. Ministry of Environment). The roles of the EPR Centre can be:

- to register all producers / importers / responsible persons for EPR,

- to collect financial sources from producers / importers / responsible persons,
- to bear responsibility for environmental sound management of EPR wastes in the country,
- to provide for the system of waste collection, treatment, recycling and disposal,
- to finance the system of waste collection, treatment, recycling and disposal,
- to meet legislative targets on waste collection, recycling and recovery.

The EPR Centre is fully controlled by the central state administration body, usually by the Ministry of Environment, but other authorities as Ministry of Finance, Ministry of Commerce or Ministry of Industry can also be interested in the activities and control of the EPR Centre.

The advantage of this system is quick accumulation of financial sources that can be used for the construction of waste infrastructure in the country. The disadvantage of the system is low flexibility, limited economic performance due to the absence of competition, centralised solutions without consideration of local specifications as well as the susceptibility to political influence and lobbyism connected with corruption.

Every EPR producer has to register in the EPR Centre. Usually the EPR Centre is responsible to call upon producers to register and to control the registration. Every producer obliged person has to report data on amounts of EPR products put on the market during given period (usually once a year, once a quarter) and to pay the recycling fee. Recycling fee is derived of amount of products put on the market.

The recycling fee is calculated as a weight of products put on the market multiplied by rate given in legal regulation. The rate must be calculated as a sum of costs of waste collection, transport and treatment plus costs of operation of the EPR Centre (labour costs plus operational costs) plus other expenses (information campaigns, information system etc.).

It is necessary to ensure the enforcement of law by the means of state control and the system of punishment and penalties. Usually several state administration bodies realise inspection of fulfilling legislative requirements:

- a) Central authority (usually Ministry of Environment):
  - checks the registration of producers (importers) of EPR products in the Register of Producers,
  - controls the activities of the EPR Centre,

## Centralised systems in Europe

Systems based on a centralised state-controlled EPR institution are operated e.g. in Hungary or till 2016 in the Slovak Republic.

In the Slovak Republic the system was called Recycling Fund and was established by national Waste Act. The producers and importers of products made from paper, enumerated plastics and glass, then producers and importers of electrical and electronic equipment, personal vehicles, mineral oils, tyres, batteries and accumulators and metal packaging we obliged to pay to the Recycling Fund contributions according to the amount of products out on the market. The administrative board deciding on budget of the Fund was formed by the representatives of the Ministry of Environment, Ministry of Finance, Ministry of Economy and representatives of municipalities. The rates of financial contributions were given by secondary legislation.



- controls Environmental Inspectorate,
  - issues permits for waste management companies; in the case that the waste industry will be developed in the future, this competency can go to second-level state administration authorities (district, regional...),
- b) Inspectorate (taxing authority, customs offices, commercial Inspectorate):
- checks the documentation connected with amount of EPR products put on the market,
  - checks the payment into the EPR Centre,
  - checks keeping records and reporting on amounts of EPR products,
  - inspects distributors,
  - undertakes other relevant inspections.
  - checks the spending efficiency and other financial aspects of the EPR Centre.
- c) Environmental Inspectorate:
- checks the fulfilment of legislative requirements put on the waste treatment and recycling facilities (technical conditions, agreement of reality with permits of state administration authorities, keeping records, reporting),
  - checks the collection points in municipalities,
  - checks waste collection companies,
  - undertakes other type of inspection within their mandate.

If the system of control and enforcement of law ought to be effective, enforcement and penalties must be defined by legislation (Waste Act and Criminal Code). Penalties can be imposed if the obligations are not met.

To implement effective system of EPR collection, treatment and recycling it is necessary to inform all involved persons:

1. Inhabitants of municipalities
2. Mayors of municipalities
3. Waste companies
4. Producers (importers) and distributors
5. State administration authorities

The information campaign can be financed by EPR Centre.

## 5.2. Market-based system

In Austria the monopoly EPR PRO for packaging called **ARA** was approved and authorised by state authority.



In the Czech Republic similar system called **EKO-KOM** was authorised.



Both countries were confronted with the demand of the European Commission to move away from a monopolistic systems towards one that allowed other PROs to operation in the country.

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A second approach of EPR is based on the principle role of PROs in the system. PROs are established by producers (importers) themselves, by the third party or by legislation as companies providing for services in the field of EPR. PROs can be regulated by legislation but there is a place for their competitiveness in the national market. In relation to the state environmental authorities PROs have only reporting obligations and underlie the state inspection.

In European countries there are either systems with one PRO (in Sweden, Finland for end-of-life vehicles and waste oils, in Netherlands and Czech Republic for packaging wastes or in Belgium for batteries and accumulators) or the systems with several PROs (UK, Denmark, France, Latvia, Slovakia for WEEE, Denmark or Austria for batteries and accumulators, etc.). The advantage of multiple PROs, system is that the producers can choose between existing PROs or together with other producers can establish a new one. Usually the state authority operates the Register of PROs. In some countries (Slovakia, Austria, Czech Republic) PROs must receive a permit and register at a designated authority (e.g. authorisation of the Ministry of Environment).

