SUSTAINABLE RECYCLING INDUSTRIES

An EPR Scheme for WEEE in Egypt

Options for implementation

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Turning waste into resources for development

SRI builds capacity for sustainable recycling in developing countries. The programme is funded by the Swiss State Secretariat of Economic Affairs (SECO) and is implemented by the Institute for Materials Science & Technology (Empa) and the World Resources Forum (WRF). It builds on the success of implementing e-waste recycling systems together with various developing countries since more than ten years.

Acronyms

ACI:	Advanced Cargo information
CPA:	Consumer Protection Agency
CEDARE:	Centre for Environment and Development
EPR:	Extended Producer Responsibility
EEE:	Electric and Electronic Equipment
EoL:	End of Life
PRO:	Producer Responsibility Organisation
WMRA:	Waste Management Regulatory Authority
MCIT:	Ministry of Communication and Information Technology
NTRA:	National Telecommunication Regulatory Authority
MSW:	Municipal Solid Waste
SWM:	Solid Waste Management
MoE:	Ministry of Environment
MTI:	Ministry of Trade and Industry
ECA:	Egyptian Customs Authority
HCP:	Hard Copy Peripherals
PM:	Prime Minister
NEC:	National EPR Committee
SRI:	Sustainable Recycling Industries Project
WEEE:	Waste Electric and Electronic

Table of contents

Tables

Figures

Executive summary

Extended Producer Responsibility (EPR) policies are being adopted to create recycling “systems” that are more sustainable. To effectively implement these requirements, there is an urgent need to better understand the conditions under which EPR systems can perform well and deliver best results. EPR can be implemented in various forms, including product take-back requirements, economic and market-based instruments, regulations and performance standards, and information-based instruments.

The report deals with the possible implementations of an EPR system in Egypt. Two different options are explained in more detail and an implementation is outlined.

Option one shows a system that would be managed by WMRA itself. The advantages of this would be a better control for WMRA over the system and the implementation and adjustments of the system or greater flexibility to allocate resources. Points against this would be, for example, that WMRA should supervise and review all recyclers and collectors or the dual function as regulator and operational decision maker.

The second option would be a producer-led system. Here, the simpler administration for WMRA or the stronger involvement of the producers would certainly speak in favor. Negative points here would be the implementation of the financial flow (why to WMRA and not directly to the PRO) or administrative hurdles in the staffing of the PRO.

Keywords

EPR Scheme, E-Waste, WEEE, Egypt, Producer Responsibility Organisation, Extended Producer Responsibility

1 Introduction and background

This report is being undertaken within the context of the Sustainable Recycling Industries (SRI) programme phase II. The SRI programme addresses the demand for a comprehensive international approach to ensure that recovery of secondary resources is enabled under sustainable conditions. Among others the programme pursues and promotes life cycle thinking, harmonization of international standards towards "fair" recovery and trade of secondary resources and applying novel financing mechanisms to safely detoxify waste streams and destroy illegal substances. Participating countries include Colombia, Egypt, Ghana, India, Peru, South Africa, and Brazil. The programme started in 2014 and is currently in its second phase which commenced in Egypt in February 2020.

Under its capacity building component, the programme aims to develop incentive mechanisms under the principle of Extended Producer Responsibility (EPR) to ensure long term functioning of recycling businesses. In this regard the programme seeks to support the concerned authorities to develop a national e-waste policy and to adopt and put into effect respective legalization which supports the sound management of WEEE.

EPR has long been utilized as an environmental policy option for the sound management of WEEE. While the adoption of EPR started in developed countries increasingly more and more developing countries are opting to start EPR schemes as a policy option to incentivize recycling and also to shift the responsibility for the sound management of WEEE back to the producer rather than the taxpayer.

The Egyptian Waste Management law 202/2020 was promulgated by parliament in December 2020. Article 17 of the law deals with the issue of EPR and stipulates that the Prime Minister shall issue a decree specifying which products shall be subject to EPR and what would be the mechanisms for implementation.

While this legal provision does not specifically address the sound management of WEEE, it paves the way and opens the door for the establishment of a regulated EPR scheme/s for WEEE. Furthermore, it is clear from the formulation of the article that the decree issued by the prime minister would be the document which identifies which products to be targeted and sets the specifics and details of the system. This ensures a certain flexibility in adjusting, adapting, and refining the EPR system proposed since the Prime Minister has more flexibility in issuing and amending the decree rather than amending the law or the executive regulations of the law.

2 Scope and objectives of the report

This report endeavors to support stakeholders, specifically the Ministry of Environment, to develop options for putting article 17 into effect. While article 17 is not exclusive to WEEE, the scope of the report is limited to WEEE. However, the approaches which will be presented in this report could potentially be beneficial for exploring other products which could be subject EPR schemes.

More specifically, this report will address:

1. Criteria for selecting priority products
2. Options for logistical and institutional arrangements
3. Modalities for financial mechanisms.

This report however is not a detailed guideline on what EPR is and how it is implemented in various countries. This has already been covered in several documents over the past years, some of which can be found in the bibliography section of this report. What this report attempts to do is to go straight into the Egyptian context and how an EPR scheme for WEEE could be developed. Hopefully, the proposals in this report would have practical implications and could be the basis upon which the Prime Minister's decree for EPR could be drafted.

It is important to note that one important requirement of article 17 is consultation with concerned stakeholders. It is hence imperative that the options or proposals presented in this report be put through a consultation process with relevant stakeholders in order to reach consensus on the final desired proposal. This report hence does not offer forgone conclusions but rather options to be explored and vetted with concerned parties including producers, recycles, collectors and concerned governmental bodies.

3 Context

3.1 The legislative Environment for EPR in Egypt

According to the OECD definition, EPR is "*an 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 implies that producers take over the responsibility for collecting or taking back used goods and for sorting and treating for their eventual recycling. Such a responsibility may be merely financial or organizational as well*" (OECD EPR Guidelines, 2019)

Since 2014 there has been successive efforts to introduce EPR as an environmental policy in the Egyptian context. Several development cooperation programmes have included EPR components to support MoE and subsequently WMRA to develop proposals for EPR implementation in Egypt[1]. There have also been a number of voluntary schemes initiated by private sector companies to collect or take back their products at the end of their life.

The culmination of these efforts has been the inclusion of a specific EPR article in the recently promulgated waste law (202/2020). Article 17 of the law stipulates that:

"*Following the approval of the Cabinet and the presentation by the responsible minister after consultation with concerned parties, the Prime Minister shall issue a decree specifying which priority products shall be subject to EPR schemes, what procedures shall be applied in this regard and what financial compensation producers shall pay to the responsible administrative entities for the safe disposal of their products at the end of their life*".

It is clear from the formulation of the article that there was no intention to provide any specific details about the type of products, the framework for implementation nor financial arrangements but rather the objective was to pave the way for EPR implementation and leaving the specifics to subsequent decrees. This is a welcome legislative approach as some of these details require a long process of

[1] The National Solid Waste Management programme incorporated an EPR component since 2014.

negotiation and consultation and are changeable overtime which makes it difficult to set them in stone in the law.

