Policy practices for e-waste management

Tools for fair and economically viable extended producer responsibility

Examples from African countries

Toolkit

This is an interactive pdf. You can use the icons at the bottom to navigate through the document.

WORLD ECONOMIC FORUM

ITU

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
Danida

About this toolkit

This is a toolkit for policy-makers. Its purpose is to provide national and local government with a guide setting out the requirements of a system for the management of e-waste. It considers the need for an all-actors approach and for the fair, inclusive and timely application of the extended producer responsibility principle. The report draws on experiences from developing countries and emerging markets, with a focus on emerging e-waste management systems in African countries.

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How to use this toolkit

Policy-makers are invited to use this toolkit as a pragmatic guide to formulate and strengthen e-waste management systems based on extended producer responsibility. The toolkit can serve as a reference for the entire system, or for the individual pillars of the system: business and finance, policy and regulation, technology and skills, monitoring and control, marketing and awareness. The toolkit is designed to support members of the African Circular Economy Alliance. ITU has developed this toolkit as part of its technical assistance to countries.

Table of contents

Use the icons to navigate the expanded toolkit's sections and its accompanying definitions.

Toolkit definitions

Carrier: A natural or legal person who transports hazardous wastes and other wastes by means of conveyance such as trucks, taxi, auto bus, aircraft, train, or ship.

Collector: A natural or legal person or organization that picks up or accepts discarded electrical and electronic equipment (EEE) from a consumer.

Collection: Includes the mixing, bulking and sorting of wastes and interim storage at an approved site or facility for hazardous wastes and other wastes as well as waste generated in small quantities.

Consumer: Any natural or legal person who acquires and is using EEE individually or in bulk.

Distributor: Any natural or legal person in the supply chain, who makes EEE available on the market.

Exporter: Any person under the jurisdiction of the State of export who arranges for hazardous wastes or other wastes to be exported.

Free-rider: A person or organization who benefits from the actions or efforts from another, in relation to an extended producer responsibility scheme without fully complying with the requirements of the extended producer responsibility scheme.

Generator: Any person whose activities or activities under his or her direction produces e-waste or if that person is not known, the person who is in possession or control of that e-waste.

Importer: Any person under the jurisdiction of the State of import who arranges for hazardous wastes or other wastes to be imported.

Informal sector: Any worker or economic unit carrying out economic activities along the e-waste value chain – in law or in practice – not covered or insufficiently covered by formal arrangements.

Manufacturer: An organization involved in the making or production of EEE either locally or internationally.

Producer responsibility organization: An organization authorized or financed collectively or individually by producers, which can take responsibility for the collection and channelization of e-waste generated from producers' products to ensure the environmentally sound management of such e-waste.

Producer: Any natural or legal person, established in a state, who manufactures or markets or resells electrical and electronic equipment (EEE) under his own name or trademark; places on the market of that state, on a professional basis, EEE from a third country or from another state; or sells EEE by means of distance communication directly to private households or to users other than private households in a state, and is established in another state or in a third country.

Registered recycler: A registered/licenced person or entity who processes e-waste to recover useful materials. Processing of e-waste may include appropriate depollution steps aiming at the removal of hazardous substances and components present in e-waste and its subsequent proper treatment and/or disposal.

Retailer: A person or organization that sells EEE to the public for use or consumption rather than for resale.

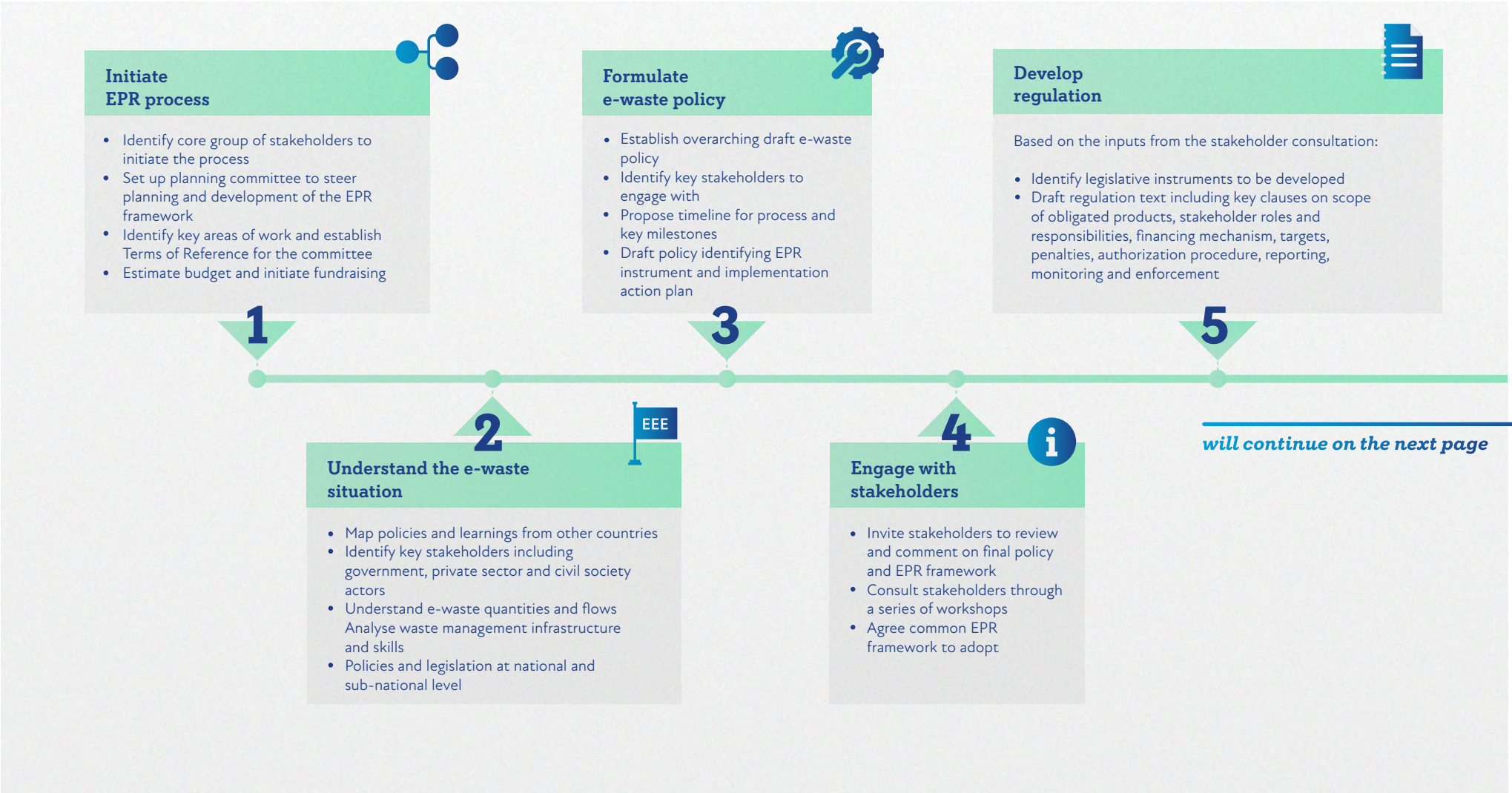
EEE and E-waste: EEE includes a wide range of products with circuitry or electrical components with a power or battery supply. EEE becomes e-waste once it has been discarded by its owner as waste without the intent of reuse.