In EU Member States the producers must be provided the possibility to fulfil their EPR obligations individually, but some countries regulate the conditions for such approach very strictly; often the financial guarantee is required.

A potential and simplified example of a scheme of under a market-based system is shown in Figure 5.

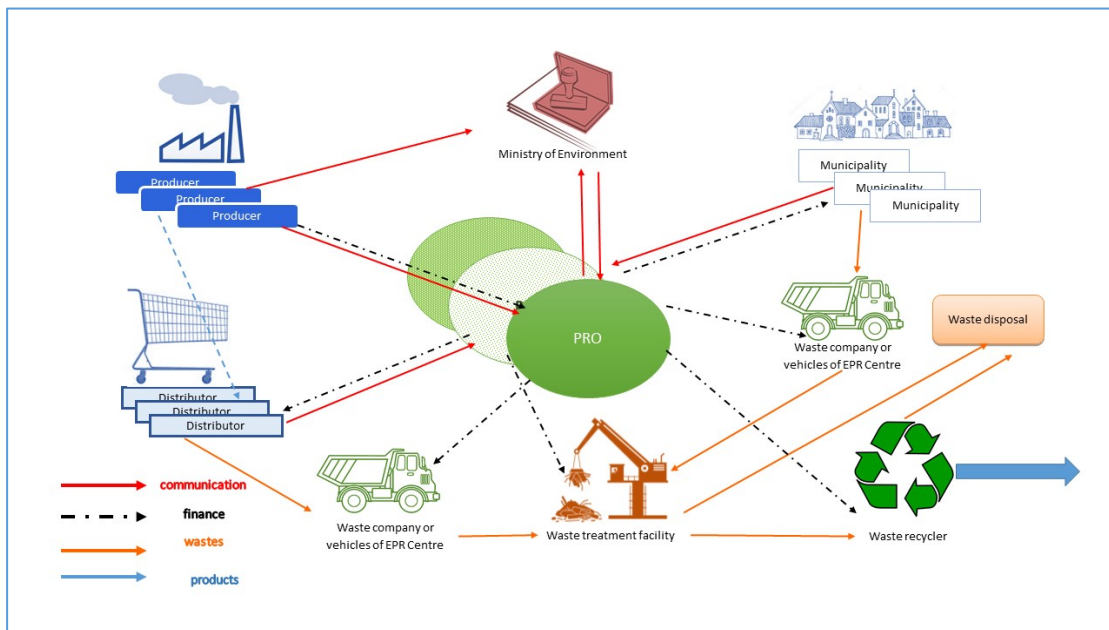


Figure 5: Scheme of market-based EPR system

Producers that enter agreements with a PRO need to report the amount of products put on the market during the dedicated period and to pay the recycling fee calculated as a weight of products put on the market multiplied by rate stated by PRO. The rate must be calculated according to the real costs of waste collection, transportation, treatment, recycling and disposal, costs of operation of the PRO (labour costs plus operational costs) plus other expenses (information campaigns, information system

etc.). In this system every PRO competes for clients through prices, thus lowering increasing the effectiveness of the system and ensuring efficient allocation of financial resources.

PROs operated in EU Member States are mostly specialised for one waste stream, but some of PROs provide complex services for their clients. Electrical and electronic equipment is typically put on the market in some sort of packaging and additionally contains some kind of battery or accumulator; hence, the producer needs to meet targets and fulfil EPR obligations for three waste streams, namely i) WEEE, ii) waste batteries and accumulators and iii) waste packaging. As such producer may prefer to have only one agreement with a designated PRO for all these obligations combined. Detailed obligations of PROs have been discussed in chapter 4.3.4.

The rate of “**recycling contribution**” does not represent any important portion of the product price:

- less than 0.1 % of the sale price (without VAT) of the large household appliances (washing machines, refrigerators...),
- approximately 0.01 % of the sale price (without VAT) of the small household appliances (shavers, irons, kitchen mixers...),
- approximately 0.01 % of the sale price (without VAT) of TV sets,
- approximately 0.007 % of the sale price (without VAT) of portable batteries and accumulators,
- approximately 0.003 % of the sale price (without VAT) of personal vehicles.



### 5.3. Individual versus collective schemes under the EPR system

EPR can be implemented in general as either individual scheme (Individual Producers Responsibility, IPR) or collective scheme (through PRO/PROs). In EU countries both systems are possible under the legislation and producers have the option to choose the system which fits them better.