One problematic inclusion in the article however is the last phrase which refers to "safe disposal" and the "responsible administrative entities". First of all, it is not clear from the formulation and the definitions in the law whether safe disposal includes recycling. This could be problematic as it implies that the payment will only be for safe disposal and not cover the full costs of sound management of WEEE including collection and recycling. Furthermore, the requirement that this payment is made to the responsible administrative entities could also pose problems since this entity is not specified in the law. The law stipulates that for hazardous waste the responsible administrative entity is the relevant ministry for each waste stream. e.g., for medical waste it is the Ministry of Health, for petroleum waste it is the Ministry of petroleum etc. For WEEE it is not clear who the responsible administrative entity should be, yes the law seems to imply that WMRA is not a responsible administrative entity.

Furthermore, this formulation could contradict another relevant article in the law which is article 12. Article 12 deals with the revenue streams for WMRA. This article lists all revenue streams for WMRA and included in this list are any proceeds from the implementation of article 17. This indicates that the legislature in passing the law envisaged that WMRA will be receiving any fees paid by the producer in the context of the implemented EPR schemes. This requirement should be taken into account in the design of any proposals for EPR schemes in Egypt. The formulation of the article implies that producers will be required to fulfil their financial responsibility while the logistical responsibility will be the prerogative of WMRA. This is similar to the Chinese model where producers pay set fees that go into a fund managed by the government to subsidize waste recyclers. It is important to note though that EPR is not a tax, and any financial proceeds will need to be allocated to the implementation of the EPR scheme and not general WMRA activities.

One way to address these problematic formulations of the law is to provide further clarity in the Prime Minister's Decree as well as the executive regulations for the law if need be. This could be done through defining safe disposal to include all activities including recycling and stating clearly that WMRA is the responsible administrative entity when it comes to EPR implementation.

3.2 The Telecommunication Sector in Egypt

Egypt's telecommunication market is one of the largest in Africa and the Arab World. In 2019, the ICT sector has contributed EGP 93.4 billion to the Egyptian GDP (MCIT). In 2021 there were approximately 60 million internet users and 95.5 million mobile phone users (MCIT). These transformations have been occurring in the context of sustained efforts by the government for digital transformation including in the provision of public services. These transformations have certainly been welcome and are of significant added value to society. However, the proliferation of the use of ICT equipment also poses some challenges. With the decreasing life spans of many ICT equipment due to technological advancement and changing consumption habits WEEE is becoming a growing problem which if left unaddressed will pose serious threats to the environment.

Cognizant of this problem, MCIT has adopted a green ICT strategy since the year 2010 which has placed the sound management of WEEE as one of its main pillars (Green ICT Strategy, MCIT 2014). This was a significant development as it indicated that within the ICT sector there is growing awareness and recognition of the need to balance the drive towards digital transformation with sustainable practices for the management of ICT equipment once they become obsolete.

An overview of some ICT products placed in the Egyptian market are presented in Table 1, Table 2 and Table 3 below:

Table 1: Market shares of Mobile Phone Devices[2].

Shipments to Egypt have reached 14.9 million units end of 2019. Number of mobile subscribers reached 99.8 million March 2021. Estimated number of EoL units by 2020 10.5 million. Average Weight 110 grams (80g phone plus 30g battery). The number of mobile phone units in use estimated at 115 million units

Company	Market share (%)
Samsung	23.3
Apple	23.1
Huawei	17.83
OPPO	12.7
Xiaome	7.42
Realme	4.41
Infinix	4.57
tecno	0.64
Nokia	0.66
HTC	0.57
other	2.62

Table 2: Market shares of PC and Notebooks.

PC Market in Egypt reached 500,000 units in 2020. Notebook market reached 400,00 units 2020. Total Sales of computer hardware amounted to 3.8 billion EGP. Estimated number of EoL PCs and notebooks 1.4 million units 2020. Average Weight 7 KG for PC 3.3 for laptop.

Company	Market share (%)
Lenovo	31.8
Dell	27
HP	12
Asus	11.5
Samsung	9
Apple	6
other	1
Non-branded	2

[2] https://gs.statcounter.com/vendor-market-share/mobile/egypt

Table 3: Market shares of Hard Copy Peripherals

Total number 26,139 units in 2018. Longer life span than mobiles, PCs and laptops. Average weight 10.5 KG

Company	Market share (%)
HP	29.4
Canon	23.1
Xerox	26
Samsung	15.7
other	5.3

3.3 WEEE management practices in Egypt

Egypt is among the highest generators of WEEE in the African continent with approximately 0.5 million tons of WEEE generated annually. Only a small fraction of this amount (around 5%) gets recycled and the rest is either openly burned or dumped. (Global E Waste Monitor, 2020). This figure does not include the large amounts of household equipment which have reached EoL but are stored at homes without being discarded. This occurs for several reasons including lack of awareness on the toxic and hazardous components of many of these products, lack of incentives for discarding these equipment as well as lack of available options for collection and safe disposal.

WMRA has recently approved 7 companies to recycle WEEE in Egypt. These companies primarily work on dismantling of WEEE products into their most basic components and then exporting valuable parts for further separation abroad for extraction of precious metals. Hazardous parts such as batteries are stored until a suitable disposal option is made available. A recent decision to restrict the export of PCBs has not been well received by dismantling companies as it deprived them of a valuable source of income. Currently Egypt has one hazardous waste disposal facility in Naserya in Alexandria serving the whole country making it inaccessible to most entities seeking safe disposal of their waste. This facility has also been facing its own challenges in terms of operation and capacity and there is currently a consensus that a new facility is urgently needed.

Further processing such as converting allows into pure metals is often not feasible economically for recycling facilities. Accessibility of waste to the approved recyclers is a major challenge. Waste is often leaked to uncontrolled processes to extract the valuable material within waste while discarding the hazardous components in an unsound manner. These processes pose a serious threat to the health of the public and the environment and are determinantal to the health of those working on such processes.

Access to WEEE is often secured through participation in auctions by governmental entities as well as businesses, particularly telecommunication companies. Large companies replace their hardware frequently which makes large volumes of used equipment available for selling to the highest bidder through auctions.

4 Why EPR for the sound management of WEEE in Egypt?

EPR as an environmental policy approach is being increasingly adopted in both developed and developing countries alike to address the challenges of dealing with the most problematic waste fractions, including WEEE. The rationale behind this approach is that the taxpayers and society at large should not be paying for the costs of sound management of products at the end of their life but rather the producers should bear this responsibility, or at least share this responsibility. This responsibility does not only entail dealing with the products at the end of their life but also adopting design options that facilitate recovery and recycling and limit adverse impacts on the environment.