Abbreviations

Acronyms/ initialisms	Meaning
ACEA	African Circular Economy Alliance
AfCFTA	African Continental Free Trade Area
AMCEN	African Ministerial Conference on the Environment
ATU	African Telecommunications Union
AU	African Union
CPR	Collective Producer Responsibility
DANIDA	Danish International Development Agency
EEE	Electrical and Electronic Equipment
EOL	End-of-life
EPR	Extended Producer Responsibility
EU	European Union
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
HCFC	Hydrochlorofluorocarbon
ICT	Information and Communication Technology
IPR	Individual Producer Responsibility
ITU	International Telecommunication Union
IWMP	Industry Waste Management Plans
KES	Kenyan Shilling
KPI	Key Performance Indicator
MoU	Memorandum of Understanding
NGO	Non-Governmental Organization
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
PCB	Polychlorinated Biphenyl
PCB	Printed Circuit Board
PPP	Public-Private Partnership
PRO	Producer Responsibility Organization
REC	Regional Economic Community
SDGs	Sustainable Development Goals
SME	Small and Medium-sized Enterprises
UNEP	United Nations Environment Programme
UNU	United Nations University
USD	United States Dollar
WEEE	Waste Electrical and Electronic Equipment
WEF	World Economic Forum
XAF	CFA Franc (BEAC)

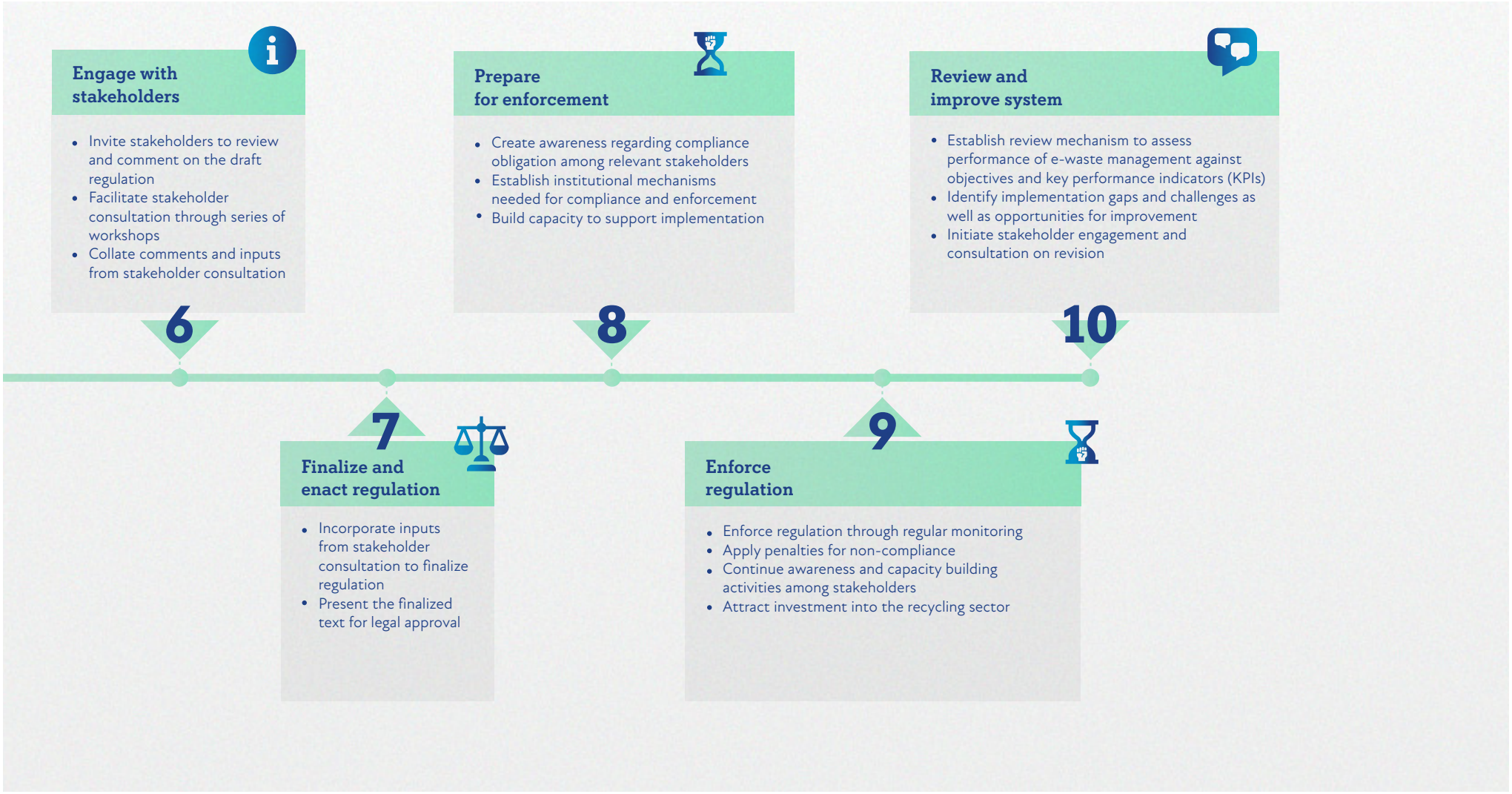
1. A timeline

How do you develop an extended producer responsibility framework?



