E-waste PRO model for Georgia

Project: Supporting E-waste Management Capacity Development in Georgia

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List of Abbreviations

ARF	Advanced recycling fee
BoD	Board of directors
CEO	Chief executive officer
EEE	Electrical and electronic equipment
EPR	Extended producer responsibility
GA	General Assembly
MoU	Memorandum of understanding
PRO	Producer responsibility organization
ToR	Terms of reference
UNDP	United Nations Development Programme
WEEE	Waste electrical and electronic equipment
WG	Working group
WMC	Waste management code

1 Introduction

1.1 Background

Extended Producer Responsibility (EPR) is one of the new principles being introduced by the Waste Management Code (WMC)[1] in Georgia. EPR is an environmental policy approach in which producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. The basic feature of EPR is that producers assume the responsibility for managing the waste generated by their products on the market. EPR has been proven to be an effective instrument in support of the implementation of the waste hierarchy as it promotes the prevention, reuse and recycling. In addition, EPR can help stimulate separate collection, recycling and other forms of recovery of certain waste streams. Thus, it supports the development of a circular economy in the country and facilitates the green growth.

For Georgia, specific EPR targets are defined in the *National Waste Management Strategy (2016-2030)* and *the National Waste Management Action Plan (2016-2020)* [2]. The targets are further adjusted in the specific waste stream bylaws. The *Technical Regulation on Management of Waste Electrical and Electronic Equipment (WEEE)*[3], adopted in May 2020 by the Governmental Decree #326, include new obligations for producers and importers and responsibilities for the Ministry of Environmental Protection and Agriculture, retailers and consumers. Further, the by-law gives details about specific requirements on establishing a producer responsibility organization (PRO) for WEEE management, the authorization process of PROs and about a future EPR registry.

The implementation of EPR related legal and strategic documents requires intensive work and a systematic approach from all stakeholders. The initiation of a prospective e-waste management unit (PRO), which would serve as a compliance service provider for producers, was identified as a critical next step for the implementation of EPR in Georgia. A model for the PRO is presented in this report, covering details on the set-up of the steering and executive layer based on findings from interviews and background research with international experts. In addition, further steps towards the initiation of a PRO are outlined. Specific details on the setting-up, steering, functioning of the PRO and the mandate of an advisory board will be determined in a charter for the PRO.

1.2 Methodology

In preparation for the PRO model, a comprehensive desk review of WEEE PROs operating in European countries has been conducted. The case studies have been selected for the most applicable examples for the Georgian context, accounting for the size of market, geographical spread and maturity of the EPR system. As a next step, interviews with representatives of the PROs, based on semi-structured interview guide, allowed for in-depth insights of the operation practices and experiences of the PROs (interview findings can be found in the ANNEX I). Interviews were conducted with Ecotic from Spain, Ecotrel from Luxembourg, SENS

[1] Waste Management Code - https://matsne.gov.ge/en/document/view/2676416?publication=8

[2] National Waste Management Strategy and Action Plan- https://matsne.gov.ge/ka/document/view/3242506?publication=0v

[3] Technical Regulation - https://www.matsne.gov.ge/ka/document/view/4877952?publication=0

eRecycling (Switzerland, WEEE Ireland, El-Kretsen (Sweden), the Icelandic Recycling Fund, EES-Ringlus from Estonia and finally the WEEE Forum. Details about these PROs are displayed in Table 1.

The preliminary results were presented to stakeholders from the Georgian government and the private sector on two occasions: first, during an initial full-day workshop in October, 2019 in Tbilisi; and second, during a three hour workshop, which took place in July, 2020. Feedback collected during these meetings was incorporated in this report. On both occasions, different modalities and models of the PRO were discussed with various key stakeholders and the Ministry of Environmental Protection and Agriculture (MEPA) as the proprietary ministry. In addition, insights and feedback from the international were also integrated into the final organizational model of the PRO.

Table 1: PROs selected as interview partners

Name of PRO	Country of operation	Year of establishment	No. of employees	Turnover	Type of EPR system	Legal form
Ecotic	Spain	2005	15	n/a	Competitive	For profit
Ecotrel	Luxembourg	2004	5	n/a	Monopolistic	Non-profit
SENS eRecycling	Switzerland	1990	10	n/a	Voluntary	Non-profit
WEEE Ireland	Ireland	2005	12	n/a	Voluntary	Non-profit
El-Kretsen	Sweden	n/a	12	n/a	Competitive	Non-profit
Iceland Recycling Fund	Iceland	2003	4	2.9 Mio € (for WEEE only)	Monopolistic, compulsory	Non-profit
EES Ringlus	Estonia	2005	3	600,000 €	Competitive, voluntary	Non-profit

2 PRO scheme

The Technical Regulation on Management of WEEE of 2020 includes a number of requirements and responsibilities that producer need to comply with in the near future. These responsibilities include:

- Participation in the collective or individual EPR scheme via PRO membership[4];
- Signing up to the EPR Registry (a clearinghouse mechanism);
- Payment of an advance recycling fee (ARF) and reserve fund contribution;
- Reporting requirements (via PRO operating on behalf of producer).

The EPR scheme described in the technical regulations is depicted in Figure 1. The PRO[5] takes a central position within this system and represents the central body for coordinating financial, physical and informative responsibilities of producers and importers vis-à-vis public authorities and the general public. The PRO scheme proposed in this report is designed to cover all legal responsibilities in the most efficient way possible. Producers and governmental organizations would equally profit from such a scheme, as it would allow for smooth operations and clear lines of communication between the stakeholders.

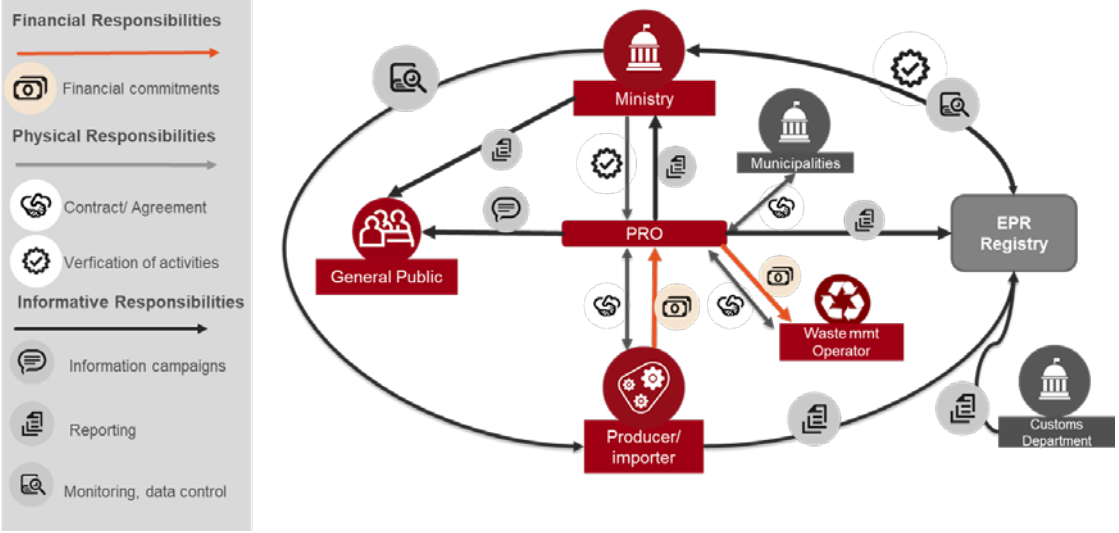

Figure 1: EPR scheme in Georgia

The organizational set-up of the PRO is shown in Figure 2 below. At its core, it distinguishes between a steering layer and an executive layer. Structural elements as well as corresponding rights and responsibilities of both layers are elaborated in the following sections.

[4] There appears to be a conceptual misunderstanding of collective and individual schemes. Whereas collective schemes usually refer to organisations of pooled resources (i.e. PROs), individual schemes normally entail that producers set up their own (in-house) collection and take-back systems without the establishment of PROs. The Technical Regulation requests establishment of a non-profit organization for both, individual and collective schemes. Both entities are called PROs.

[5] While the Technical Regulation allows for the existence of multiple PROs, the system is designed in such a way that it encourages a trend towards centralization by making the establishment of PROs contingent on a minimum market share and introducing far-reaching administrative requirements for authorization, which may make it less attractive to establish several PROs in Georgia. Therefore, the report will refer to the PRO as a singular entity, although multiple organisations may in fact operate in the future.