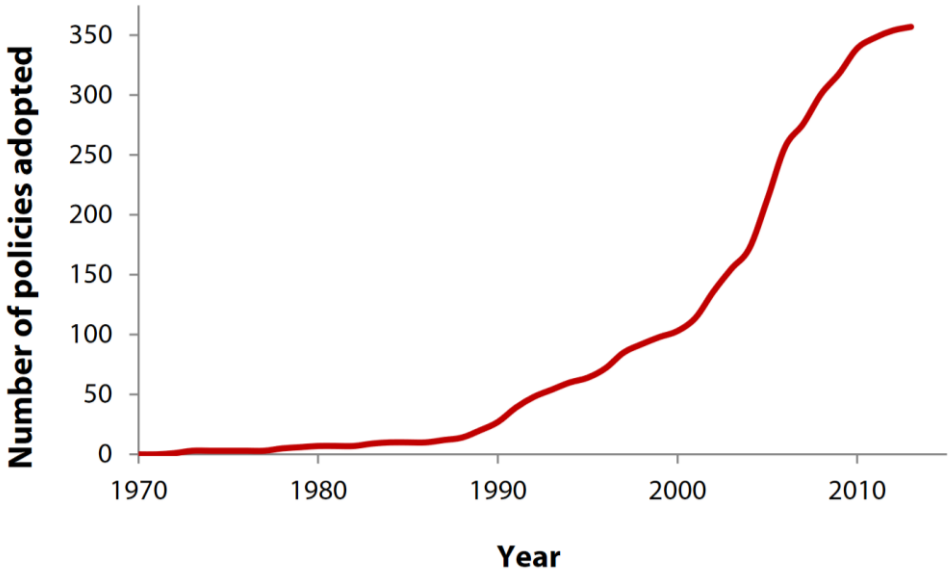

Figure 1: Cumulative EPR policy adoption globally, 1970 -2015. Source: OECD (2013) *What have we learned about extended producer responsibility in the past decade?*

The challenges facing the sound management of WEEE in Egypt outlined in the previous section are manifold. Increasing volumes, low collection rates particularly from households, unsafe and environmentally detrimental treatment and disposal methods, lack of investments in recycling and treatment facilities are just some of these challenges. EPR could help address some of these challenges by ensuring that the cost of the sound management of WEEE is internalized in the cost of the products from the outset. In addition, EPR enables WMRA to regulate the management of WEEE and provides an opportunity for exercising a much higher degree of control over the sector. As will be described in subsequent chapters, an EPR system entails systematic flows of information between WMRA and the various players including producers, collectors and recyclers and hence provides MWRA with the tools to monitor and control the flows of WEEE between the various players in the system. The multiplier effect of this on WMRA could be invaluable as it strengthens WMRA as an institution allowing it to perform its regulatory function.

Finally international experience has shown that the adoption of EPR has led to higher recycling rates and could lead to the creation of a vibrant recycling industry as it sends the right price signals and

financial incentives for investments in recycling. Egypt, with the large amounts of waste and accumulated experience with recycling has a high potential for the creation of such an industry and thus creating economic, social, and environmental benefits.

5 Why prioritize ICT products for EPR implementation in Egypt?

One of the first steps to be undertaken when setting up EPR schemes is to select the products which will be covered by the scheme. There are generally two approaches in this area. One approach is to include all WEEE products from the outset. This approach while not very common, especially in developing countries, is the approach adopted by the EU. This approach saves the time and burden of continuing to add products over time and in theory could also guarantee larger volumes of waste collected and treated, which is desired from an environmental as well as an economic perspective (Step Green Paper, 2015).

The other approach which is perhaps more commonly used in developing countries is the gradual approach where products are included overtime. If a gradual approach is adopted, there are generally 3 main criteria for selecting priority products:

A) The volume of waste being generated by the product. Products which are widely consumed are problematic by virtue of their sheer volume.

B) The hazardous nature of the products. The main objective of setting up EPR schemes is to protect the environment and health. Products which pose the greatest risk due to the hazardous substances in their various components are usually prioritized when setting EPR schemes.

C) The availability of facilities for the recycling and treatment of the products. Indeed, one of the objectives of an EPR scheme could be to make such infrastructure available yet it is always preferred that some level of infrastructure is already available otherwise actual implementation of the scheme would be delayed for years until such infrastructure is made available.

While the afore-mentioned criteria are the most commonly used, there are other factors that come into play when deciding which products to prioritize. These factors include the practical considerations which for the purposes of this report will be grouped under a fourth selection criterion labelled “ease of implementation”. The degree to which an EPR scheme would be relatively easier and faster to set up and control will depend on a number of interrelated factors which comprise the ease of implementation criterion, these factors are:

1. **Number of producers**- The less the number of producers WMRA should consult with the easier the consultation process could go and the quicker the route to actual implementation.
2. **Nature of producers**- Whether the products of concern are locally produced, imported or both could also have an impact on how easy it is to control and regulate the EPR system. In addition, resistance to EPR might be higher in the case of locally produced products.

3. **Regulatory environment of the sector**: highly regulated sectors which are governed for example by a regulatory authority could be conducive for an organised and well-structured consultation process. In addition, having an ally from the industrial sector rather than just the environmental regulatory authorities could be crucial for reaching consensus among producers on the shape and nature of the EPR scheme to be implemented. Furthermore, once implementation starts the existence of such regulatory body would be important for the control and monitoring of the proposed EPR scheme.
4. **Socio-economic factors**: Products which are household items, and which could have high price elasticity, could face resistance from local actors. For example, If the assumption that an advance disposal fee would be passed on to the consumer there could be resistance from the Consumer Protection Agency.
5. **Experience with voluntary schemes**: for some products producers might have already experimented with pilot projects to deal with the products at the end of their life. This experience would be invaluable in the design of the regulated EPR system as there is bound to be valuable lessons learned as well as willingness to engage from the side of producers facilitating implementation.

Grouping these factors together in an assessment matrix could help WMRA decide which products to prioritize and thus include in the first Prime Ministerial Decree for EPR. The matrix in Table 4 assesses eight types of WEEE and assigns a score from 1-3, with 1 being low, 2 medium and 3 high. The assessment was done by the consultant and vetted with members of the EPR sub-committee which concurred with the assessment and the rationale behind the selection of ICT equipment as priority products to be covered by the EPR decree.

Table 4: Assessment Matrix for selection of priority products.
LHA: Large Household Appliances, SHA: Small Household Appliances, ICT: Information Communication Technology products, CE: Consumer Electronics, LE: Lighting Equipment, EET: Electric and Electronic tools, TLS: Toys Leisure and Sports equipment, MD: Medical Devices

Criteria for Selection	LHA	SHA	ICT	CE	LE	EET	TLS	MD
Large volume of EOL products	3	3	**3**	2	2	2	3	1
Hazardous nature of components	3	2	**3**	2	3	2	3	3
Availability of recycling Infrastructure	2	2	**3**	1	2	1	1	1
Ease of Implementation	2	2	**3**	1	3	2	1	2
Total Score	10	9	**12**	6	10	7	8	7

The selection of ICT as priority products was premised on a number of characteristics for the ICT sector in Egypt:

1. The ICT sector in Egypt is largely dependent on imports of ICT products as there are no local manufacturing. This is a unique characteristic for this category of WEEE which could facilitate implementation as the control could happen at the point of entry. This will be clarified further in the description of the options for implementation.

2. Relative to other types of WEEE an EPR scheme for ICT WEEE could face less resistance. For example, Egypt has a vibrant local industry for large and small household appliances which is not yet sensitized to the benefits of EPR and thus there could be higher resistance from producers. This does not mean that these products should be excluded from EPR implementation but rather that maybe it should not be the category to start with.
3. The ICT sector is regulated by NTRA which was involved in the development of the green ICT strategy for MCIT and hence could play a pivotal role in the implementation of the system and in liaison with the producers.
4. According to information from recyclers and collectors ICT products are probably the highest fraction of waste they receive. This ticks the boxes when it comes to volume and availability of infrastructure.
5. Several telecommunication companies have participated or established schemes during different periods to collect and recycle their products at the of their life. Some of these initiatives are still ongoing and the experience from setting up those schemes would facilitate the establishment of a regulated EPR scheme for selected ICT equipment. These companies are likely to be more receptive to the idea of a regulated scheme and would be able to provide useful insights from their past experiences.