Under an individual scheme (IPR) a producer would only have to take care of its own products. He would need to ensure himself (or through a contractor that the products that he has put on the market are collected and returned at their end-of-life. IPR systems are closer to that group of producers who use the EPR products as the input (materials, components...) into their own production, their products are dedicated to B2B (business to business) usage and producers take care of their own wastes. IPR generally gives a stronger incentive to change the design of products because producers need to take back their own waste goods.

However, this is quite a complex task and hence many producers opt for a collective scheme where a PRO is mandated with the fulfilment of EPR obligations. This is particularly true for the early implementation stage of EPR as there is quite a lot of uncertainty in the market – hence, producers are more likely to pool their resources and share the risks. Moreover, collective compliance schemes should enable producers to shift from one scheme to another in order to create dynamics and competition in the system. Collective scheme is also more acceptable for state authorities because of simpler for control and monitoring.

## 6. Products as subject to EPR

EPR principle is successfully applied to products which are easily assigned to individual producer. The best results are achieved in the case of vehicles (usually EPR is applied only on personal vehicles) and WEEE. EPR is also applied for batteries and accumulators, packaging, tyres and mineral oils. Every product has its own particularity and needs different approach when designing the EPR scheme in question.

### **e-ZAP system in Slovakia**

In Slovakia the Association of automobile industry (Zväz automobilového priemyslu – ZAP) operates information system called "e-ZAP". All end-of-life vehicle treatment facilities must obtain the authorisation by the Ministry of Environment which offers the list of such facilities to ZAP. The treatment facilities are connected on-line to e-ZAP. Also all police departments dealing with registration and evidence of vehicles are connected on-line to e-ZAP. If anybody wants to strike the vehicle from the state evidence system he must first take the vehicle to the authorised treatment facility which accepts the scrap for treatment, puts data on the scrap into e-ZAP and after that the holder of the vehicle can go to the police department to strike the car from evidence. If not the car is not deregistered and the owner must pay for obligatory insurance and under-go obligatory technical and emission check. e-ZAP is financed by car importers.

## 6.1. Personal vehicles

Every piece of vehicle is specified by special labelling (badging, motor, body and windscreen labels) to ensure that the producer is immediately recognizable. Producers may support the end-of-life vehicle treatment facilities which disassemble scrap vehicles to get valuable materials (metals) by applying environmentally friendly methods. In many countries the strict recycling targets lead to establishment of facilities which are able to utilise other wastes from disassembly of end-of-life vehicles, including windscreens or textiles. The rubber components are recycled or often used in cement kilns as fuel substituent.

The end-of-life vehicle treatment economy is closely connected to the international prices of metals and often it is not profitable so the producers must financially support the operation of treatment facilities.

In EU countries legislation orders to state administration close cooperation with waste treatment facilities by the means of shared information system when the vehicle becomes scrap and the owner (holder) intends to strike the vehicle from the state evidence system. This



**Picture 8: Hall of the manual disassembling of end-of-life vehicles in ZSNP Recycling Žiar nad Hronom, Slovakia**

is an effective tool against illegal handling of vehicle scraps and risks connected with pollution of waters and soil by liquids from vehicles.

## 6.2. Electrical and electronic equipment

The producer of individual piece of electrical and electronic equipment is usually easily recognizable by brand label and the responsibility of producers is easily determined. A special approach is necessary in the case of “historical waste” (also

referred to as orphan products) which comprises waste generated from products on the market before the legislative regulation entered into force. In some EU Member States producers which are actually putting their products on the market must share responsibility for historical wastes collectively through association in PROs.

There is a possibility of special regime for professional electrical and electronic equipment (health-care equipment, measuring and controlling equipment, etc.). This equipment cannot be used in households and its installation and disassembling can be done only by specialists – professionals. In this case the

### WEEE Forum



The WEEE Forum is European association speaking for 31 not-for-profit e-waste producer responsibility organisations (PROs). Its role is to help the PROs succeed operationally, take back and report e-waste efficiently and be known as members of the world’s chief e-waste competence centre and as promoters of a circular economy. One of the most important outputs of its work is the system of technical standards “WEEELABEX” for WEEE treatment of refrigerators and joint movement against WEEE illegal trade.

More information on <http://www.weee-forum.org/>

responsibility of waste treatment can be shared by the holder (owner, operator) of the equipment or the supplier (producer of EPR product) on the basis of the reciprocal treaty<sup>17</sup>.

### 6.3. Batteries and accumulators

When EPR system is implemented for batteries and accumulators, usually the different approaches are used for industrial and automobile batteries and accumulators and for portable batteries and accumulators. There are two different approaches in the case of waste batteries and accumulators. Industrial batteries and accumulators (e.g. traction batteries) are not used in households and the system of separate collection need not include municipalities.

In the case of automobile batteries and accumulators the role of distributors involving car repair services or fuel stations is important and take-back system is recommended.