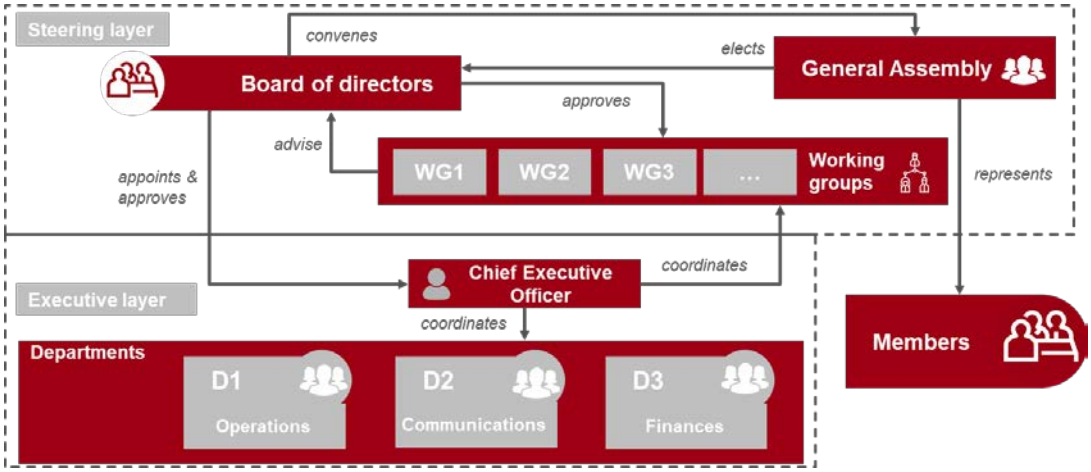

Figure 2: Set-up of PRO scheme

2.1 Steering layer

The steering layer is responsible for overarching strategic decision-making within the PRO. It consists of several bodies. The general assembly (GA) of the PRO represents the interest of all members and thus ensures accountability of the Board of Directors (BoD). It convenes at least once a year (additional meetings can be held on a needs basis), amongst other subjects, to elect the members of the BoD on a democratic basis, including the chairperson, and potentially to vote on the exclusion of members. The GA receives an annual report for the past financial year from the BoD and, in case no objections exist, discharges the BoD on that basis prior to a new election.

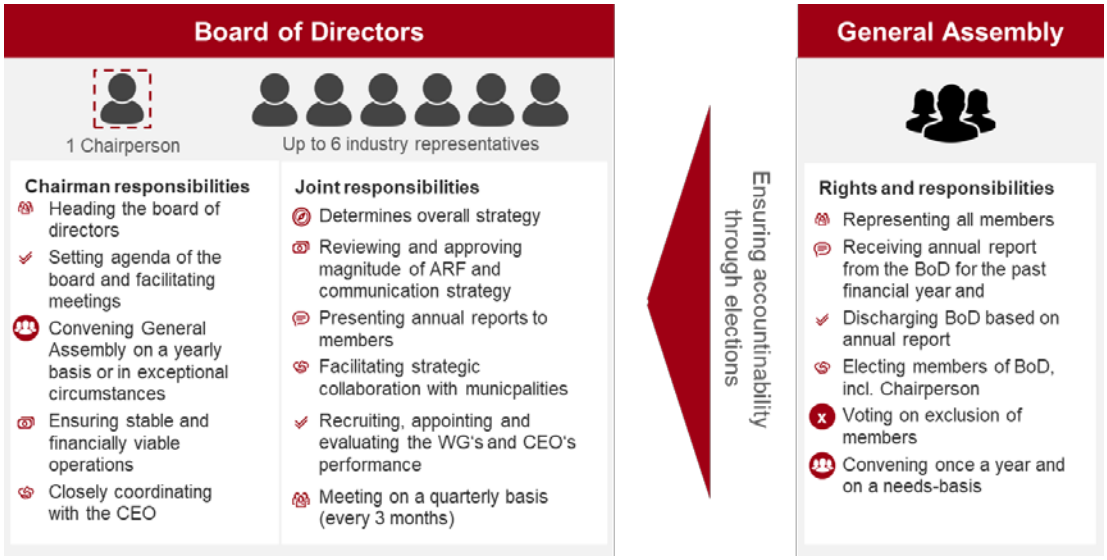

Figure 3: Structure and responsibilities of steering layer

The BoD consists of up to six representatives of the PRO members and a chairperson. The chairperson is in charge of setting the agenda of the BoD, facilitating meetings and ensuring stable and financially viable operations of the PRO. Joint responsibilities of the BoD include the determination of the overall strategy, to review and approve the magnitude of the Advance Recycling Fee (ARF) based on the recommendations of the working groups, review the PRO's communication strategy and draw up annual reports. The BoD is further in charge of convoking the GA at least once a year and reviewing the annual action plan and implementation report to be submitted to MEPA. The BoD is also responsible for filing the initial registration with MEPA as well as recruiting, appointing and evaluating the performance of the Chief Executive Officer (CEO) and the working groups (WGs). In close coordination with the executive layer, it is further responsible for facilitating strategic collaboration with municipalities. Meetings on a quarterly basis (every three months) are advised to fulfill these tasks.

Gender Quota in BoD

A gender quota is recommended for the BoD consists of at least 50% female representatives. All elections held by the GA are to be decided based on simple majorities; the only exception being votes on exclusion of members, which requires an absolute majority (2/3).

In addition, WGs represent an important element of the PRO, informing the decision making process of the steering layer. WGs are coordinated by the Chief Executive Officer (CEO) of the PRO and advise the BoD on key technical issues across product categories. Each WG may consist of up to 10 members and participation is open for anyone from the sector (upon approval by the CEO), as well as to producers/importers and to second participants from their side. WGs operate on a pro-bono basis and convene on a regular basis, while financial support for logistical costs, such as travel, accommodation, field trips, consultancies, may be provided through the PRO's general funding structure.

Key activities of the WGs include the determination of the magnitude of Advance Recycling Fee (ARF), development of guidelines for collection, treatment and reporting; support for strategic decisions (e.g. on collaboration with municipalities) and an exchange on lessons learnt from collection and treatment operations. For this purpose, it is recommended to divide WGs according to the different waste categories, resulting in six WGs once established:

- WG1: Temperature exchange equipment
- WG2: Screens monitors, equipment containing screens having a surface greater than 100 cm2
- WG3: Lamps
- WG4: Large equipment (external dimension more than 50 cm)
- WG5: Small equipment (external dimension less than 50 cm)
- WG6: Small IT and telecommunication equipment (external dimension less than 50 cm)

It is recommended that WGs convene on a regular basis in order to produce results and effectively inform the decision-making processes in the steering layer. Meetings should be

convoked and facilitated by dedicated chairpersons (one per WG) which is appointed by the CEO.

2.2 Executive layer

In general, the executive layer is in charge of day-to-day operations, including human resource management, accounting and controlling, invoicing, and managing customer relations. This includes also tendering collection and treatment activities in coordination with municipalities and other economic operators. At the initial operational stage of the PRO, a CEO and at least three staff members will be required (see also Figure 4). Once the PRO has become fully functional and collection and recovery targets become more stringent, the staffing structure should be reviewed and potentially stocked up.

The CEO acts as the key executive decision maker of the PRO. He/she has the right to sign and represent the PRO and is in charge of staffing decisions and strategy and business development. Coordination of the WGs and the departments of the executive layer and an active liaison with the chairperson of the BoD are key responsibilities of the CEO. Moreover, the CEO is responsible for preparing and submitting the action plan and an implementation report to MEPA on an annual basis, as well as for ensuring continuous data entry to the EPR registry.

The PRO's operational units are in charge of coordinating all tasks and activities that may arise on a day-to-day basis and cover specific areas of expertise. Each unit, at the initial stage may consist of one staff member[6]. In total, it is recommended to set up three departments in total: operations (U1), communications (U2) and finances (U3).

- U1 (operations) is in charge of customer relations, such as member support, coordination with local authorities, management and monitoring of logistics and tender procedures are covered by the operations department. Further responsibilities include management of tendering procedures, contract negotiations, setting up agreements with operators, calculating collection and recycling rates as well as managing data entry to the EPR registry.
- U2 (communications) is tasked with engaging and building company loyalty, development and implementation of awareness raising campaigns, non-financial reporting and website and social media administration.
- U3 (finances) covers all activities concerning accounting, controlling and HR management. It is in charge of customer relations, covering contracting and invoicing with members and of all financial reporting, including a contribution to the annual reports.

[6] Most PROs in EU countries, do not have a large workforce. The process can be started with little number of employees and then gradually increase the staffing size.