6 Options for Implementation

As mentioned in the section on the legislative environment, the articles pertaining to EPR were left deliberately ambiguous to leave scope for stakeholders to select the products and the most appropriate options for implementation.

For any option however there are 4 main pillars that should be addressed which are:

1. **The roles and Responsibilities**: Who should do what, when?
2. **Information flows**: objectives of the system, who are the producers and what are the products, setting targets and standards, monitoring and reporting, public awareness
3. **Material flows**: How will EoL products flow through the system, collection, Recycling, safe disposal?
4. **Financial flows**: What amounts will be paid, who collects, and how are the resources used to sustain the system and achieve its objectives?

The following section will delve deeper into two options which could be explored to set up EPR systems for WEEE in Egypt.

6.1 Option 1: WMRA Operated System

As mentioned in previous sections, the reading of article 17 in the Egyptian waste management law implies that the legislature intended for WMRA to play a pivotal role in the management of EPR schemes. This role perhaps goes beyond the typical role of a regulator, which is usually limited to setting the framework and targets of the system, as it goes into the actual management and control over financial flows. While this model is not the most common in terms of EPR schemes, there has certainly been several experiences where a government body have played such an enhanced role, most notably

the Chinese EPR model adopts a similar approach (Chines E Fund, Liu 2018). Nevertheless, it should be iterated that EPR is not a tax and whether WMRA or a producer organisation manages the financial flows within the system these flows have to be kept within the system and utilized to promote the sound management of the products identified at the end of their life.

In addition, the fact that WMRA plays the central role within this system does not mean that it is the sole player. Other actors in the system whether from the producers' side, collectors and recyclers or other governmental entities still need to play a crucial role for the system to function properly.

As mentioned earlier the reasons for selecting ICT products is that there are other entities which could support WMRA in the implementation and monitoring of the system. Most notably these include the Egyptian Customs Authority (ECA) and the National Telecommunication Regulatory Authority (NTRA). With ICT products being primarily imported the ECA has a very important role to play in controlling the entry of products under the EPR scheme and also the initial collection of the fees before transferring it to WMRA. NTRA is the regulatory body for the ICT sector and will play a valuable role in the negotiations with producers as well as monitoring and enforcement.

With WMRA being at the center of managing the system it is imperative that a National EPR Committee (NEC) is created to provide oversight and ensure that the voices of all actors are represented. The NEC could be comprised of all concerned governmental entities as well as representatives of producers and recyclers. The envisaged role for the NEC would be to determine the EPR fees, receive the annual report from WMRA and the external auditor report and ensure the targets and objectives of the system have been achieved. This committee could be modelled on the existing sub-Committee for EPR with the addition of the non-governmental entities.

Table 5 below summarizes some of the main functions within the system and the roles played by each player. Subsequent sections will delve deeper into these functions and the roles and responsibilities.

Table 5: Roles and Responsibilities in a WRMA operated system.

Responsibilities	WMRA	Customs Authority	NTRA	NEC	Producers	Recyclers
Registration of producers	x					
Certification of recyclers and collectors	x					
Determination of EPR Fees				x		
Payment of EPR fees					x	
Collection of EPR Fees		x				
Setting Recycling and collection targets and Standards	x					
Disbursement of Subsidy to Recyclers	x					
Public Awareness and Sensitization	x				x	
Monitoring and Enforcement	x			x		
Reporting	x				x	x

6.1.1 Information flows

Products and Producers

From the foregoing analysis and the fact that the ICT products identified are imported, the producer could be defined as any entity under whose name the products listed in the list of priority products in the PM decree enter Egypt i.e., the Importer. However, as will be explained in the section on material flows the decree could also set responsibility on the retailers to take back the EoL products from consumers. Retailers could hence be included in the definition of the producer, yet their responsibility would not be financial but rather logistical responsibility.

The list of products covered by the EPR system could initially be the list in Table 6.

Table 6: Proposed list of ICT products subject to EPR.

	Products subject to the EPR scheme
1	Mobile phone devices
2	PCs, notebooks, and tablets
3	HCP (printers, copier fax machines)
4	Routers
5	Switch Boards
6	Servers
7	Spare parts for the list of products

This list is not an exhaustive list of ICT equipment and certainly not an exhaustive list of WEEE. However, through initial consultation with some of the main stakeholders it appears that this list covers most of the products which are currently being handled by recyclers in Egypt and which would be most appropriate to include in the priority list. What is presented in the report however are proposals based on initial consultation and assessments which must be vetted and adjusted based on the consultation phase with the producers and other stakeholders.

System Objectives

One of the first steps to be undertaken when setting up EPR systems is to have a very clear articulation of the desired outcomes of the system. The objective must be very clear to all stakeholders and consensus on it should be agreed upon during the consultation phase. The objectives of the system would be reflected in indicators or targets which producers, collectors and recyclers must meet and which also WMRA as the operator of the system must be accountable for.

Some examples of objectives for the EPR system for the products listed would be:

1. Increase collection rates of WEEE (With Specific targets)
2. Sound management of WEEE to prevent toxic material from contaminating soil and water.
3. The recovery of valuable material in WEEE to reduce the need for mining virgin material and provide necessary raw material to industry.
4. Preservation of natural resources and reducing greenhouse gas emissions by reducing reliance on mining processes.
5. Formalisation of informal sector recycling activities reduces environmental degradation and improves the working conditions recyclers.

6. Ensuring fair sharing of responsibility and reducing the burden on the taxpayer and society at large.
7. Creating a vibrant recycling industry for WEEE in Egypt with substantial economic and social benefits.

Public Awareness

Public awareness is a key component of the EPR system. As mentioned, one of the key objectives of the system would be increasing collection rates. Achieving this objective will rely on the public being fully aware of how and where they can get rid of their WEEE. One of the responsibilities of the system manager then would be to ensure that there are sufficient resources for communication activities and that information about the system flows to the public in a consistent and continuous manner.

Registration and certification

A prerequisite for the system would be to ensure that the system is controlled. This starts with the process of identification and registration of producers, collectors, and recyclers. WMRA as the system manager would have to register producers and certify the collectors and recyclers who could be eligible to be part of the system. Registration of producers is straightforward since any producer who falls under the definition of producer articulated in the decree should be required to register with WMRA. This process should be simple for the producer preferably through a digital information platform and not so administratively burdensome on the producer.

Certification of collectors and recyclers on the other hand requires that WMRA very clearly sets what the technical standards and requirements are for being part of the EPR scheme. Since Recyclers and collectors would be eligible for receiving a financial incentive, as will be described later in the financial flows section, they need to meet certain requirements and standards which are derived from the objectives set for the system. For example, technical standards would go into specific processes for recycling, safe disposal of residual requirements, requirements related to the facilities and their environmental standards etc.