1. A timeline

How do you develop an extended producer responsibility framework?



2. The scale of the challenge in Africa

2.9million
tonnes generated each year

USD3.2billion[1]
value of materials

According to The Global E-waste Monitor 2020, Africa generates 2.9 million tonnes of e-waste every year, yet a mere 1 per cent is collected or recycled officially. Some USD3.2 billion worth of raw materials are contained in e-waste generated in Africa. A huge amount of economic value is lost, and a cost is incurred for both the environment and society.

Official e-waste recycling facilities currently exist in several countries, such as South Africa, Rwanda and Nigeria but in tandem considerable informal sector activities remain.

The management of e-waste is "a matter of" increasing policy concern due to the growing amount of EEE and waste as a result of increasing urbanization, higher disposable incomes and industrialization, as well as digitization with a notable upsurge in Internet use and ICT devices.

What are African countries doing?

In 2019, 13 countries in Africa had a national e-waste policy, regulation or legislation in place. The majority of these incorporate the concept of extended producer responsibility (EPR), which is a policy approach growing in popularity globally. According to a report by the Organisation for Economic Co-operation and Development (OECD), there are about 400 EPR schemes in operation throughout the world, including ones for packaging and tyres, not just electronics.

Many emerging markets have analysed and adapted EPR approaches from Europe and Asia, while attempting to formulate tailor-made solutions and apply them to a local setting. Cameroon, Côte d'Ivoire, Egypt, Ghana, Kenya, Madagascar, Nigeria, Rwanda, South Africa and Zambia – the core case-study countries of this toolkit – all have policies for e-waste management, with a range of approaches.

The aim of all approaches is to organize producers of electrical and electronic equipment (EEE) and to systematize sustainable financing. Several regulatory approaches also stipulate the role of a producer responsibility organization (PRO) as a core function in e-waste management. In 2020, there were three registered PROs in Africa concerned with e-waste. The role of producers in African e-waste management remains relatively unclear, and traditionally the financial burden lies mainly with the public sector.

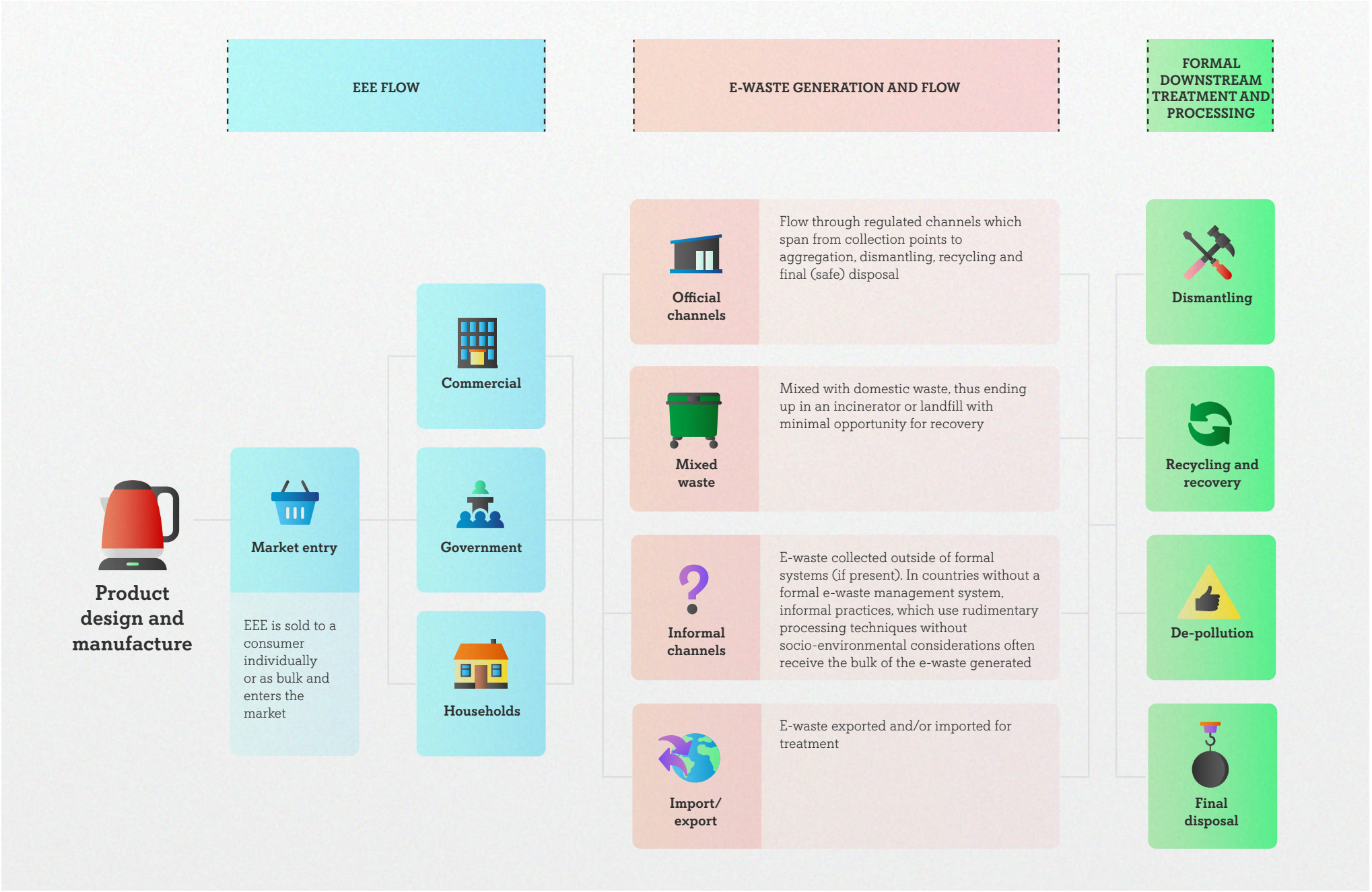
DEFINING EXTENDED PRODUCER RESPONSIBILITY

A policy principle to promote total life cycle environmental improvements of product systems by extending the responsibility of the manufacturers of the product to various parts of the entire life cycle of the product, and especially to the take-back, recycling and final disposal of the product.