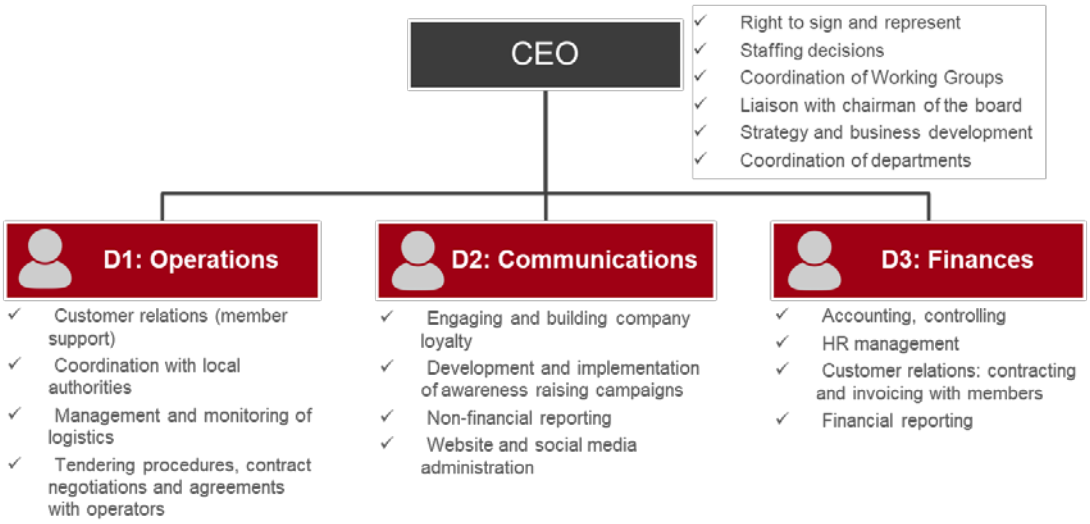

Figure 4: Structure and responsibilities of executive layer

3 Next steps

3.1 Immediate activities

In Georgia, the Technical Regulation on Management of WEEE enters into force on September 1st 2020. According to Article 7 (3) of the Regulation, producers and importers not complying with the regulations and not participating in an EPR scheme by July 1st 2021 will be banned from importing and placing EEE on the Georgian market. More specifically, registration of EEE producers in the EPR registry needs to be completed by June 1st 2021. Following the registration there are specific deadlines for reporting. A swift initiation of the (collective) PRO is therefore advisable and the following steps to make this process as effective as possible are suggested.

1st step: Signing a memorandum of understanding (MoU) between producers

The first step towards the initiation of the PRO is to establish cooperation between producers (incl. industry, importers and manufacturers alike) and may be initiated by signing a MoU to join efforts for compliance with the new technical regulations. A driving force may be industry associations, since they represent the interest of their members vis-à-vis public authorities. This process may be further supported by the government, but should not be interfered with or steered by public bodies. A common understanding of cooperation and mutual support between producers and importers themselves as well as between industry and government is crucial for successful operations.

2nd step: development of ToR for PRO pilot project

A PRO pilot project supporting the initiation of the organization, running for one year, may be started by developing Terms of Reference (ToR) by all involved stakeholders. The pilot project can be seen as a trial to test collection mechanism, cooperation with municipalities and the determination of fees. The estimated budget for the pilot project is 350,000 GEL which can be funded partly privately (at least 20%) and partly by donor organizations (up to 80%).

International experience from Estonia shows very positive effects of such a trial. The project budget should not include contributions to the reserve fund, should be financed on a non-profit basis (grant) and should not cover operations beyond one year. Due to the limited experience of operationalizing EPR schemes and setting up PROs in Georgia, it appears advisable to include contingency positions for hiring external support from national and international experts.

3.2 Follow-up activities

Authorization by ministry

After completing the first two steps as described above, the organization needs to be registered and PRO authorization with Ministry of Environmental Protection and Agriculture (MEPA) needs to be requested. The completed registration (form) may present a key output

of the pilot project. Further, the PRO can hold the first GA and elect a BoD. Involvement of the municipalities and formal waste management operators is advisable from an early point in time, especially concerning the biggest urban area Tbilisi.

Authorization of PRO by MEPA is required by adopted regulations and involves the submission of a comprehensive application file. Details on the application file are illustrated in Figure 5. The decision for approval by the ministry may take up to 3 months and approval is valid for 6 years. Reporting obligations of PRO start with approval of application file.

Application file

- Information on applicant;
- Total annual amount of EEE placed on the market (estimated);
- Description of current WEEE management practices & infrastructure;
- Goals, objectives and geographical scope of PRO scheme;
- Technical and economical study of the EPR scheme;
- Budget;
- Copies of the preliminary cooperation contracts;
- Information on awareness-raising programs.

Figure 5: Information to be included in application file

Legal form

According to the Technical Regulation and following international experience (see Figure 6), the PRO shall be a non-profit making entity. The viable form in Georgian law for these prerequisites is a non-entrepreneurial (non-commercial) legal person. The membership-based legal entity is bound to a specific purpose/objective and has to serve its members' goals through organized collaboration for achieving those joint objectives. The Legal Entity of Public Law (LEPL) – National Agency of Public Registry of the Ministry of Justice of Georgia, maintains the Register of Non-entrepreneurial (Non-commercial) Legal Entities.

According to the national legislation, a non-entrepreneurial (non-commercial) legal person may engage in an entrepreneurial activity of an auxiliary nature the profit from which shall be used for achieving the objectives of the non-entrepreneurial (non-commercial) legal person. The profit made from such activity may not be distributed to the founders, members or donors of the non-entrepreneurial (non-commercial) legal person or to those having managerial and representative powers in such non-entrepreneurial (non-commercial) legal person (from civil code of Georgia).

"Compliance scheme does not exist to make profit but to meet legal standards."

- Ecotrel, Luxembourg

Figure 5: Quote from Ecotrel on legal for of compliance schemes

Membership contracts

Membership contracts need to be drafted to formalize the involvement of the producers. This is also stated in the Technical Regulations. The membership agreements need to be publicly accessible (online) to ensure equal rights of all member producers and will serves as official

verification of membership in a PRO scheme. Several aspects are to be covered in the agreements. Some are given by the regulations, including that termination of membership is only possible at the end of the reporting period after completion of all mutual obligations. Other aspects, such as the obligations of producers and the PRO or the validity of contract (one/multiple year(s) or open-ended) should be subject to negotiations between the involved parties. Figure 7 shows a proposed structure with relevant parameters for the design of a membership agreement. The structure is based on international experience from Ecotrel (Luxemburg) and EES-Ringlus (Estonia). Signing membership agreements (numbers to be determined) may also represent a key outcome of the PRO pilot project.

Membership Agreement

- Obligations of producer
  - Reporting
  - Auditing
  - Payments (ARF & reserve fund)
  - Sanctions
  - Exclusivity
- Obligations of PRO
  - Terms of operation
  - Representation and reporting obligations
  - Authorization
  - Utilization of fees
- Validity of contract
  - Open- ended
  - Termination only at the end of the reporting period after completion of all mutual obligations*
- Annexe:
  - Definitions
  - Confirmation letter
  - List of EEE categories
  - Declaration form for products of concern

Figure 7: Proposed content of membership agreements

Reporting

Reporting is a central element in the Georgian EPR scheme as it allows monitoring of compliance and ensures equal rights of all members. Therefore, a number of reporting and data collection mechanisms need to be established by the PRO and governmental actors.

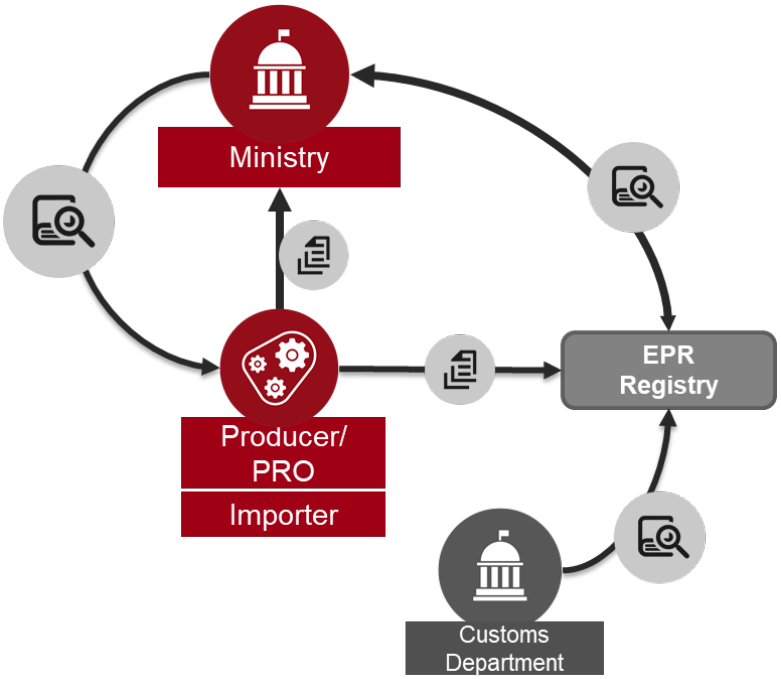

Figure 6: Reporting responsibilities within the Georgian EPR scheme

First is the monthly report to the EPR Registry on Electrical and Electronic Equipment (EEE) placed on the market. The exact format and rules of operation of EPR Registry will be determined by the decree of the Minister of Environmental Protection and Agriculture, which is currently under development. Information about materials and components used during preparation for re-use, treatment and manufacturing of the equipment needs to be reported to operators in the waste management sector upon request. Data on quantities of EEE (weight by categories in tons) imported, needs to be forwarded to the ministry every six months, the import data is approved by the customs department equally every six months. In addition, an action plan and an annual report need to be submitted by the PRO to the ministry by November 15th of each year (reporting the weight by categories in tons on EEE planned to be placed on the market during next year). The action plan, handed to the ministry for evaluation and approval, is submitted annually for the next year of operation. It includes the budget, planning of operation for management of WEEE and a public information and awareness-raising component. The annual report shows status of implementation of the previous action plan and includes information such as fulfillment of collection targets and Invoices and financial reports. Details on both documents can be seen in Figure 9.