Monitoring and reporting

An intrinsic component of ensuring control over the system would be ensuring that accurate information flows about the achievement of the targets. e.g. amounts being collected annually, amounts being recycled, amounts being safely disposed. Quarterly and annual reports should flow from recyclers to WMRA. These reports should be verified through monitoring by WMRA team who should be well trained and equipped to verify the information provided by recyclers. An external audit should also be conducted on annual basis to verify that the system is achieving its objectives. Since WMRA in this model is acting as system manager this auditor should be independent from WMRA

From the foregoing description, WMRA as the entity acting as the system manager would have a broad range of responsibilities which could be summarized in the following list:

1. Setting up a registry to register producers, collectors, and recyclers.
2. Setting up the technical standards for recycling
3. Collection of Fees
4. Providing financial incentives to collectors and Recyclers to ensure achievement of the set targets

5. Establishing an information management system to record data and information on the amounts being collected, recycled, and disposed of and also to analyse reports by collectors and recyclers.
6. Report to the National Committee on the results of the EPR system implementation.
7. Monitoring and enforcement of producer, collector, and recycler responsibilities.

6.1.2 Material flows

There are generally 3 sources of WEEE in Egypt which are:

1. Households
2. Businesses
3. Governmental institutions

The largest volume of WEEE is in households, however the largest concentration is in businesses and governmental institutions where the current practice is to conduct auctions for selling WEEE to collectors and dealers. The high concentration of WEEE at businesses and governmental entities makes collection relatively easier as there are sufficient volumes to incentivize collectors and also high willingness from the generators to get rid of their waste. Collection systems from households on the other hand have generally faced three main challenges.

1. No sufficient incentives for households to release their WEEE.
2. Lack of convenience- efforts for take back through drop off points have suffered from limited number of drop off points making it inconvenient for consumers.
3. High unit costs for collectors to collect from households since WEEE is geographically dispersed and is of low volume per household.

An EPR system could potentially address these challenges and lead to higher volume of collected waste from households.

There are three different options for collection mechanisms which are not mutually exclusive but could be utilized collectively.

Retailers take back schemes

There are currently several initiatives in Egypt where retailers are attempting to collect EoL products from consumers. The most recent initiative is the initiative of E-Tadweer where telecommunication operators and mobile phone devices' retailers are taking back mobile phones in selected stores in exchange for discounts and financial incentives (www.etadweer.com). While this initiative is still in a nascent phase, it is clear that there are a number of challenges being faced. With only a limited number of retailers and selected stores participating convenience would is a hinderance to collecting large volumes. In addition, it appears that the incentives being provided are not sufficient to entice consumers to return their EoL products. Furthermore, the cost of logistics is currently being covered by a developmental project, such as the cost of transportation from retailers to the recycling centres. This cost will be covered for 3 months only which will put the sustainability of such initiatives at risk. A regulated EPR system could however address some of these challenges. First, by ensuring that all retailers are participating to fulfil the targets which would be set by an EPR system the convenience aspect could be addressed with a higher probability that consumers would find a drop off point near to them. Secondly, financial flows within the system could allow for higher incentives for consumers thus leading to higher collection rates.

Direct collection from Households

As mentioned earlier, the main challenge facing collection from households would be the cost of logistics for the collector. The number of units per household is low and the geographic dispersion does not make collection economically viable for most collectors. One way of addressing the issue of costs is to develop synergies with entities which are already engaging in collection of various other items from households. Large charitable organisations for example have logistical fleets which cover the whole country to collect various items and donations from households. These items include used clothing items, scrap items, used paper etc. If a cooperation protocol could be developed between WMRA and some of these charitable entities allowing them to become certified collectors of listed products this could potentially lead to much higher collection rates. These organisations would then deliver the items to certified recyclers for a fee covering their costs. This fee would be covered by subsidies provided to the recyclers through WMRA as will be described in the financial flows section.

One important aspect to note here is the driver for households in dealing with such entities is often charitable and hence financial incentives are often not sought after or required in these transactions. The dynamics of these transactions are hence different than the ones in takeback systems through retailer drop off points where some level of incentive to the consumer would likely be required.

This option does not preclude other collectors collecting from households. Small collectors who are certified by WMRA would certainly be eligible to be part of the system if they could comply with certification requirements. These requirements should not be a hindrance to inclusion of small collectors specially given that there is a large number of small informal collectors currently rely on WEEE collection for their livelihoods.

Collection from Businesses and government entities

Institutional entities and businesses often hold auctions discard their old hardware when they need replacement. This process takes place frequently as large companies renew their IT equipment on regular basis. This process has been problematic in the past with no clear eligibility criteria for participating in these auctions and waste being accessed by those who might not be qualified to handle it in a sound manner. A requirement by WMRA that those participating in these auctions be certified recyclers or collectors is essential for ensuring a degree of control on the material flows. Those who eventually succeed in these auctions also have a duty of to report to WMRA on where the material ended up and how it was safely recycled. This information would be corroborated by the certified recyclers. This is an essential pre-requisite for the disbursement of subsidies to collectors and recyclers.

It is also crucial that businesses and governmental entities should not be allowed to use consumer take back drop off points since this would put unnecessary burden on these points. An overview of collection mechanisms is presented in Figure 2.

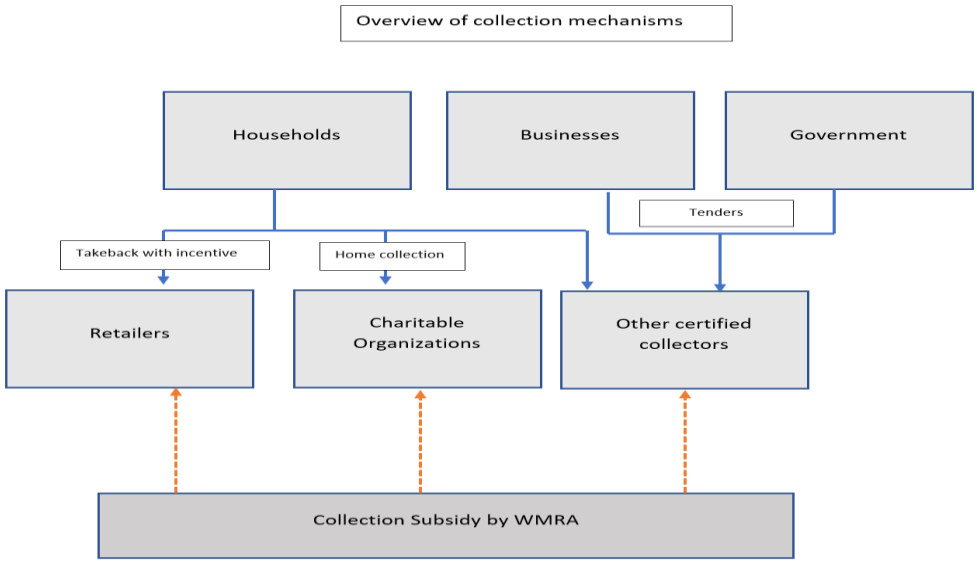

Figure 2: Collection Mechanism.

6.1.3 Financial flows

As mentioned previously ICT products are largely imported with limited local production if any. This leaves the ports of entry and the respective customs authorities with a major role to play in an EPR system. In addition to custom duties, the Egyptian Customs Authority (ECA) commonly collects fees on behalf of other entities and transfers these amounts subsequently. This is usually done through a co-operation protocol between the ECA and each respective entity. It would be essential for WMRA to have this cooperation protocol with the ECA to facilitate financial flows of the EPR fee.