L.1021 Extended Producer Responsibility – Guidelines for Sustainable E-waste Management.

[1] *The Global E-Waste Monitor 2020.*

Stocks and flows of e-waste



3. Expanded toolkit




1. Getting started	2. Building the system	3. Operating the system	4. Monitoring and reviewing
1.1 How could EPR work for you?	2.1 How does EPR work?	3.1 How do you implement EPR regulation?	4.1 How do you handle non-compliance?
1.2 What are the five pillars of a sustainable e-waste management system?	2.2 What does effective EPR regulation look like?	3.2 How do you build capacity in e-waste management?	4.2 How do you boost technical expertise and regional collaboration?
1.3 What baseline information is needed?	2.3 Which types of financing mechanisms work?	3.3 How do you generate public awareness about e-waste?	4.3 How do you continuously improve the system?
1.4 What are the phases of a sustainable e-waste management system?	2.4 How do you engage producers?		
	2.5 How do you build infrastructure and capacity?		

1. Getting started

1.1 How could EPR work for you?

EPR shifts responsibility for the product lifecycle onto producers, who are thereby incentivized to invest in more eco-friendly designs, or products that can be repaired, remanufactured or recycled.

Policy-makers must keep in mind, however, that producer responsibility is seldom borne solely by the producer alone, insofar as producers tend to add end-of-life (EOL) management costs to the price of the product. Therefore, the consumer also pays a slightly higher price.

Most EPR programmes worldwide are mandatory, and are implemented through two types of EPR:

individual producer responsibility (IPR)

Type of EPR	Advantages and disadvantages
Each producer is responsible for collecting and recycling their own products. Some pay a third party to do this work.	• The cost of e-waste management is not affected by the behaviour of competitors. • Directly promotes eco-design, since producers are incentivized to build in EOL. • Difficult for smaller producers owing to higher costs, low market share and lack of economies of scale. • A charge levied on product sales is used to subsidize the cost of e-waste management.

collective producer responsibility (CPR)

Type of EPR	Advantages and disadvantages
Producers collect and recycle products together, regardless of brand. CPR often involves a PRO, an intermediary that is paid by producers to ensure producers meet obligations and are supported with compliance. PROs are often not-for-profit organizations, governed by producers who come together to form a separate legal entity that collectively supports take-back and recycling.	• E-waste management is typically characterized by economies of scale, where joint schemes may be more cost-efficient. • Collective schemes are easier to administer for producers, regulators and consumers. • Dilutes incentives for eco-design, since the responsibility does not fall on a single producer. • A charge on product sales is used to cover the cost of e-waste management, ensuring the polluter pays principle.

For more reading on IPR vs CPR, please consult the ITU standard L.1021 Extended Producer Responsibility – Guidelines for Sustainable E-waste Management.

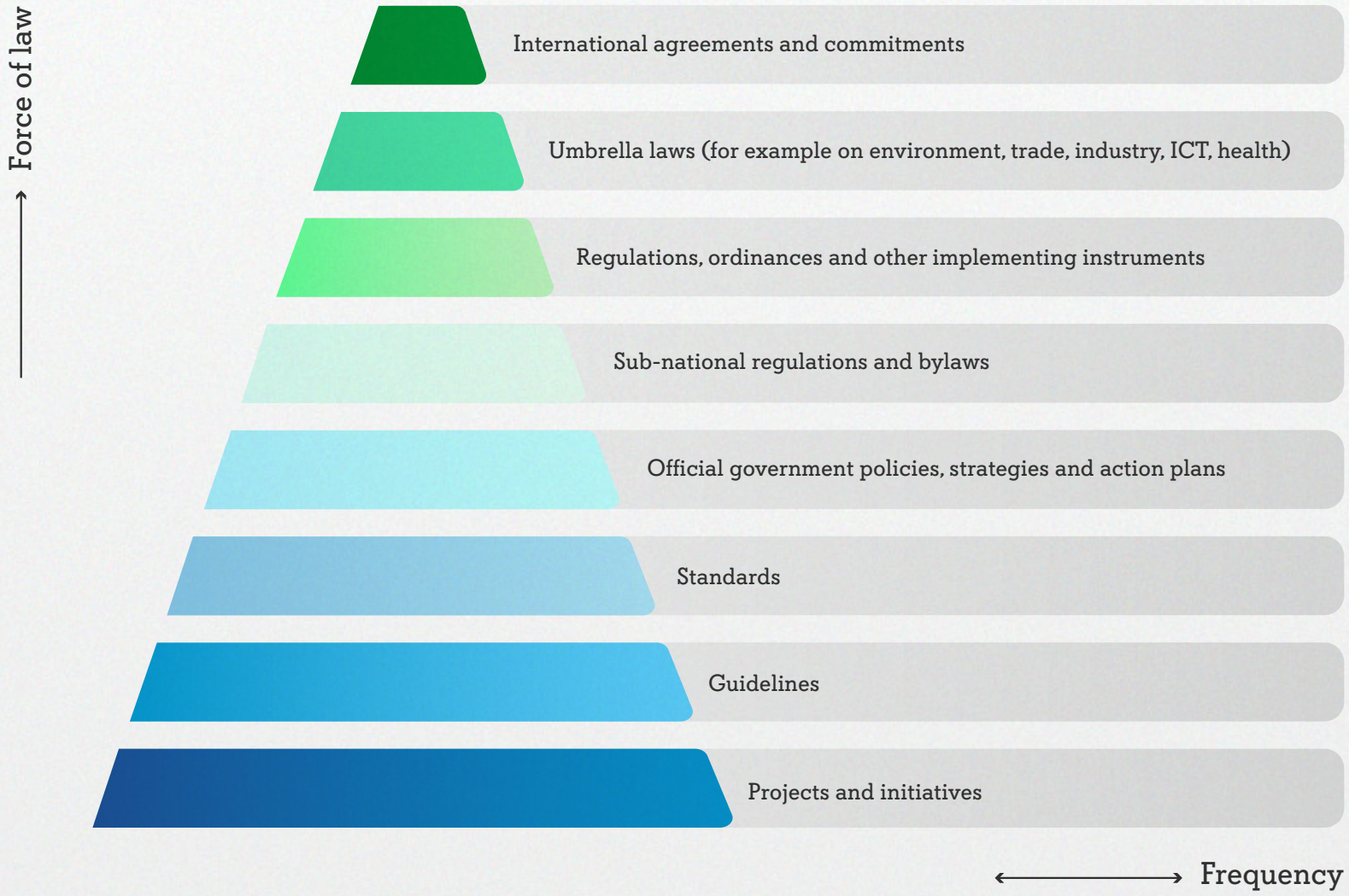
1.2 What are the five pillars of a sustainable e-waste management system?