Portable batteries and accumulators are a part of practically every piece of electrical and electronic equipment. The households are the important source of waste batteries and accumulator and municipalities with their separate collection system can be involved into the EPR system. In this case the education and information campaigns are principal to avoid the illegal dumping or other disposal of waste batteries and accumulators. The cooperation of municipalities and producers / PROs is absolutely necessary. As portable batteries and accumulators are a part of nearly every electrical and electronic equipment, the WEEE treatment facilities are also involved into the EPR system for batteries and accumulators as separate treatment of waste batteries and accumulators becoming from WEEE treatment is required.

### 6.4. Tyres and mineral oils

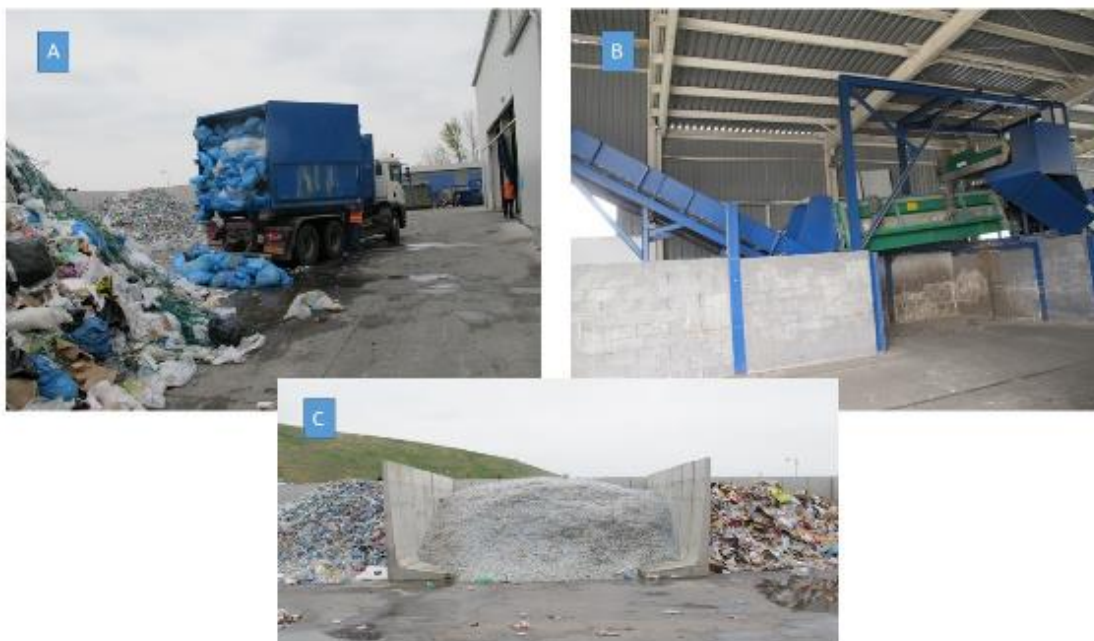
The approach of EPR in the case of tyres and mineral oils is similar as in the case of automobile batteries and accumulators, so the role of car repair services or fuel stations is paramount. In the case of professional tyres (tyres for lorries, agricultural vehicles or special construction machines) the responsibility of waste treatment can be distributed among tyre producer / importer and tyre user (holder, waste tyre producer).

### 6.5. Packaging

Packaging is a special product that is usually not the primary product of the producer but it serves for protection and relief of handling products. Packaging wastes from households have very different qualities and compositions. The management of such wastes needs sorting of materials according to the requirements of legal obligations in authorised recycling or treatment facilities.

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<sup>17</sup> Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (recast) or Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU



**Picture 9: Production of refused derived fuel from waste packaging. A – acceptance of incoming wastes, B – technology for fuel production, C – output – fuel. FCC Environment Zohor, Slovakia**

Two approaches can be applied: one for waste packaging from industrial and similar facilities and another one for waste packaging from households. In industrial, commercial or purchase facilities waste packaging is usually clean and consisting of defined material / materials. The employees of the facility are able to sort the waste packaging according to the requirements of recycling companies directly at the point of source. The industrial facility controls the quality of sorting because the price of waste recycling is derived from the purity of wastes.

In households the role of municipalities is important. Education and information activities are necessary for sufficient separate collection of wastes from households. Municipalities which are able to educate inhabitants toward separation can benefit from trading the secondary raw materials as paper, plastics or metals. The cooperation with producers / PROs must be very close.

## 6.6. Other products

The document of Basel Convention<sup>18</sup> mentions next products with EPR instruments in several countries:

- agricultural film,
- cooking and frying oils
- furniture,
- graphic paper,

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<sup>18</sup> Draft practical manuals on extended producer responsibility and financing systems for environmentally sound management, UNEP/CHW.13/INF/8 from 16 February 2017, 13th meeting of the Conference of the Parties to the Basel Convention, item 4(a)(ii) of the provisional agenda

- magazines and newspapers,
- mercury auto swithers and mercury thermostats,
- paints,
- pharmaceuticals,
- textiles.