It should be noted that the establishment of a joint PRO by producers will significantly reduce reporting obligations and subsequent resources required in contrast to an EPR scheme were producers and importers set up individual PROs and decide to operate individually.

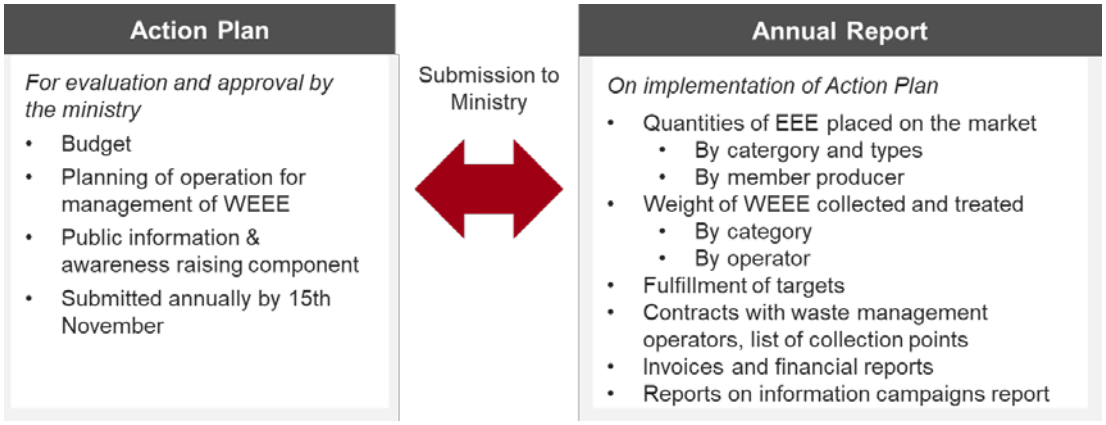

Figure 7: Overview of action plan and annual report as required in the regulations of 2020

Costs and fees

Details on the ARF should be established in a transparent manner between the members of the PRO. A financing structure, including the ARF, along product categories is advisable. This allows for higher costs for some product categories to compensate for negative tendering prices as part of contracts with waste management service providers. The ARF shall not exceed the costs that are necessary to provide waste management services in a cost-efficient way. Collection of funds from members of the PRO lies with the finance department. This way, the ARF will pre-finance the collection of e-waste in a given year and excess funds will be offset/disbursed against invoices for the subsequent year. The calculation of ARF should be based on multiple factors, namely:

- Costs for collection from households, institutions or collection points;
- Storage and sorting costs accrued to municipalities;
- Treatment costs (incl. dismantling, removal of gases, baling for shipment etc.);
- Administrative fees (e.g. export permits in line with Basel Convention);
- Shipment (e.g. trucks for transport to harbor, shipment of containers;
- Revenues (per kg value of e-waste fractions, can be positive or negative); and
- Overhead (flat fee; for operations, awareness raising, finances etc.).

Details provided by the Technical Regulation are displayed below. For more details about the calculation of the ARF, please refer to ANNEX II.

Excerpt on ARF as per the Technical Regulation #326

"The advanced recycling fee [sic!] shall be sufficient to cover the following costs for the products that producers put on the market of Georgia:

- costs of collection, transportation and treatment of wastes, taking into account the revenues from re-use and from sales of secondary raw material;
- management costs of take back systems organized by EEE distributors in accordance with Article 13 of the present Technical Regulation;

- costs of providing adequate information to waste holders;
- costs of data gathering and reporting in accordance with the provisions of the present Technical Regulation;
- costs for establishment of reserve fund;
- administrative costs of PRO."

In addition, the Technical Regulation also requires ARFs to be calculated on a cost efficient basis.

The actual operational budged of the PRO also needs to be considered. This budget should include costs for human resources, for the CEO and the departments, for logistics (WGs, travel), reporting and audits, communication and awareness raising activities and the collection network itself. BoD and CEO of the PRO should agree upon the magnitude of the budget allocation. A reserve fund, as established by other PROs, offers the benefits of compensation of negative market values of recycling materials and for covering contingency costs (e.g. arising from orphan products of bankrupt producers) in order to achieve quantitative targets. The BoD determines the size of this reserve fund in line with the Technical Regulation.

Annex I: Research report on development of PRO model for Georgia

1. Background

Extended Producer Responsibility (EPR) is one of the new principles being introduced by the Waste Management Code (WMC) in Georgia. EPR is an environmental policy approach in which producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. The basic feature of EPR is that producers assume the responsibility for managing the waste generated by their products on the market. Therefore, EPR can be considered as a strong instrument in support of the implementation of the waste hierarchy as it promotes the prevention, reuse and recycling actions. The EPR stimulates separate collection, recycling and other forms of recovery of certain waste streams. It therefore supports the development of a circular economy in the country and facilitates the green growth.

Specific EPR targets are defined in the *National Waste Management Strategy (2016-2030)* and *the National Waste Management Action Plan (2016-2020).* The targets are further adjusted in the specific waste stream bylaws. The implementation of EPR related legal and strategic documents requires intensive work and a step-by-step approach from all stakeholders. In order to support this process, adelphi has been tasked to conduct research and develop the organizational set-up of the prospective e-waste management unit (Producer Responsibility Organization - PRO). This report provides an overview of the research process, as well as key findings and recommendations for the organisational set-up of the PRO.

2. Methodology

In order to develop a PRO model for e-waste management in Georgia a comprehensive desk review was carried out. This resulted in a data base of e-waste collection schemes across the European Union, which was used in order to identify potential interview candidates, which could inform the development of a PRO scheme for Georgia. 15 PROs were selected as preliminary interview candidates and contacted for an interview (selection criteria included the geographical coverage, population density, as well as local labour costs). In parallel, adelphi developed a semi-structured interview guide, which served as a basis for exploring modalities in setting up PROs. The interview guide was shared with the interviewees upon first contact. Notes were taken during the interviews and shared with the interviewees after completion in order to allow for clarifications. The following institutions were interview:

- Ecotic (Spain)
- Ecotrel (Luxemboug)
- SENS eRecycling (Switzerland)
- WEEE Ireland
- El-Kretsen (Sweden)
- Iceland Recycling Fund
- EES Ringlus (Estonia)
- WEEE Forum (Pan-European PRO member organization)

The interview findings were reviewed, evaluated and consolidated during the preparation of the PRO model for Georgia.

3. Key Findings

3.1. Structure of EPR Systems

Establishment of most of the PROs was initiated by the industry or traders' associations. However, other models received support from the state in order to kick start operations. In Iceland for instance, a cooperation of government, municipalities and the general industry led to the foundation of the Iceland Recycling Fund (IRF). While producer of WEEE established EES Ringlus in Estonia, the first year functioned as a pilot project (collection trial) and was financially supported by the state (financed 90% by state, 10% by producers, overall budget 100,000€).

Most of the analysed EPR systems are competitive and voluntary, such as EES Ringlus in Estonia where a minimum collection network of 75 collection points makes it economically unfeasible for producers not to join a PRO. In Spain, 9 PROs are operating and additional 3 companies are working independently. In Sweden, a second PRO (EÅF) is operating besides El-Kretsen but without maintaining its own infrastructure. The use of El-Kretsen's infrastructure is managed via a financial clearinghouse, which allocates the costs for collection and recycling between EÅF and El-Kretsen but no physical volumes (as is the case in many other systems, e.g. Norway, Denmark and Germany). In essence, costs between the PROs are allocated on two grounds: i) current costs for collection and recycling of historical WEEE, shared based on current market share; and ii) estimated future costs for collection and recycling of new WEEE, based on products put on the market and their estimated lifetime. The voluntary system in Ireland allows theoretically all producers to self-comply within the legislation or to join a PRO scheme. However, due to financial guarantees from the PRO, no producer is currently using self-compliance (sometimes referred to Individual Producer Responsibility, or IPR).