The five principle areas

1.3 What baseline information is needed?

Mapping the current baseline situation for e-waste management in the country includes mapping existing policies and regulation that are relevant in the context of e-waste.

Hierarchy of system instruments



The first step is to map stakeholders

		WHY?	HOW?
WHAT TO MAP?	Policies and regulations	• To identify gaps in regulation and any instruments that have an influence on e-waste management. • To leverage on and align with any existing policies or regulations. • To determine what new policies and regulations could work. • To ensure new policies and regulations do not conflict with existing ones.	Mapping regulation and other legal instruments allows you to answer these issues: • Has the country ratified the Basel Convention? If so, how is this delivered in existing national law? • What are the policies or restrictions on hazardous waste and substances? • Are there any trade policies regarding the import or export of EEE/e-waste? If so, what product categories do they cover? • Can existing policies set the scene for new regulations covering EEE/e-waste? • Have there been any past efforts to implement EPR for e-waste or other waste streams?
	Stakeholders	• To identify individuals, groups and organizations who influence and are impacted by policies and regulations. • To understand how these relevant stakeholders can be engaged, and to what extent. • To create awareness about the stakeholder process in the development of the policy or regulation.	• Make a stakeholder list to include a broad range of actors, and a short list of the key actors and their representatives. • Categorize stakeholders in term of how interested they would be in EPR and how much influence they would exert. An interest-influence matrix can help. • Positions on the matrix can help you prepare an engagement plan for each stakeholder.
	E-waste quantities and flows	• To establish the scale and scope of the e-waste volumes. • To establish baselines and identify hotspots. • To develop pragmatic targets for the EPR scheme.	• Begin mapping EEE product flows and generation of e-waste, as well as e-waste imports. The E-waste Statistics Guidelines published by the United Nations University (UNU) provide a useful reference. • The volumes of EEE/e-waste handled can be estimated using proxy data from government or other institutions. • To request support with collecting e-waste data, visit globalewaste.org.
	Existing infrastructure and skills	• To take stock of the existing infrastructure and value chains, both formal and informal. • To assess capacity and skills in collection, dismantling and recycling as well as broader system management. • To identify areas of social or environmental concern that needed to be addressed. • To identify ways of formalizing the informal sector.	• Engage with formal and informal recyclers to understand their e-waste management processes and gauge their knowledge of safe and efficient recycling. • This can help map the e-waste management landscape, with details on key locations, collection networks, volumes handled, and methods used to deal with e-waste. • Understand the reach and challenges of the informal sector by engaging with knowledgeable stakeholders involved in social development (e.g. NGOs, academia, ministries of labour).

1.4 What are the phases of a sustainable e-waste management system?

From planning to review

1. Planning	» A legal framework covers the administrative, technical, social and economic aspects of the environmentally sound management of e-waste. » Planning instruments are designed at this stage to govern the system, as are financing mechanisms; this includes the institutional framework for implementation, regulation and monitoring of the system. » Key stakeholders are involved in the design of policy or regulation and of planning instruments.
2. Implementation	» Sector stakeholders carry out responsibilities set forth in the regulation. » The regulatory authority ensures the enforcement of the regulation. » Enforcement is necessary to jumpstart the system and ensure a level playing field for all stakeholders, but initial teething troubles should be ironed out through clarifications and guidance documents. » Capacity building and awareness generation are crucial at this point.
3. Monitoring	» All parts of the value chain should operate in accordance with the regulation. » Applying end-to-end monitoring, covering the whole EEE product lifecycle, serves to provide a comprehensive view and identify gaps and problems. » Monitoring protocols can include specific performance standards and indicators that are tracked by regulatory agencies.
4. Review	» Depending on the outcome of the monitoring, regulations can be reviewed and adjusted. » If EPR schemes set overambitious targets, hefty taxes or fees, as well as cumbersome compliance documentation, they can be amended in this phase so as to make the scheme more realistic. » Building in a review process allows for corrections and adjustments for local markets so that schemes can be continuously improved.

Stakeholder roles

NATIONAL GOVERNMENT (MINISTRIES, DEPARTMENTS AND AGENCIES)	
Group	**Key roles**
Environmental protection	• Enforces regulation often through a national agency and oversees implementation of policy or regulation.
Finance, revenue, customs	• Determines the financing mechanisms to govern e-waste management and outlines the import duties for EEE/e-waste.
Health, awareness, education	• Supports awareness raising activities, capacity building and training programmes.
ICT growth and governance	• Collaborates closely in the formulation of e-waste policy and regulation, implementation and enforcement.
Labour rights and conditions	• Provides guidelines on occupational health and safety for actors in the e-waste management system. • Supports the transition of the informal sector into the formal sector.
Trade and commerce	• Supports the tracking of EEE producers that are active in the country that are putting EEE onto the market, registering companies and keeping records where necessary.
Data and statistics	• Collects data on EEE put on the market in the country in a given year and identifies from where to collect this information. • Creates a comprehensive data source nationally that comes from public or private-sector-led monitoring and measurement.
Standards, guidelines and conformity	• Develops national standards relevant to the role of supporting the implementation and enforcement of regulation.
Public works, facilities and transportation	• Oversees the logistical requirements of transporting e-waste between different locations and the infrastructure in place to serve this. • Ensures that all e-waste generated by governmental institutions is adequately managed.