The application of EPR tool for these products depends mostly on the special problems with waste streams in different countries and is dependent on the national differences in structure and power of industry, state authorities and municipalities.

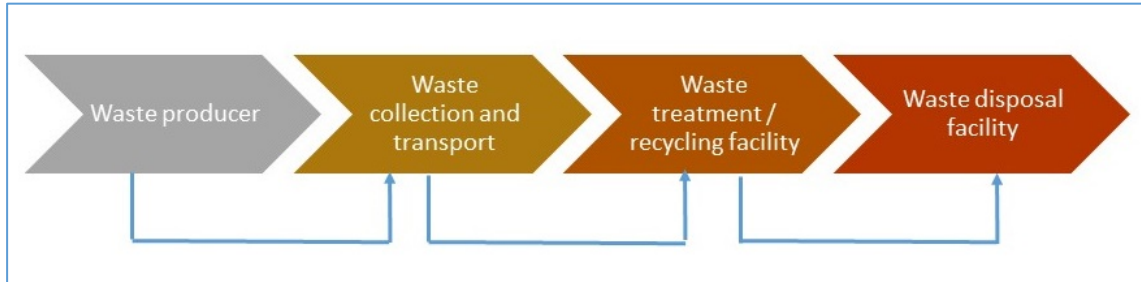


**Picture 10: Acoustic shielding made from waste tyres by company INTERTECH PLUS s.r.o., Czech Republic**

## 7. Financing scheme of EPR

The financing of waste management according to the principle “polluter pays” is usually based on a contract between waste producer and waste facilities. This scheme is implemented in the case of direct responsibility of waste producer and in the case of municipal wastes as described in chapter 1.

The financial flow in the case of **direct responsibility of waste producer** is simple (Figure 6).



**Figure 6: Financial flow in the waste producer responsibility system**

A waste producer has a contract with waste facility which can handle the wastes produced by waste producer. A waste producer pays to a waste facility which can be either company dealing only with collection and transport of wastes or both collection and treatment, recycling or disposal of wastes.

The costs of the contract usually consist of the costs of:

- waste collection,
- waste transport,
- waste treatment,
- waste recycling / recovery /disposal,
- overheads of the waste facility,
- environmental taxes, fees, etc.

In the case of **Municipal Solid Waste (MSW)**, the principal role in waste management is put on municipalities which collect funds for waste management (Figure 7). Funds are collected from households / inhabitants and the rate of contribution of every household is calculated according the real prices of waste management in the municipality.



**Figure 7: Financial flow in municipal waste management system**

Municipality has to finance waste management which includes:

- waste collection,
- waste transport,
- waste treatment as sorting, pressing, packaging,

- waste recycling / recovery / disposal /,
- overheads of the waste facility,
- environmental taxes, fees, etc.,
- awareness raising of citizens.

It is necessary to distinguish between the financing schemes of both approaches (centralized and market based) of EPR as described in chapter 5. The financial model must be designed to cover all costs of waste products' management:

- separate collection,
- transport,
- treatment,
- recycling,
- recovery ,
- disposal in environmental sound manner,
- educational and awareness raising costs.

It is necessary to regard the impact of recycling contribution to prices of products. If recycling fee is too high, the prices of products which are put on the market by compliant producers (fulfilling their EPR obligations) will be higher than prices of products from non-compliant producers (free riders). In turn, higher prices will stimulate illegal sales. Free riders reduce their taxes paid to the state budget as they do not fund recycling contributions. If the prices of products are much higher than average values, people also tend to buy products abroad especially if they live in close-to-border regions. Therefore, it is necessary to see the recycling contribution in connection with state economy and to find the balance between the economy and environmental requirements.

**The financing scheme of approach I – centralised system** described in chapter 5.1 can be illustrated by Figures 8 and 9.