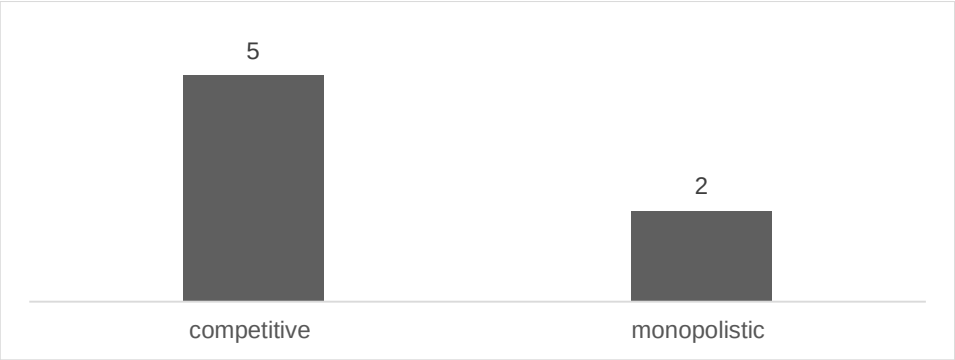

Figure 8: Number of interviewed PROs operating in competitive and monopolistic of EPR systems

Table 2: Types of EPR systems by country

Country	Competitive	Monopolistic
Spain	x	
Luxemburg		x
Estonia	x	
Sweden	x	
Switzerland	x	
Iceland		x
Ireland	x	

Analysis of the different modes of collection channels shows that collection points are both established at retailers (obligations for retailers may be connected to area of retail space available in order to lower the burden on public collection infrastructure), municipalities or via mobile collection. Combinations of these options are possible and frequently applied in order to diversify collection channels and boost collection rates. Retailers may be obliged to bring waste to municipal collection points and regrouping centres can serve as dismantling stations, which further reduce transportation costs (it appears neither economically nor ecologically feasible to transport more than 300 km).

Clearinghouses[7] are also used commonly as monitoring and enforcement mechanisms. In some cases, **physical collection** is organised by the PRO itself, whereas in other systems it is organised by municipalities or private entities in agreement with the PRO. Payments are usually charged on a weight-basis (per kg) for the amount of WEEE collected. In addition, differences in the organisation of WEEE treatment can be observed across the analysed sample of EPR systems. In countries with sufficiently high levels of WEEE generation (e.g. Sweden), treatment is carried out by a network of domestic treatment plants, whereby process steps can be outsourced to dedicated recycling facilities. In smaller countries WEEE is only partially treated within the country (e.g. Iceland: WEEE is partly treated in Iceland and then sent to Europe for further treatment and recycling).

Spotlight: Collection and treatment of WEEE - EES Ringlus

Organization of collection of WEE

- Network of collection points: agreements with retailers or municipalities
- Final consumer to retailer
- < 400 m² retail space: obligation that they have to offer 1:1 collection
- > 400 m² retail space 1:0 collection
- Final consumer to municipality (public collection point)
- Organization

Organization of treatment of WEEE

[7] A clearinghouse is an entity that registers, monitors and coordinates allocation of WEEE collection between the producers. It may also include geographical allocation of collection points and/or allocate financial shares between producers.

- Treatment through
    - open tenders
    - BAT facilities
- MoU/long-term contracts between EES-Ringlus and municipality
- Additional contract EES-Ringlus with site operator (monthly fee for opening gates for EES-Ringlus; u to 100 € per site; ownership of waste belongs to EES-Ringlus)

3.2. Organizational set-up of PROs

The interviews show that most of the PROs are **legally organised** as non-profit entities (see Figure 2 below). Only Ecotic in Spain operates on a for-profit basis (see also figure below). Most interviewees from non-profit PROs mentioned that this helps to increase the efficiency of the system and ensures that all types of WEEE are collected. In contrast, for-profit systems were perceived as being prone to selectively collecting fractions of high material value in order to increase revenues.

"Compliance scheme does not exist to make profit but to meet legal standards."

- Ecotrel, Luxembourg

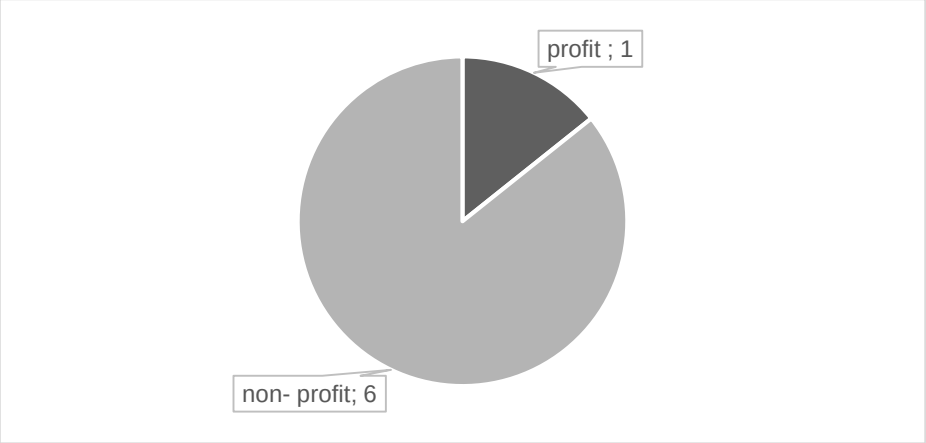

Figure 9: Legal forms of interviewed PROs

The range of **responsibilities** of the PROs varies between the countries. Most PROs bear financial responsibility, which includes financing take-back, transfer of funds for collection and other aspects (5 in total, i.e. all expect El-Kretsen from Sweden and WEEE Ireland where this is done through the clearinghouse). 2 of the interviewed organisations (Ecotic in Spain and

EEEs-Ringlus in Estonia) have physical responsibilities in addition to financial responsibility, such as the collection of WEEE, treatment of WEEE or building infrastructure. Informative responsibility (e.g. awareness raising, reporting of collected quantities, verification of data) is borne by 3 PROs in addition to other types of responsibilities (see also Figure 4), namely EES-Ringlus (Estonia), Ecotic (Spain) and the Icelandic Recycling Fund. In Estonia, this includes an annual information campaign. In Sweden, some awareness raising has to be done by collection schemes in combination with the responsibility of municipalities to inform about collection of WEEE:

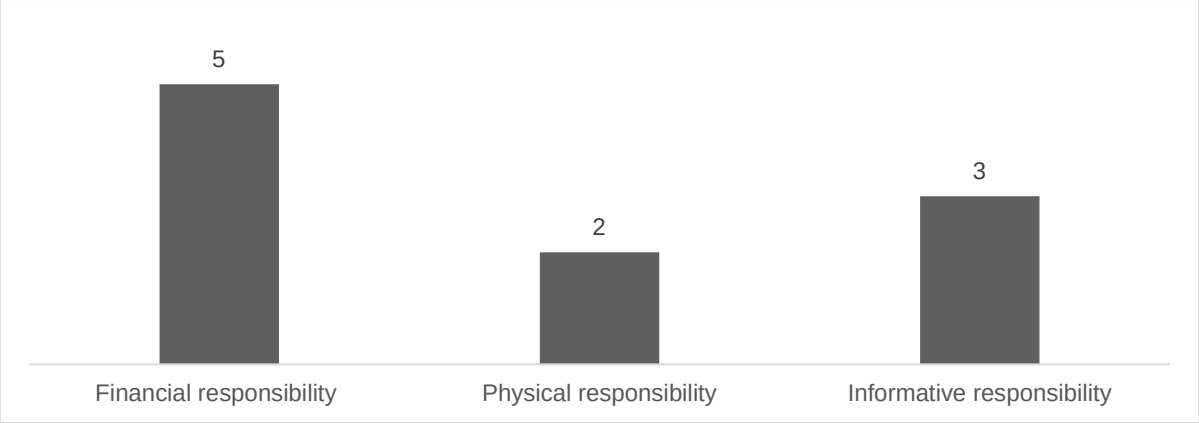

Figure 10: **Number of PROs with financial, physical or informative responsibilities**

Regarding the ownership structure it can be said that the majority of organizations are privately owned with the exception of the public Iceland Recycling Fund (see Figure 5).