Stakeholder roles

LOCAL GOVERNMENT	
Group	**Key roles**
Municipality	• Prepares local laws for the environmentally sound management of toxic substances and chemical wastes, including e-waste. • Ensures that local communities are equipped with the appropriate collection infrastructure including local drop-off points for e-waste.

NON-GOVERNMENTAL	
Group	**Key roles**
Academia	• Supports capacity building and the adoption of best practices and developments in the sector internationally. • Conducts local and national research to ensure a science-based approach is taken for determining policy decisions.
Non-governmental organizations	• Creates synergies across borders to accelerate the sharing of international best practices. • Encourages innovation growth and provides support to those establishing e-waste management businesses, especially entrepreneurs and small and medium-sized enterprises (SMEs).
Consumers	• Takes onboard awareness and marketing around the responsible disposition of e-waste. • Complies with local laws on the bring-back of e-waste and prohibits the disposal of e-waste outside of formal facilities. • Reuses or repairs EEE before bringing it back for recycling and final disposal.

PRIVATE SECTOR	
Group	**Key roles**
Brands and original equipment manufacturers	• Collaborates and coordinates with their supply chain to ensure that registration with the relevant authority is done for those importers and distributors putting EEE on the market in a jurisdiction on their behalf.
Dealers, importers and distributors	• Collaborates and coordinates with brands and original equipment manufacturers (OEMs) to ensure registration takes place with the relevant authority when putting EEE on the market in a jurisdiction.
Retailers	• Creates awareness and marketing for their staff, customers and for consumers, around the responsible disposition of e-waste. • Provides accessible and free e-waste drop-off locations for consumers.
Collectors, dismantlers, repairers and recyclers	• Supports and advises in the development of EPR regulation and the fee setting for the EPR system for e-waste management at the national and regional levels. • Adheres to environmental permitting and environmental impact assessment regulations.

2. Building the system

2.1 How does EPR work?

Scoping an EPR framework

There are a range of policies and regulations for e-waste management. They can be implemented concurrently. OECD categorizes them into four groups:

1. Product take-back policies that require the producer or retailer to collect the product at the post-consumer stage.
2. Economic and market-based instruments that are imposed on producers to fund the collection, recycling, treatment and disposal of e-waste.
3. Regulations and performance standards to be respected by the producers. These can range from collection or management targets to eco-design product standards.
4. Accompanying information-based instruments aiming to bolster EPR by raising public awareness.

Policy instruments provide the EPR framework; but they then need to be leveraged through an EPR scheme organized by producers, which the latter are obliged to comply with by law.