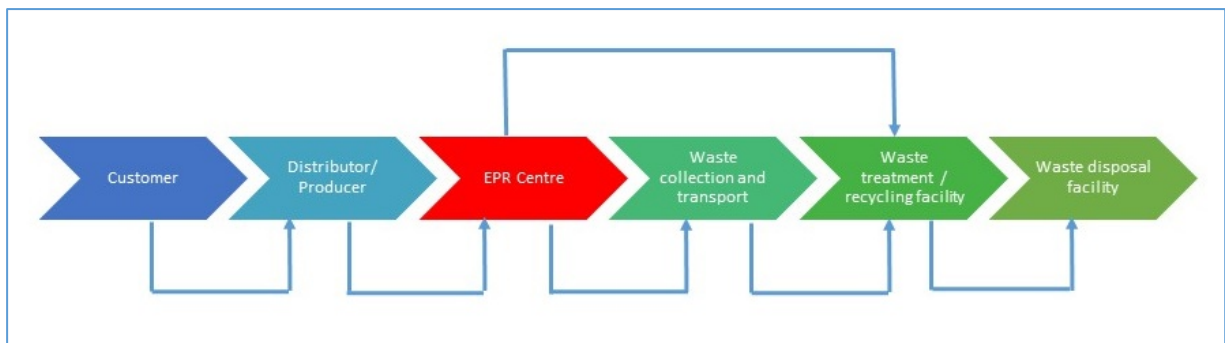


Figure 8: Scheme of financial flows in approach I – centralised EPR system

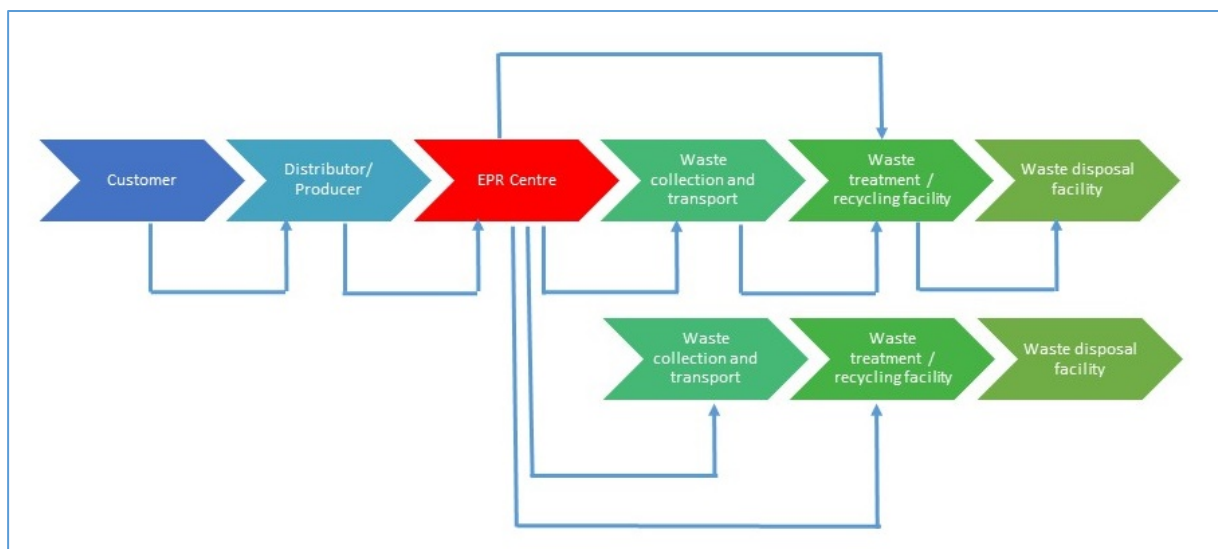


Figure 9: Scheme of financial flows in approach I – centralised EPR system with several waste companies involved

The customer pre-pays the costs of waste product management to the distributor at purchasing. The distributor who is connected to registered product producer pays the recycling contribution to producer at moment of supply of goods. The producer pays the recycling fee to the EPR Centre according to the amount (in kilograms or tons) of product put on the national market in dedicated period. The fee is calculated as amount of products put on the market multiplied by the recycling rate. The recycling rate must be stated in secondary legislation (decree, decision ...).

The EPR Centre finances all expenses connected with waste collection, transportation, treatment, recycling, recovery and disposal. Usually the costs of disposal of wastes arisen during the waste treatment, recovery or recycling processes are involved in the price of treatment, recovery or recycling and EPR Centre pays only to waste treatment, recovery or recycling companies. Often the waste facility dealing with waste collection and transport includes the costs of next waste management (treatment, recovery or recycling) into its own price and EPR Centre pays for complex service to this waste collection and transportation company providing several services of waste management. If the product of waste recycling is a secondary raw material which is sold on stock-exchange (plus value), the costs of recycling are lowered by the profit of sold materials (either by legislation or on market-based principle).

In the case of centralised EPR system, when the rate is given by legislation, usually no other financial tools are applied (environmental taxes or fees). All costs are covered in the recycling rate.

In the case of the market-based approach, as described in chapter 5.2., the financial flows are similar as in the approach I, but the basic difference is that the financing is flexible and is reacting on the market needs. The prices are formed by the market, not by the legislation. In the case when one PRO is established the system is not competitive and the recycling fee can be higher than in the case of several PROs operating in the market (Figure 10).