Spotlight: Ownership structure

El-Kretsen (Sweden)

- Private
- Board of directors:
    - Managing directors of branch organisations
    - CEO
- Informal advisory board
- Occasional meetings of bigger producers for feedback
- Coordination of producers that are also active in other Nordic countries

Icelandic Recycling Fund

- Public: State operated agency
- Board of 7 members (representing trade and industry, municipalities and the government).
- Trade and industry form majority in the board
- Very close cooperation within ministry, environmental agency

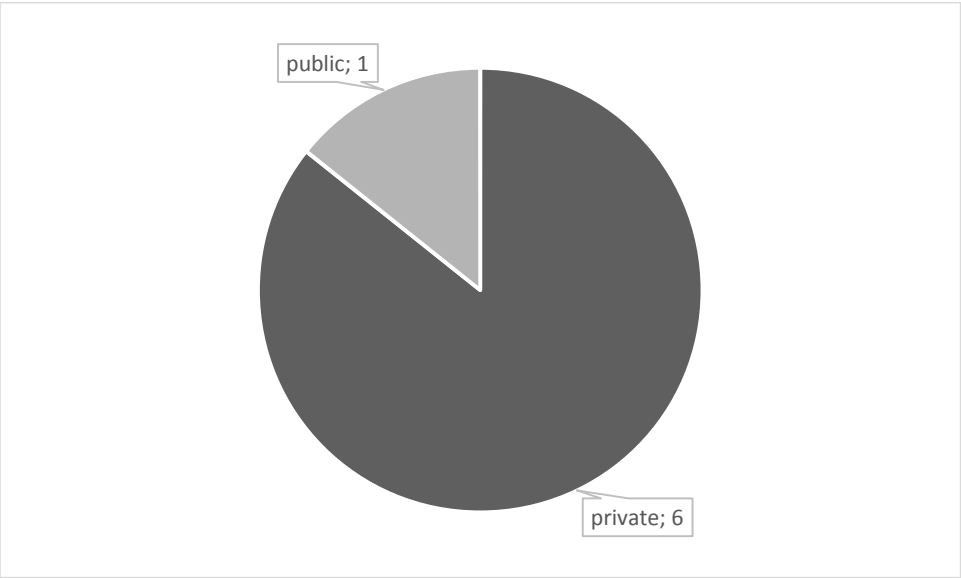

Figure 11: Number of PROs per private/ public ownership

Looking at the internal **organizational structure** different models exist between the PROs and should be set in relation to size of the organization and the range of operations an organization is offering. While smaller organisations, like EES-Ringlus with 3 employees, not require special units, bigger PROs have several departments or functional units.

Options for departments within PROs:

- Managing director
- Administration
- Operations
- Marketing
- Finances
- IT
- Customer service/ project communication (with producers)
- Communication
    - with Member/ project communication
    - with municipalities
    - with other stakeholders (e.g. universities)
- Management of own infrastructure:
    - Collection
    - Transport

Some organisations further have **working groups**, such as Ecotic. Here, five groups work on different product categories and share experience during quarterly meetings. Each group has about 10 members and participation is open for anyone from the respective sector, with larger companies usually seconding at least one representative. Notably, most working groups operate free of charge, and producers support this process in order to contribute to the structure of the system.

Spotlight: Organizational structure (departments/functional units)

El-Kretsen (Sweden)

- Marketing, information: 1 person
- Customer related questions (with producers): 2 persons
- Collection & transport (own infrastructure; pre-recycling site): 1 person
- Collection points: 2 persons
- Contact with municipalities (municipalities organised in umbrella organizations; contact with those umbrella organizations): 1 person
- Collaboration with universities and projects, future developments: 1 person
- IT
- Managing director

SENS (Switzerland)

- Management
- Finance Division
- Expenses Division
- Marketing Division

WEEE Ireland

- CEO: corporate governance, independent director
- Board of directors: board makes decision towards strategic direction of the scheme, procurements
- Battery steering committee
- Compliance team
- Battery and project team
- Marketing team
- 1-2 persons per team

3.3. Costs and Fees

Two different financial models are currently applied: pay as you go and pre-financing. The costs covered by the EPR systems range from collection and transport only (El-Kretsen) to full coverage of all waste management steps (Ecotic). Details for each PRO are presented in Table 1. Prepaid recycling fees are the underlying financing mechanism in most countries. In Switzerland for instance, this fee is transferred to SENS (Swiss PRO), which is used to pay for recycling, collection and transport. In Iceland, a recycling fee is levied on EEE by the Customs Office when imported and by the Tax Authorities when produced in Iceland. Since the Icelandic Recycling Fund (IRF) is state operated, all fees are collected through public systems (custom authorities, tax authorities), centrally pooled in the PRO and subsequently dispersed (e.g. for salaries) .

Table 3: Costs covered in several EPR systems

Costs covered by EPR System	**Ecotic**	**Ecotrel**	**EES Ringlus**	**El-Kretsen**	**SENS**	**IRF**

Collection	x	x	x	x	x	x
Transport	x		x	x	x	x
Treatment	x	x	x		x	x
Disposal	x		x			x
Awareness raising	x	x	x		x	

The rates of the recycling fees are based on a number of parameters, such as prices on the markets or the actual costs of operation and management, which may be determined through results of tenders of treatment and collection, by the operational costs dedicated to categories or by allocation of costs based on reports and market shares of members in concrete product category. The exact rates may be set by a board of directors with input from the management (e.g. in Iceland and Ireland) or by a working group (e.g. in Switzerland, Board has right to veto). In Spain the price depends on amount and type of WEEE declared (based on categories of EU directive, subcategories and codes by Spanish ministry), e.g. lamps: price for units instead of kg. In Estonia the membership fee is set to 65 € / month, equal for all 140 members and the money is collected on monthly basis. In addition, fees are charged based on products put on the market (differentiated by category and market share for each product). In Iceland fees are set by a price per kg per product category, those are listed in Table 2.

Table 4: Fees for each WEEE category by the IRF (exchange rate from Nov 1st 2019: ISK 138,18 = EUR 1,00)

No	**Category**	**ISK/kg**	**EUR/t**
1	C&F	47	340
2	Screens	130	941
3	Lamps	25	181
4	LHA	22	159
5	SHA	16	116
6	IT&Comm	13	94

Spotlight:

Costs and fees – El-Kretsen

Determination of fees:

- Market share on different type; share collection; carry won costs
- Based on what is put on the market but pay what is calculated today
- e.g. costs of TVs: new TVs have to share burden on actual market share
- Arrangements of central agreement for all (290) municipalities (fixed amount per kilo collected e-waste)
- Contracts with transport firms, to transport from collection to treatment.
- Contracts with recyclers, handling the material:

    - certain amount per kilo, depending on which category (freezers, white goods, small appliances, lightbulbs, batteries).
    - small plant for statistics where around 2 % of all small WEEE goes through. Shows how the material looks like, how long it takes to dismantle etc.
    - treated material is then sold for revenue
- Around 2/3 of our income is from sold material
- Annual fluctuations of income, depending on
    - world market prices on secondary materials and
    - the consistence of WEEE (many computers – good, many crt TVs – bad).
- Contracts with around 2000 producers, (importers and manufacturers):
    - Environmental fees (1/3 of our income).
    - The pricelist reflects costs for collection and treatment and income from sold material.
    - Prices depending on product categories (Large monitors put on market needs to pay for old large monitors that we collect today, still around 20% CRT. Some categories, computers and telecom have a zero-producer fee)
- Annual reimbursements after summary of full year costs: WEEE categories with positive balances (due to too high producer fees/ higher income than anticipated) allow for repayments for producers of respective categories.

3.4. Monitoring and reporting

A number of different monitoring and reporting requirements were mentioned across the analysed sample of EPR systems:

- Producers have to become member of the national collection system (combined with mandatory tasks such as collection)
- Documentation of
    - Financial guarantees and strengths
    - Treatment of materials
    - Compliance with environmental standards/ legislation
    - Compliance with requirements of the PRO
- Inspection of leakages and scavenging

Some organizations are required to comply with EU **standards and norms** in their country of operation. In Estonia a minimum number of collection points are required by law (depending on population density for a given geographical location) and the PRO itself must be organized as NGO and not for profit. In Sweden it is not allowed to disseminate producers, to collect just one type of waste or to collect just in the big cities to avoid cherry picking. Finally, in Ireland requirements for PROs include the conduction of communication and awareness activities, guidance to its members and a financial report that describes their activities for government and members.

Options for **monitoring of a PROs performance**:

- Conducted by independent third-party auditors and/or state inspectorates
- Post-invoicing system (declaration of what is put on the market)
- Data directly from producers (avoidance of overreporting)

Options for **monitoring of producer's targets** (combinations possible):

- Regional monitoring by local administration (e.g. agency for waste in Sweden)
- Annual reporting to ministry (on collection targets)
- Waste management companies report to PRO on collected and treated quantities
- The Customs and Tax authorities report to PRO on quantities on EEE put on the market.

It has to be noted that monitoring schemes are a big cost factor. Especially in smaller countries (Luxembourg, Estonia, Switzerland) WEEE quantities are too small to make auditing of the whole value chain beyond the PRO financially viable.