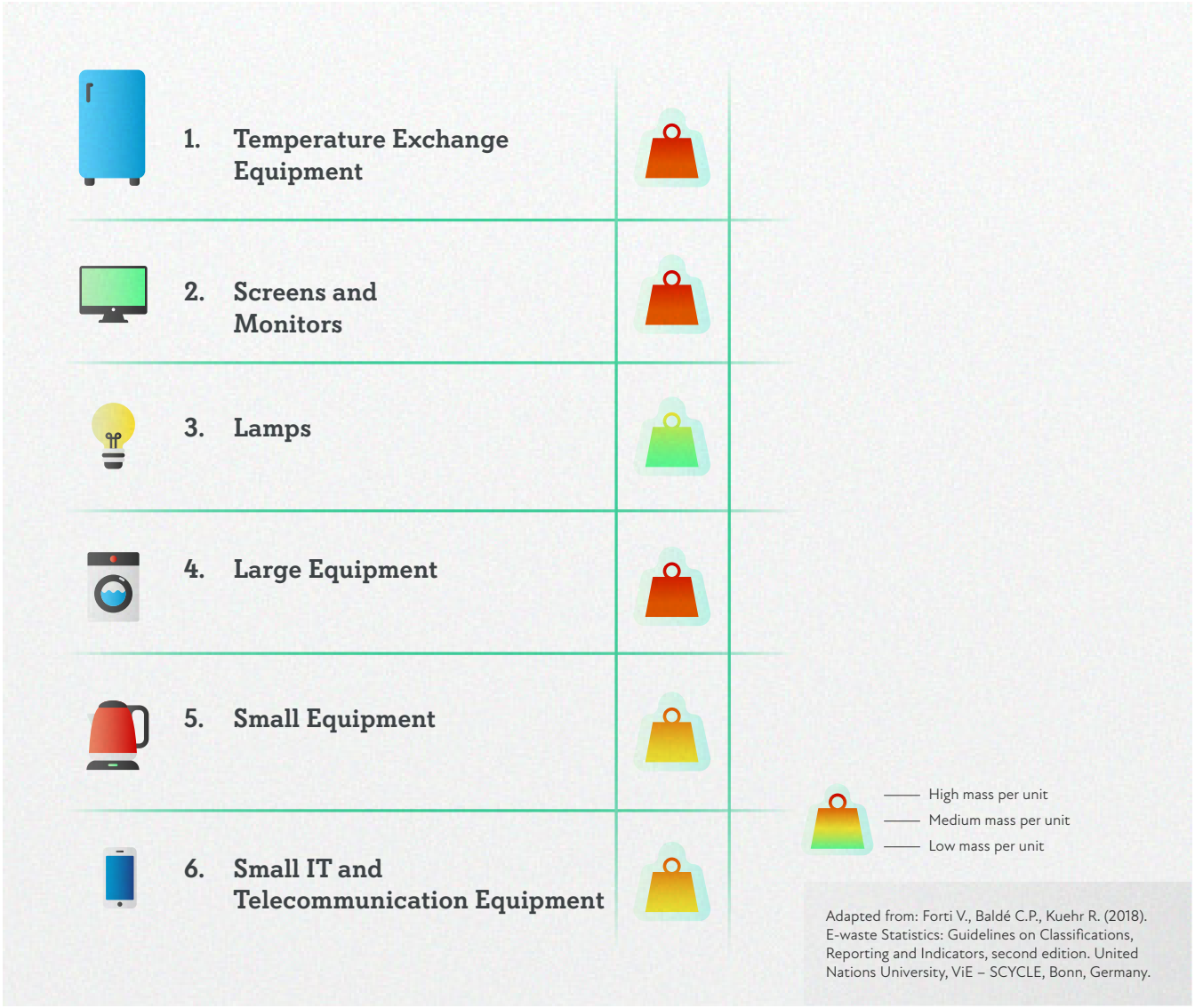
Designing an EPR scheme

The design of an EPR framework varies according to a number of factors:

- **Products covered:** The policy covers different types of products and producers. One option is to include all types of EEE. The other option is to focus on a few types of problem EEE to start with, and expand over time. Regulation should be cognizant of new and emerging EEE, such as off-grid solar power.

The currently most popular method of product classification is shown in the table. While countries may choose to follow a different categorization, or introduce sub-categories, following this system helps to ensure regional and global harmonization.

EEE and e-waste categories



Adapted from: Forti V., Baldé C.P., Kuehr R. (2018). E-waste Statistics: Guidelines on Classifications, Reporting and Indicators, second edition. United Nations University, ViE – SCYCLE, Bonn, Germany.

- **Nature of the scheme:** Instead of being mandatory, an EPR programme can be a voluntary agreement with industry. However, the eventual intention should be to compel all producers to comply, not just a proactive few.

- **Producer coverage:** Individual producer responsibility (IPR) schemes are mainly applied in business-to-business contexts. In most EPR schemes, however, collective producer responsibility (CPR) is preferred. CPR schemes are usually operated through a producer responsibility organization (PRO) that carries out EOL collection and/or recycling of EEE on behalf of its members. The policy should nevertheless make provision for producers to be able to implement IPR, as it encourages eco-friendly product design.

- **Types of responsibility:** The responsibility for waste management imposed on producers may be either financial or organizational, or both. In the first case, producers pay fees to the government, which remains in charge of waste management (usually collection), while recycling is outsourced to specialist contractors. In the second case, producers finance and organize waste-management operations themselves through contracts with recyclers, often through a PRO.

- **Allocation of responsibility among stakeholders:** While EPR schemes shift the burden of waste management to producers, there are still other stakeholders in the system whose responsibilities need to be clearly articulated.

- **Cost coverage:** The EPR scheme has to deal with two key financial considerations: first, how to calculate costs of EOL management of EEE under EPR, and, secondly, whether producers bear the full costs, or whether the cost is shared among a specific set of stakeholders.

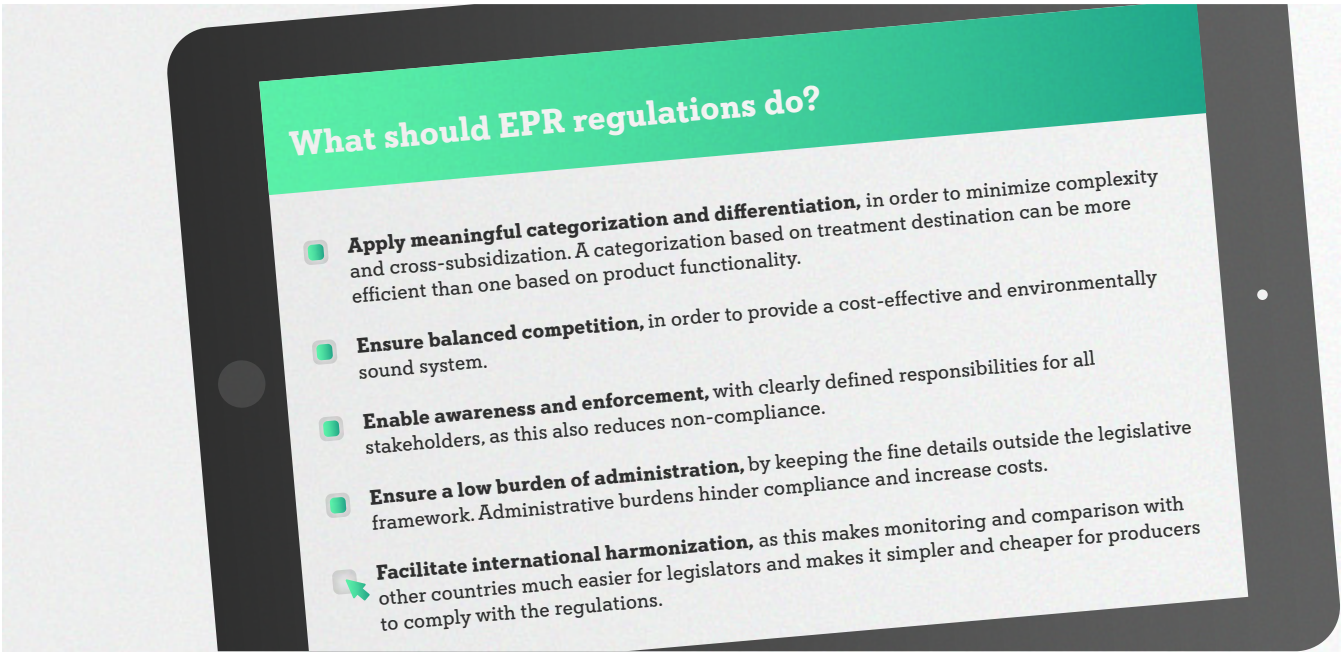
2.2 What does effective EPR regulation look like?

If it is to function properly, act as an incentive for compliance and foster the economic development of a thriving circular economy, formal e-waste management requires regulation. Complex legal instruments lead to confusion among stakeholders. Passing clear regulations is thus key.