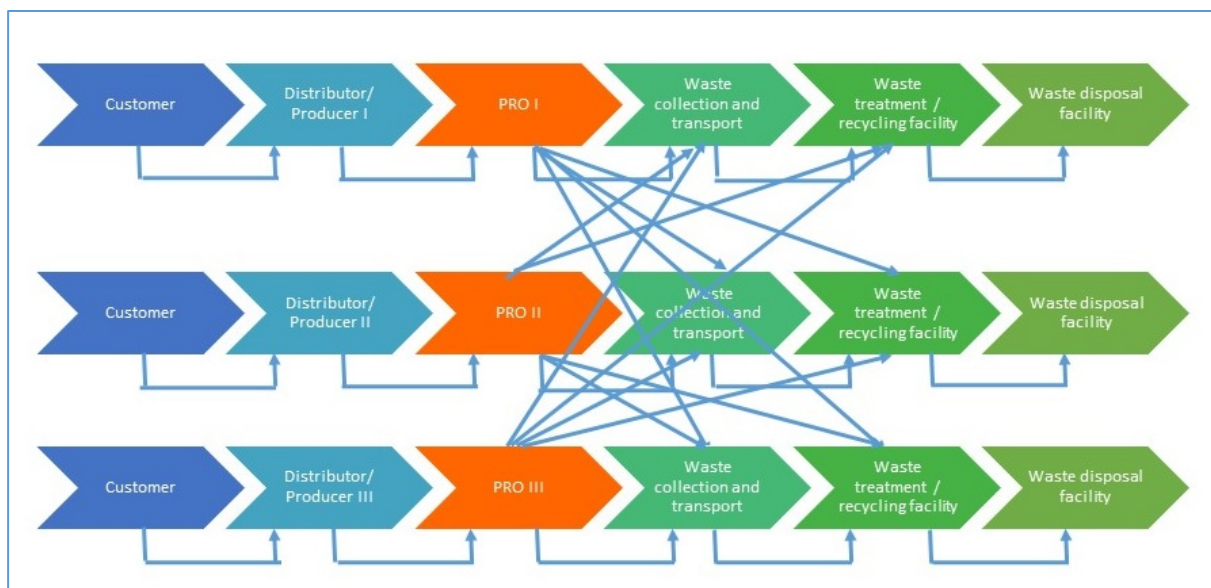


Figure 10: Scheme of financial flows in approach II – market based EPR system

There can be several PROs on the market but only limited amount of waste companies/facilities, so PROs must cooperate with several existing waste companies. In this model, the recycling rate is not given by legislation, but is formed by market-prices and is not time constant but is being changed according to the course of prices of secondary raw materials, minimum wages, taxes, highway taxes / fees, fund contributions (social, health-care...), prices of fuel, etc.

From the financial point of view, the market – based model is sustainable in long-time period and usually is economically more effective (and cheaper) than centralised system. Centralised system is useful for limited period to collect the financial resources for building new waste infrastructure, but there are many risks necessary to consider at setting the EPR system as corruption, bureaucracy, abuse of dominant position, costs higher than in free market, harmful subsidies...).

It is necessary to distinguish between the recycling fee and recycling contribution. The producer of product pays the recycling fee to EPR system (both approaches described in chapter 5). The recycling fee is calculated as total costs of waste product management plus educational and awareness raising activities plus overheads of the EPR system (EPR Centre, PRO, IPR) on one unit of product put on the market in given period.

Recycling contribution is a part of the product price at purchase which corresponds to the waste management costs relative to one piece of product. Recycling contribution can or cannot be visible at purchase<sup>19</sup>.

There is a difference between recycling fee and recycling contribution. Recycling fee is the charge paid by producer to EPR system (PRO / IPR / EPR Centre) for fulfilling all obligations as meeting limits of separate collection, recycling and recovery, information obligations, awareness raising activities, reporting obligations, etc. The recycling contribution is a charge (visible or not) which is paid by consumers at purchase of product for environmentally friendly waste management.

<sup>19</sup> Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (recast)

## 8. Cost-efficiency and performance of EPR systems

While measuring the cost efficiency, it is important to define the costs covered by the EPR system. Most EPR systems cover the costs for collection, logistics and treatment of waste, communication and reporting, and enforcement and surveillance. An evolution in the EPR systems over time has witnessed producers' fees graduating from partially covering the operational costs to covering it almost completely. Some Producer Responsibility Organisations (PROs) apply an average fee to all their member producers while others, like Eco TLC (France), introduce graduations and incentives to reward those who look to decrease the end-of-life costs. The latter, also known as the 'true cost principle' or 'fee modulation', in turn makes the case for eco-design criteria and other quantitative targets stronger.