Most of the **reporting protocols** are based on online solutions and serve as data banks EEE and WEEE manufactured, imported or exported. In Spain facts about WEEE (kilos, units, origin, imported, exported, manufacturers) is collected on an online platform. Equally in Estonia where an online National Register was established. Collectors with no contact to producers must also report WEEE to the same register. In Sweden, producers report on monthly basis amount and kilos based on six WEEE categories and 60-70 sub categories. A summarized report is sent to Swedish EPA on producer level (collected volumes only on El-Kretsen level). In Switzerland two reports per year are generated: a technical report (contains, among other things, material flows) and financial report (revenue and expenditure presented transparently). Additionally, official financial audit ("gap analysis") shall guarantee that money is not misused.

Spotlight: Reporting protocols – WEEE Ireland

- All producers have to register in separate legislation body
- National reports tight to invoice -> no direct reporting to scheme like in most other EU countries
- Independent body provides reports to WEEE Ireland
- Global reports each month to track market share data
- File in invoice data, but no market data (sensible data) is send to WEEE Ireland
- Intensive auditing programme is a challenge
- National visible fees on certain appliances validated and published by public register; visible fee in specific wording included in price display (lamps 15 cents, LED 5 cents, large televisions 5 €)
- Invoicing report on visible fees; apply additional fees to categories that do not have visible fees
- Report on environmental management of collected tonnage
- Recycling quality standards for producers and PROs
- Black box system; provide coordination; coordinate data in commercially sensitive way.

Fines, levied by administration, can be used as an **enforcement mechanism** in case of non-compliance with a producer's targets. If targets are not met in regions in Spain, more money

will be directed towards awareness raising campaigns directed to specific sectors in the respective regions. Some issues where reported with respect to the enforcement of targets. Ecotrel for instance reports about badly estimated collection targets which might hinder compliance. The shipment of second-hand IT to African or Asian countries might further influence the collection rates because these EEE effectively count towards the amount of products put on the EU market but cannot be collected by domestic compliance schemes and count towards the EU's collection targets.

3.5. Key take-aways and lessons learnt

Strengths and disadvantages of existing PRO schemes, as described by the interviewees are summarised in the table below:

•Strengths of EPR systems

- **Non-for-profit guarantees fair level playing field:** accepted; no competition on fees and ecological activity
- **Cooperation with municipalities** and branch organisations
- **Clear roles** between PRO, recyclers, municipalities
- **Good dialog** between the government, local authorities and trade & industry
- **Stakeholder engagement platform**: meetings; easy to engage with trading organisations etc.
- Producers on board of directors
- **Comparable prices** and visible fee system
- Voluntary schemes: no problems with companies that want to bypass the system
- **Simple set-ups**
- **Direct contracts** to operators allow for better tracking and control (avoidance of multiple-contracting between collection, transportation and treatment facilities)
- **Clear rules** in legislation on how to handle competition in a competitive system
- **Transparency** towards all stakeholders

•Challenges of EPR systems

- Limited capacities of scheme, state must assist with importers, online trade (Switzerland)
- More auditing necessary (Ireland)
- PRO at European level would be easier
- Not all facilities for all waste streams
- Loopholes:
  - Online sales: Enables free riders
  - Purchasing abroad, disposal in Switzerland (e.g. kitchen builders in southern Germany)
- Reporting structure challenging for multi-national companies because not harmonized with reporting structure throughout Europe
- (Informal) collectors must comply with legal requirements and report to the state
- High rate of awareness needs to established from the beginning on, needs to be strongly supported by the state
- Integration of existing waste management industry / scrap dealers, reduction of informal channels (-> change of behaviour)
- Involvement of national and international producers/ importers
- Funds must be so interesting that recycling takes place on site
- Long-term financial sustainability (operation as cost effective as possible)

Annex II: Calculation of ARF

Prerequisites

- WEEE is taken by consumers to the collection points operated by PRO or persons acting on their behalf.
- PRO is owner of the collected WEEE
- Calculations of ARF is based on collection target quantities of concrete year
- Quantities of new products sold to consumers (placed on market) is reported by all members of PRO in a timely manner and correctly.

Calculation of Advance Recycling Fee (ARF)

To determine the Advance Recycling Fee (ARF) the full costs of operation of the PRO need to be considered. These include costs for the treatment of waste itself, costs for the collection of waste and administrative costs that arise. As waste treatment is handled by external treatment operators and needs to follow certain requirements, the establishment of a special tendering process is recommended. Costs for treatment are set during the tendering process as €[8] per kg per product category. A tendering process is also recommended for collection services like transportation or storage of WEEE. The collection costs are therefore based on the offers from the bidding process, whereby aspects of costly mixed collection of waste of different categories need to be considered. Finally, the administrative costs are budgeted by the PRO. While costs for treatment and collection vary between the WEEE categories, administrative costs are distributed equally across the different categories. Based on experience from Estonia it is recommended to base the calculation of the share of costs for the producers on the amount of EEE placed on the market in the previous three months.

The possible ARF (€/kg) for a product category therefore comprises of the costs for treatment (C_T) and collection (C_c) per product category and the administrative costs (C_A), divided by the amount of EEE placed on the market (EEE POM) by a producer during the last three months. An equation for product category 1 is shown below and a sample calculation is provided at the end of this document.

$$ARF_1 = {(C_{T1} + C_{C1} + C_{A1})}/{EEE\ POM}$$

Treatment costs

PROs will follow a special public tender process to find treatment facilities able to conduct treatment operations in line with technical requirements for treatment of WEEE (see Annex 2 and Annex 5 of Technical Regulation)[9]. For different categories and sub-categories of WEEE different treatment facilities may be required.

Prices for treatment are agreed during the tendering process on a €/ kg basis per WEEE category and ideally per subcategory. This allows for a more precise estimation of treatment costs. An option for subcategories of temperature exchange equipment is shown in the table below.

[8] Can be in national currency (GEL) as required by national legislation

[9] Resolution № 326 Technical Regulation on Management of Waste Electrical and Electronic Equipment (WEEE)

1.	**TEMPERATURE EXCHANGE EQUIPMENT** (f.e Refrigerators, Freezers, Equipment which automatically delivers cold products, Air conditioning equipment, Dehumidifying equipment, Heat pumps, Radiators containing oil and other temperature exchange equipment using fluids other than water for the temperature exchange)	Estimated WEEE quantity t/year	Treatment price contract period euro/ton **Attention!** Treatment price **should not include** any fractions income/cost		
			<100 t	500- 1000 t	1000-1500t
101	HFC/CFC/HCFC cooling and freezing appliances (R134a, R12,R22)	700	x		
102	HC cooling and freezing appliances (R600a)	450	x		
103	NH_3 cooling and freezing appliances	10		X	x
104	Air conditioning equipment	5		x	x
105	Electrical heating equipment (hot water boilers, radiators etc)	30		x	x
106	Other temperature exchange equipment				
	Attention! Treatment prices of cooling and freezing appliances must be based on special requirements for treatment of cooling and freezing appliences "Requirements for the Collection, Transportation, Storage; Handling and Treatment of Household Cooling and Freezing Appliances containing CFC; HCFC or HFC" and "Requirements for the Collection, Transportation, Storage and Treatment of Cooling and Freezing Appliances containing Hydrocarbons (HC), **see Annex 1 in Part II**				

Figure 12: Price table from tender document of EES-Ringlus[10]

In the tender, bidders are asked to give a price including all cost for treatment of WEEE into fractions while expenses or income for end-treatment must be excluded. Income and/ or costs that arise from the final treatment of the fractions are shared according to the principle that negative values are covered by the PRO by 100% while income is shared with the treatment partner. Details of the sharing fraction are to be negotiated within the PRO, in Estonia treatment partners are entitled to 10% of income while the PRO is entitled to 90% of income[11].

Treatment facilities taking part in tenders must provide the PRO with a detailed description of their treatment process and performance levels, which gives PRO confidence that legally binding treatment requirements for recovery and recycling are achieved by technology used. Monthly treatment reports must include quantities and cost by WEEE categories and sub-categories, which PRO needs for allocation of cost for producers or calculating ARF for certain time periods in the future.

On this basis the costs for treatment (C_T) for a producer in a given time period can be calculated using the total treatment costs for a category during a certain time period (T_1 for category 1) and multiplying this value by the share (%) of a producer in EEE put on the market in the respective category (S_1 for category 1). The sum of treatment costs for all categories equals the total treatment costs for a producer for the given time period. A table with a sample calculation for the share of treatment costs for one producer is provided below. The share (%) in categories relates to the fraction of EEE in the respective category the producer put on the market in the last three months of the sum of EEE put on the market of all members of the PRO combined.

$$C_T = (T_1 * S_1) + (T_2 * S_2) + (T_3 * S_3) + (T_4 * S_4) + (T_5 * S_5) + (T_6 * S_6)$$

[10] http://eesringlus.ee/hange-ees-jaatmete-umbertootlemiseks-weee-tender-invitation-2/

[11] http://eesringlus.ee/wp-content/uploads/2018/10/Tender_Invitation_EES-Ringlus_2018-final-1.pdf

Table 5: Sample calculation for treatment costs for a producer with EEE put on the market across different categories during the last three months (shares of EEE across the categories: 2.5% in Category 1; 15% in Cat. 2, 0% in Cat. 3, 1.5% in Cat. 4, 2% in Cat. 5 and 0.5% in Cat. 6).