ECA has recently introduced an Advanced Cargo Information (ACI) electronic registration system. This system requires that all importers register the details of their cargo at least 48 hours before being shipped from the export country and have all customs duties calculations done automatically on the system. The stated objective of the system is to identify any products which could pose risks to Egyptian society. This advanced notification system for customs procedures would hence be extremely beneficial and central to the success of the proposed EPR scheme.

The proposal is that importers, as the producers for the selected priority products, would be identified at the time they enter their shipment details on the ACI system. Once the cargo has been identified to include products subject to the EPR scheme the importer would be required to enter further details to be defined by WMRA and would have his EPR fee calculated based on the number of units being imported. The fee would be collected by the ECA which in turn would transfer the collected amount to WMRA as per the cooperation protocol between the two entities. This process could be fully automated through the ACI system. MCIT, which has played a role in the setting up of the ACI system, has indicated that technically this would be a simple process of integrating WMRA requirements on the system and would not require complicated changes.

Figure 3: Simplified financial flows. below depicts how financial as well as information flows would work between WMRA, ECA and the Producer.

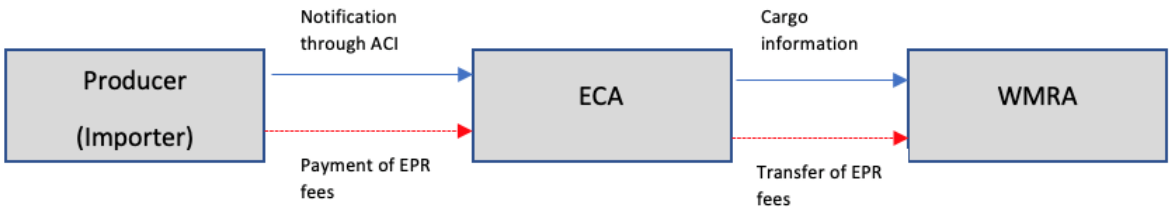

Figure 3: Simplified financial flows.

6.1.4 Determination of the EPR fee

When deciding how to set EPR fees a full understanding of full net costs for collection, transportation, recycling, and disposal is necessary. Full net costs include costs of investments in infrastructure and also takes into account the value within collected waste. There are various methods for determining these costs which could include an independent evaluation and also negotiations and discussions with stakeholders. Regardless of the method chosen, transparency regarding the fee, its structure and how it is calculated is essential to ensure the buy-in from producers. It is also important to note that costs for the sound management of WEEE include also other indirect and administrative costs which should be taken into account. These include costs for public awareness, administrative costs for managing the EPR scheme, cots related to monitoring and enforcement, and they are typically in the range of 5-10% (EPR policy Highlights, OECD 2019).

As mentioned in the roles and responsibilities matrix the responsibility for establishing the fee should be left to NEC. This would ensure transparency in decisions on fee determination and would avoid putting WMRA In the difficult position of being the fee setter and the fee collector at the same time.

The most common model for fee determination would be to charge a flat fee per product unit. This would effectively mean that producers would be paying a fee based on their market share. The fee should be determined based on the total cost of safe collection treatment and disposal of EoL products.

While it is beyond the scope of this report to determine the exact costs of the collection treatment and disposal. Table 7 provides range of fees that could be set per product type based on benchmarking with other countries as well as anecdotal evidence from collectors and recyclers in Egypt.

Table 7: Possible EPR fee ranges and potential revenue.

Product	Volume (Million units)	Fee Range (LE/unit)	Low Estimate (Million LE)	High Estimate (Million LE)
Mobile Devices	14.9	10-15	140.9	223.5
PCs and Laptop	1	25-35	25	35
Routers	1.5	10-15	15	22.5
Servers	0.03	20-25	0.6	0.75
HCP	0.01	15-25	0.15	0.25
Other	0.01	5-10	0.05	0.1
Total			181.7	282.1

6.1.5 Disbursement of collected fees

The amounts collected by WMRA should then be used to finance the following activities

1. Providing incentives (subsidies) to recyclers and collectors
2. Financing part of the discounts being given by Producers to consumers to return their EoL products. This would be based on agreements drawn between retailers and WMRA.
3. Financing public Awareness Campaigns to inform the public about the new system.
4. Covering costs related to administration, monitoring and enforcement.

An example of how a typical budget for WMRA could look like is presented in Table 8.

Table 8: Possible EPR budget for WMRA.

Item	Amount (Millions LE)
Recycling and collection subsidy	152
System Administration	18
Awareness Raising	10
Auditing	1.5

There could be two options explored for WMRA to manage its relationship with collectors and recyclers.

Subsidy model:

In this model WMRA would incentivise certified Recyclers and/or collectors based on volumes of waste collected and recycled. Collectors and recyclers would submit to WMRA quarterly reports indicating the volumes they handled and following a verification process by WMRA a subsidy per unit and type of product would be provided by WMRA. WMRA here has a choice to only deal with certified recyclers who would in turn pass part of this subsidy to collectors when buying the waste from them or subsidise both collectors and recyclers. The challenge with providing incentives directly to both collectors and recyclers would be the administrative burden on WMRA to deal with a large number of actors, while the benefits would be to ensure a higher degree of control and also to avoid exploitative practices between recyclers and collectors.

Contractual model:

In this model WMRA would enter into contractual agreements with a set of certified collectors and recyclers to collect and recycle specific amounts for a specific fee. These contracts could be based on total volume and performance targets. There are a lot of similarities between the two options, but contracts usually offer higher degree of control and clarity and gives WMRA the space to include specific conditions and requirements for each contract to achieve a specific set of objectives or targets.

Figure 4 summaries how the various flows could work for the WMRA managed EPR system.