Comparison of the performance of different waste streams can be a difficult task since the technical conditions for recycling and recovery are extremely different. Comparison across EU is done based on the *technical performance* which can be said to capture the extent of collection and recycling and their respective rates, and *economic performance* which can be assessed based on the costs incurred in implementing an EPR scheme. Some of the findings include variation in –

- collection rates of batteries from 5% in Malta to 72% in Switzerland
- recycling rates of end-of-life vehicles from 64% in Malta to 96% in Germany
- collection rates of oils from 3% in Bulgaria to 61% in Belgium
- recycling rates of packaging from 29% in Malta to 84% in Denmark
- collection rates of WEEE from 1.2 kg/cap in Bulgaria to 17.2 kg/cap in Belgium

Besides the lack of data and the variance in the producers' fees for different product categories, the conclusion which emerged from the European Commission analysis was that the best performing schemes are often not the most expensive ones. Some of the external factors leading to such a phenomenon include population and geography of a country, historical waste management infrastructure development, market costs of the secondary materials and citizen awareness. In conclusion, it can be summarised that –

- EPR systems should cover collection, logistics and treatment costs of separately collected wastes, not including the revenues from the recovered material sales
- It is not possible to prefer a centralised organisation over introduction of competition among PROs or vice versa. Instead stronger legal framework with reinforcement and control from public authorities is the way forward.

To develop clear evidence of strong impact of EPR on the eco-design criteria, much needs to be done like the development of eco-design targets and indicators, and collective schemes which mutualise responsibilities of individual producers.<sup>20</sup>

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<sup>20</sup> Development of guidance on Extended Producer Responsibility (EPR). (2015, August 17). Retrieved October 10, 2017, from [http://ec.europa.eu/environment/archives/waste/eu\\_guidance/introduction.html](http://ec.europa.eu/environment/archives/waste/eu_guidance/introduction.html)

## 9. Monitoring and enforcement

Inevitable condition of functional EPR system is monitoring of fulfilling the obligations of stakeholders and enforcement of obligations by state authorities as well as EPR systems.

Monitoring of obligations should be divided into the following areas<sup>21</sup>:

1) Name of producers through registration

Each producer (or importer) active in a country and bringing products into the market that are covered by EPR legislation needs to register. This way the further Monitoring and Enforcement steps can be directed towards the registered producers. It should be verified by the authorities that all producers and importers are properly registered.

2) Quantity of new products each producer puts on the market

To know about the amount of products put on the market by the registered producers, each producer or importer needs to report on these exact amounts. This needs to be verified by the authorities. The data on the amount of products put on the market allows calculating the financial contributions of the producer (for a central system with an EPR Centre or if he uses a PRO) as well as the take-back targets.

3) authorised treatment facilities (ATFs) in the system (domestic/foreign)

Treatment facilities need to be registered. It needs to be verified that their operation and waste treatment processes are in line with environmental requirements. It also needs to be verified that they are adequately monitoring the input and output of their facilities.

4) the quantity of waste which enters the system

It needs to be monitored that all relevant organisations involved in the collection and channelization of waste (distributors, municipalities, waste management companies) have adequate processes in place to report on the amounts of collected waste, its origin as well as its destination.

5) the quantity of waste going to different treatment and recovery channels

ATFs need to be monitored regarding the treatment of wastes as well as the recovery channels in which wastes and their fractions enter. It needs to be ensured that those wastes entering a certain treatment or recovery can be attributed to a certain producer or PRO; this is not relevant in a system with an EPR Centre

In Slovakia six-level system of penalties is stated:

1<sup>st</sup> Level (penalty up to **50 000 EUR**), if the obliged person does not keep records.

2<sup>nd</sup> Level (penalty up to **80 000 EUR**), if distributor does not show the recycling contribution at purchase...

3<sup>rd</sup> Level (penalty up to **120 00 EUR**), if the obliged person puts EPR products on the market without registration in the Register of producers or does not fulfil information obligations...

4<sup>th</sup> Level (penalty up to **200 000 EUR**), if PRO does not ensure waste collection, recycling and recovery, does not keep evidence...

5<sup>th</sup> Level (penalty up to **250 000 EUR**), if obliged person does not fulfil limits for collection, recovery and recycling of waste or does not ensure take-back of waste products, if the obliged person puts on the market EPR products containing banned materials...

6<sup>th</sup> Level (penalty up to **350 000 EUR**) if the waste handling can cause environmental endangering.

<sup>21</sup> <http://portal.research.lu.se/ws/files/5412497/1515113.pdf%20page%2031>

In case that an actors does not fulfil the requirement stipulated under legislation, legal actions in form of penalties or up to withdrawal of operating licenses need to be implemented.

## Abbreviations

ARF	Advanced Recycling Fee
ATFs	Authorised Treatment Facilities
DfD	Design for Disassembly
DfE	Design for Environment
DfR	Design for Recycling
(DRS)	Deposit-Refund System
EPR	Extended Producer Responsibility
EU	European Union
IPR	Individual Producer Responsibility
MSW	Municipal Solid Waste
OECD	Organisation for Economic Co-operation and Development
PRO	Producer Responsibility Organisation
WEEE	Waste electrical and electronic equipment