Producer A / Treatment	Cat.1	Cat.2	Cat.3	Cat.4	Cat.5	Cat.6	
Share in category, (%)[12]	2,5	15	0	1,5	2	0,5	
40 000€ Treatment cost of cat.1 in period X, (€)	1 000						
10 000€ Treatment cost of cat.2 in period X, (€)		1 500					
5 000€ Treatment cost of cat.3 in period X, (€)			0				
25 000€ Treatment cost of cat.4 in period X, (€)				375			
7 500€ Treatment cost of cat.5 in period X, (€)					150		
15 000€ Treatment cost of cat.6 in period X, (€)						75	
Treatment cost SUM in period X for member A, (€)	1 000	1 500	0	375	150	75	3 100

[12] Based on previous three month average PoM (placed on market)

Collection costs

For the calculation of collection costs a number of variables need to be considered such as costs for equipment, transportation and for maintaining a warehouse. The mode collection is another critical aspect. Separate collection of loose products like fridges and large household equipment allows for straight forward calculation and is equivalent to 100% on collection equipment cost for a specific category. However, co-collection of other appliances (e.g. as often is the case for small appliances, IT and consumer electronics which are collected as a mix) hinders the allocation of costs per product category. This needs to be reflected in the internal documents and fixed proportions per (sub-) product category can help to facilitate cost allocation for producers fairly.

Total costs for collection (C_C) for a producer in a certain time period are calculated similar to the cost of treatment. The collection cost for a category (Co_1 for category 1) is multiplied by the share (%) in EEE put on the market of a producer of the respective category (S_1 for category 1) during the last three months. The lumpsum of these additions equals the total costs for collection (see equation below). A sample calculation for the collection costs of a producer is provided below.

$$C_c = (Co_1 * S_1) + (Co_2 * S_2) + (Co_3 * S_3) + (Co_4 * S_4) + (Co_5 * S_5) + (Co_6 * S_6)$$

Table 6: Sample calculation for collection costs for a producer with EEE put on the market across different categories during the last three months (shares of EEE across the categories: 2.5% in Category 1; 15% in Cat. 2, 0% in Cat. 3, 1.5% in Cat. 4, 2% in Cat. 5 and 0.5% in Cat. 6)

Producer A / Collection	Cat.1	Cat.2	Cat.3	Cat.4	Cat.5	Cat.6	
Share in category, (%)[13]	2,5	15	0	1,5	2	0,5	
30 000€ Collection cost of cat.1 in period X, (€)	750						
15 000€ Collection cost of cat.2 in period X, (€)		2 250					
2 000€ Collection cost of cat.3 in period X, (€)			0				
14 000€ Collection cost of cat.4 in period X, (€)				210			
5 000€ Collection cost of cat.5 in period X, (€)					100		
10 000€ Collection cost of cat.6 in period X, (€)						50	
Collection cost SUM in period X for member A, (€)	750	2 250	0	210	100	50	3 360

[13] Based on previous three month average PoM (placed on market)

Administrative costs

Administrative costs are covered by two sets of fees. Members of the PRO pay a fixed amount, which is the same for all PRO members regardless of their size or quantities placed on market. This can be done on a monthly or annual basis as defined by the PRO. In Estonia members pay these costs as a monthly membership fee of € 63.91.

The second fee is included in the ARF and based on an equal allocation between across the 6 categories. It is thus producer-specific, as producers will place different amounts of products per category on the market.

The exact amount of administrative costs arising during the operation needs to be determined by thorough budgeting.

Table 7: Cost allocation for administrative costs across product categories (second fee)

	Cat.1	Cat.2	Cat.3	Cat.4	Cat.5	Cat.6
Administrative Variable cost allocation, %	16,6%	16,6%	16,6%	16,6%	16,6%	16,6%

Similar with the previous calculations the administrative costs (C_A) equals the lumpsum of 16,6% administrative costs per category (A) times the share of EEE the producer placed on the market (S_1 for category 1). A sample calculation is provided below.

$$C_A = (A * S_1) + (A * S_2) + (A * S_3) + (A * S_4) + (A * S_5) + (A * S_6)$$

Table 8: Sample calculation for collection costs for a producer with EEE put on the market across different categories during the last three months (shares of EEE across the categories: 2.5% in Category 1; 15% in Cat. 2, 0% in Cat. 3, 1.5% in Cat. 4, 2% in Cat 5 and 0.5% in Cat. 6).

Producer A / Admin.	Cat.1	Cat.2	Cat.3	Cat.4	Cat.5	Cat.6	
Share in category, (%)[14]	2,5	15	0	1,5	2	0,5	
8 330€ Administrational cost of cat.1 in period X, (€)	208,25						
8 330€ Administrational cost of cat.2 in period X, (€)		1 249,50					
8 330€ Administrational cost of cat.3 in period X, (€)			0				
8 330€ Administrational cost of cat.4 in period X, (€)				124,95			
8 330€ Administrational cost of cat.5 in period X, (€)					166,60		
8 330€ Administrational cost of cat.6 in period X, (€)						41,65	
Administrational cost SUM in period X for member A, (€)	208,25	1 249,50	0	124,95	166,60	41,65	1 790,95

[14] Based on previous three month average PoM (placed on market)

Calculation of possible ARF

As described in the beginning of this ANNEX the ARF for a producer can be calculated using the costs for treatment, collection and administration. The ARF provides the costs a member of a PRO has to pay per kg of EEE put on the market per category. The final table below provides a sample calculation for a possible ARF for a producer with given shares of EEE put on the market across the six categories.

Table 9: Sample calculation for possible ARF for a producer with EEE put on the market across different categories during the last three months (shares of EEE across the categories: 2.5% in Category 1; 15% in Cat. 2, 0% in Cat. 3, 1.5% in Cat. 4, 2% in Cat. 5 and 0.5% in Cat. 6).

Producer A / ARF	Cat.1	Cat.2	Cat.3	Cat.4	Cat.5	Cat.6	
Treatment cost SUM in period X for member A, (€)	1 000	1 500	0	375	150	75	3 100
Collection cost SUM in period X for member A, (€)	750	2 250	0	210	100	50	3 360
Administrative cost SUM in period X for member A, (€)	208,25	1 249,50	0	124,95	166,60	41,65	1 790,95
TOTAL SUM in period X, for member A, (€)	1 958,25	4 999,50	0	709,95	416,60	166,65	8250,95
EEE placed on market in period X by member A, (kg)	20 000	50 000	0	18 000	7 500	3 000	
Possible ARF = TOTAL SUM / EEE POM, (€/kg)	0,1	0,1	0	0,04	0,05	0,05	

Outlook and Challenges

The determination of an ARF is a complex and risky undertaking where a variety of aspects in close consideration of the local context need to be taken into account. A solid data basis for the arising costs of all aspects of operation is therefore crucial and should not be underestimated.

When allocating costs (for treatment), it should be considered that each product category (see Annex 1 of Technical Regulation) is not detailed enough to share costs fairly. The PRO needs a more detailed categorization due to the differences in treatment costs of products included in the each of the main categories. For example, the net cost of treatment of cooling and freezing appliances is must much higher compared to the net cost of washing machines and electric stoves.

The minimum recycling targets set in ANNEX IV of the Technical Regulations are a critical tool to motivate producer to fulfil their responsibility and they are equally the basis of calculating the ARF. However, the option of an “over-collection” of products of a certain category bears the risk of underestimating the ARF and subsequently underbudgeting the operations of the PRO. Additionally, unforeseen events, like this year's COVID19 pandemic, can influence the operation and the expenses, of a PRO significantly.

To provide for such events, it is therefore advisable to establish financial reserves. This could be done with an additional fee which can be retrieved from producers in times of financial stress. In the case of EES-Ringlus this third fee amounts to the sum of the membership fee plus the ARF times an additional 20%.

$$F_c = (F_A + F_B) * 20\%$$

Whereby $F_A = Membership\ Fee$; $F_B = ARF$; $F_C = Financial\ Reserve\ Fee$

The approach towards ARF calculation described here is to be considered as a suggested procedure, and the equations and numbers given are intended to illustrate these suggestions. A detailed design of the ARF in Georgia requires a careful research of the data basis and a thorough examination of which of these suggestions is actually suitable at this point in time.