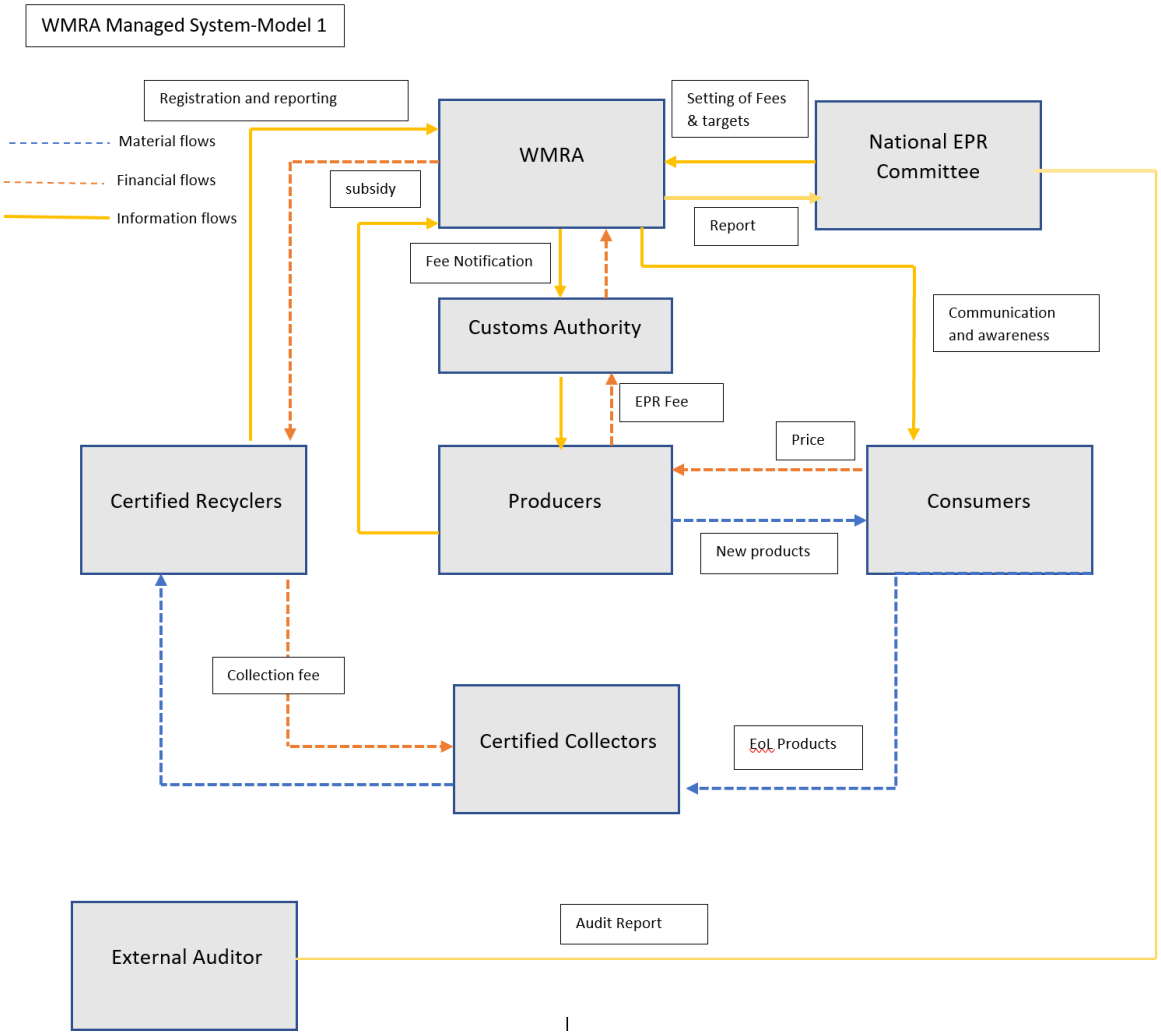

Figure 4: WMRA managed EPR system.

6.2 Option2: Producer Managed System

With the requirement of the waste management law that financial flows from EPR go through WMRA as one of its revenue streams, it is difficult to envisage a pure producer responsibility organisation (PRO) model where WMRAs role would be solely regulatory and limited to setting targets and enforcement. Nevertheless, a hybrid model where producers assume more than just the financial responsibility could be explored.

Figure 5 below depicts how flows for such a system could work.

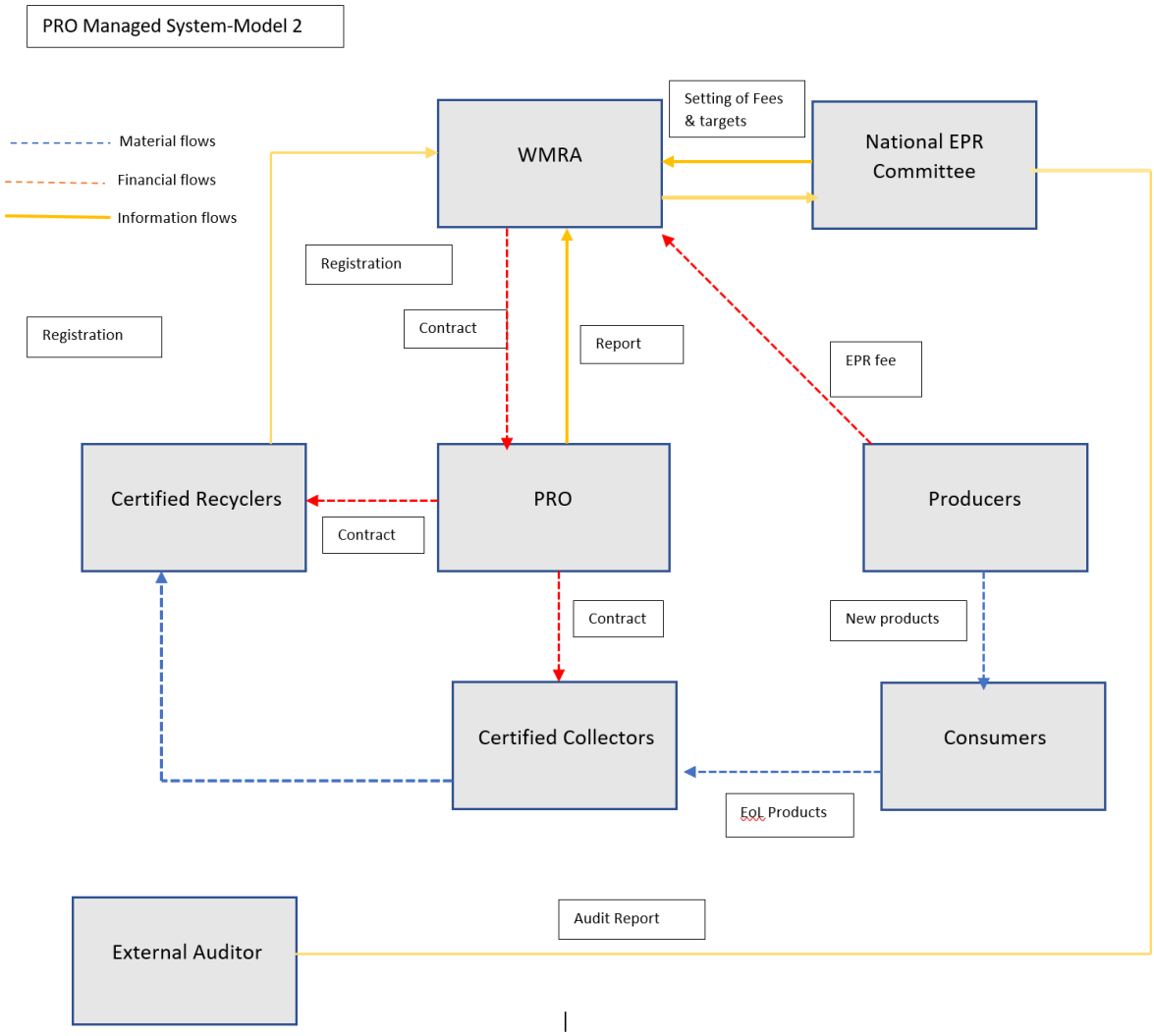

Figure 5: PRO EPR model.

6.2.1 Roles and responsibilities

The main feature of such a system would be that WMRA following the collection of the EPR fee would contract out an entity which fulfils the obligations of producers on their behalf. It is preferable at this nascent stage of implementation to ensure that it is only one entity rather than giving the options to producers to choose multiple entities as this would further complicate the system and WMRA initially might not be able to deal with multiple entities. This entity would then replace WMRA in its contractual arrangements with collectors and recyclers and hence would be responsible for organising the logistical arrangements. WMRA could then retain part of the EPR fee to cover its monitoring and administration functions while passing all other proceeds from the ECA to the designated PRO. Other responsibilities within the system would remain fairly the same with the NEC determining the EPR fees and setting the objectives and targets.

6.2.2 Information flows

The main distinction within this model would be that WMRA's role would not entail multiple communication channels with recyclers and collectors. WMRA could still retain the role of certifying collectors and recyclers, but these recyclers and collectors would then be reporting to the PRO not WMRA in

relation to the fulfilment of the targets. WMRA would not need to receive reports and feedback from each individual recycler or collector but rather would only be in direct communication with one entity which has the duty to fulfil the targets and obligations. From an administrative perspective this could be easier on WMRA to implement given that WMRA is still a nascent organisation with limited capacities.

With regards to public awareness and communication, typically this should also be the responsibility of the PRO but potentially WMRA could also play a role in this area while also retaining part of the fee to cover this cost.

WMRA would continue to report to the NEC on the fulfilment of the targets.

6.2.3 Material flows

There would be no major changes in the material flow in a PRO managed model. Similar collection modalities could be used while the only difference would be that it would be left to the PRO to decide what options to utilise as long as it can fulfil the targets set by WMRA.

6.2.4 Financial flows

EPR fees could still flow through the ACI mechanism described in option 1. However, in terms of the disbursement of the fee the bulk of the amount should be disbursed to the PRO through its contract with WMRA. WMRA will not be contracting or subsiding each individual recycler or collector and hence it should only retain a small part of the administrative fees envisaged in option1. The retained fee could cover both monitoring activities, a share of the public awareness budget and also the external auditor.

7 Conclusions and Recommendations

The two models presented above share a lot of the basic tenants but only differ in implementation modalities. In fact, Model 2 cannot be described as a pure PRO model mainly because producers are not contributing financially directly to the PRO but rather to WMRA which in turn subcontracts some of its function to another entity. This entity would be responsible for fulfilment of the obligations and targets on behalf of producers but the link with producers would be weak. Table 9 below summarises the pros and cons of each model.

Table 9: Pro and Cons of EPR Models

	Model 1 – WMRA managed	Model 2 – Producer managed
Pros	▪ Provides WMRA with more control over the system and its implementation. ▪ Offers WMRA more opportunities to learn and grow as an institution. ▪ Gives WMRA the flexibility in the allocation of resources and disbursement and hence adjust to shifting priorities	▪ Easier to administer by WMRA as it only deals with one PRO. ▪ More in line with WMRAs role as a regulator only, not involved in operational aspects. ▪ Allows producers to share more than just the financial responsibility and be more involved in the achievement of targets.
Cons	▪ More burden on WMRA to manage the system and have oversight over recyclers and collectors. ▪ Might raise questions about the role of WMRA as a regulator and why it is engaged in operational aspects. ▪ With limited involvement of producers there could be no desire or incentive for producers to engage fully or to contribute to the success of the system. e.g., through changing product designs, or setting up takeback collection points)	▪ Raises questions about the need to provide the EPR fees to WMRA rather than directly to a PRO. ▪ Difficulty in assigning the PRO entity, producers could find it difficult to agree and organize. ▪ With producers providing the fee to WMRA they might not have an appetite to set up or contribute to another entity.

Regardless of what option is preferred, there are a number of success factors which need to be taken into account for the EPR system to achieve its desired objectives. Those factors are demonstrated in Figure 6 below:

Figure 6: Success factors for the EPR system.

In both options WMRA has significant responsibility and hence it must ensure that it possesses the minimum requirements in terms of capacities, resources, and operational procedures for the system to succeed. These prerequisites could be summarised as follows:

1. WMRA must set up a system to certify collectors and recyclers. Doing so requires sound technical knowledge of what is required and having clear objectives for the system. This system would also require investment in IT infrastructure and having sound and clear procedures.

2. WMRA should have the technical capabilities to monitor and enforce. This includes qualified human resources with staff capable and knowledgeable of WEEE recycling practices and technologies.

3. From a financial perspective and since WMRA would be collecting the EPR fee it needs to ensure that it can ring fence these payments in a special account or a fund to ensure that disbursement is only allocated to EPR implementation and no other expenses.

4. Related to point 3 full transparencies on the financial flows needs to be maintained and producers should be able to have confidence that the payments made have been allocated to EPR system implementation. This information should hence be shared in the annual report which should be accessible to both producers and recyclers.

5. A consultation process with all stakeholders to reach consensus on the system to be implemented is necessary. This will be described in more detail in the following section.

8 Next steps

The establishment of an EPR system is often a lengthy and complex process that requires a lot of deliberations and consultations. Nevertheless, there has been significant steps taken over the years to introduce EPR in the Egyptian context which has culminated in the waste management legislation 202/2020. The next step from a legislative perspective would be that WMRA drafts a proposal for the Prime Minister's decree for the Minister of Environment to present to the Prime Minister. However, since the legislation specifically requires that this presentation only occurs after consultation with stakeholders it is imperative that WMRA starts thinking about the format of the process and taking the necessary steps to undergo these consultations. Figure 7 below describes the necessary steps that should be taken until a decree is issued.

Figure 7: Process Steps for Setting up an EPR system for ICT Equipment

The following stakeholder's diagram (Figure 8) represents a proposal for the key groups which need to be consulted.

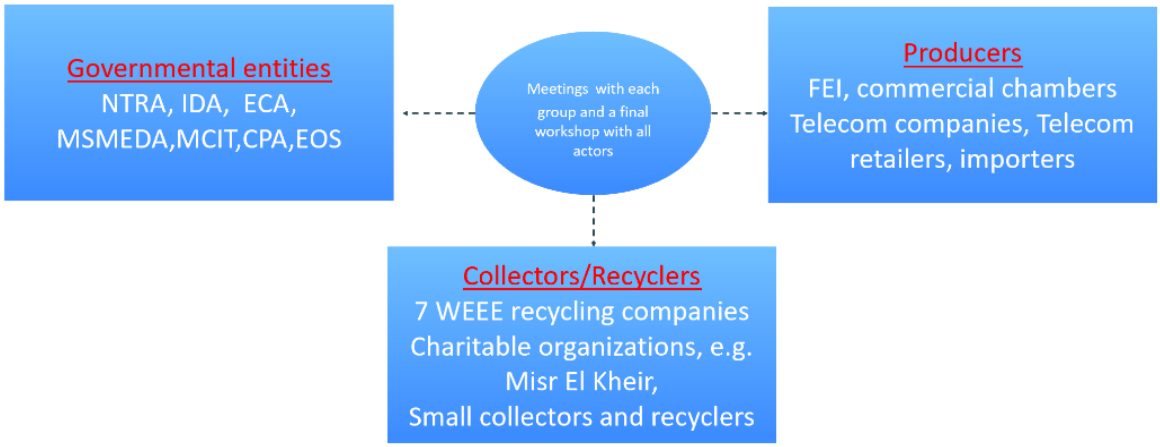

Figure 8: Stakeholder Consultation

In terms of structuring the consultation process one option could be to hold separate 1 or 2 meetings with each group separately to be followed by one large meeting where all 3 groups would attend. The objective of the meetings with each group is to reach consensus on the proposals in this report and make any necessary adjustments based on the feedback and input of each group. The final meeting would be mainly to present to the groups collectively the final output following any changes made to the proposal. Once the consultation process is finalised the process of drafting the decree could commence by WMRA.

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