EPR regulation requires an intensive consultation process that requires bringing on board, not just producers, but all players within the entire value chain, including the informal sector, whilst striving to find a balance between economic, social and environmental benefits.

Sharon Mogomotsi, Director, Department of Environmental Affairs, South Africa.

Checklist for effective EPR frameworks



CASE-STUDY: AMENDING RULES TO RELAX TARGETS IN INDIA

India introduced the E-waste (Management) Rules in 2016, repealing the previous rules for the sector (which had been in force since 2012). The 2016 rules were then amended two years later in order to rationalize the high targets that had been set and to support greater flows into the formal system.

Changes included:

- Collection targets were revised to 10 per cent of annual generated waste with an annual 10 per cent increase until 2023, instead of the original 30 per cent of generated waste with a biennial 10 per cent increase until 2023.
- Producers new to the market who were previously not obligated were also brought into the purview to avoid free riding.

Choosing the right regulation

If there is no pre-existing legally binding instrument, then the first key document to develop is a national e-waste management policy. A policy will establish a national vision and will create interactions among stakeholders across the value chain. The policy must be an actionable document. It must have an implementation action plan that allows for more targeted and timely guidance for the sector.[2]

Building robust definitions

Regulation must contain clear and easy-to-understand definitions. Where regulation is underpinned by EPR, explicit definitions encourage producer engagement. A lack of clarity leads to misinterpretation. It can be helpful to consider definitions that are already internationally recognized.

For instance, the definition of a 'producer' in EPR policy can be challenging. Who is a producer of e-waste? In countries in Africa it is likely to be an importer, distributor or retailer, as it is they who bring EEE products into the country and should thus be responsible for their EOL management. International agencies and organizations working on e-waste have formulated definitions that can be used as a foundation for building robust national definitions.

It is useful to apply learnings from other waste or hazardous material management approaches that are already in operation in the country, such as for plastic packaging. Such experience provides an insight into both strengths and challenges for implementing the approach for e-waste.

Key components of e-waste regulation

HOW MIGHT YOU DEFINE A PRODUCER?

A producer is any natural or legal person who, is established in the country and manufactures EEE under his own brand name or trademark, or has EEE designed or manufactured and markets it under his name or trademark within the country; is established in the country and places imported new or used EEE on the market for sale or personal use; is not established in the country and is registered with a locally, legally approved authorized representative and sells EEE by means of distance communication into the country.

StEP: One Global Definition of E-waste

[2] *Policy document format depends on the government guidelines of each country.*

CASE-STUDY: DEFINING PRODUCERS IN GHANA

In 2016, Ghana passed the Hazardous and electronic waste control and management act (Act 917) and the Hazardous and electronic waste control and management regulations (LI 2250). Initially the system faced challenges posed by definitions. Ghana is a net-importer of EEE, which is brought in primarily by importers and distributors. Thus, manufacturers themselves are not practically responsible for their products entering the Ghanaian market. Initially, the limited definition of a 'producer' meant that the vast majority of actual 'producers' were not covered by regulation.

CASE-STUDY: AFRICAN EXAMPLES OF DEFINITIONS OF PRODUCERS

The following are examples of definitions of producer from regulations that were either in force or in draft form in 2021.

Nigeria: Referred to as the entity (which may include, but is not limited to, the brand owner, manufacturer, franchisee, assembler, distributor, retailer or first importer of the product) who sells, offers for sale or distributes the product. It also includes the local manufacturer or importer of new and used EEE to be placed on a national market at first invoice by sale or donation. A producer can be a legal or natural person.

South Africa: Referred to as any person or category of persons or a brand owner who is engaged in the commercial manufacture, conversion, refurbishment (where applicable) or import of new and / or used identified products as identified by the Minister by Notice in the Government Gazette in terms of section 18(1) of the Act, and a producer includes, where relevant, the same as defined in the specific section 18 Notices for each of the identified products as gazetted by the Minister in terms of section 18(1) and (2) of the Act.

Kenya: Referred to as an entity that introduces goods, products and packaging into the country using authorized means by manufacturing, importing, distributing, converting, selling or reselling.

Ghana: Ghana applies regulations in regard to manufacturers and importers of EEE, who are defined, respectively, as any person who assembles or produces electronic equipment in the republic and a person who, in the ordinary course of business, imports electronic equipment into the republic or arranges for hazardous waste or other wastes to be imported into the republic.

Rwanda: Referred to as any person or entity who introduces or causes to be introduced new and used EEE into the market by sale, donation, gifts, inheritance or by any such related methods and can either be a manufacturer, importer, distributor or assembler.

Madagascar: Referred to as polluter and payer and any person who manufactures, ships, imports or introduces EEE on the national market in a private and professional capacity.

Côte d'Ivoire: Referred to as any person who manufactures, imports or introduces EEE on the national market, on a professional basis, except where such equipment is sold under the sole brand of a reseller. In this case, the reseller is considered as a producer.

Cameroon: Referred to as any natural or legal person who manufactures, imports or introduces on the national market on a professional basis electrical or electronic equipment, unless this equipment is sold under the sole brand of a reseller. In this case, the reseller is considered as a producer.

Egypt: Referred to as any manufacturer, exporter or distributer falling under the product's extended liability system.

Zambia: Although not explicitly identifying them as a producer, Zambia's 2018 EPR regulations define the actor mandated to implement the regulations as a person who intends to manufacture, retail, import, trade or commercially distribute in Zambia.

CASE-STUDY: EXPERIENCE FROM OTHER WASTE STREAMS IN CAMEROON

Cameroon is party to numerous international conventions, including the Montreal Protocol on Substances that Deplete the Ozone Layer. In recent years, Cameroon has built a robust system to manage the import and control of products that use hydrochlorofluorocarbons (HCFCs). It has set up a "one-stop shop system" (Guichet unique) which verifies all shipments entering the country. A technical visa is signed by the National Ozone Coordinator and is issued to the importer to allow entry into the country. Cameroon is now in the process of implementing a similar system for all EEE and e-waste entering the country. Importers will have strict guidelines. The technical visa system for e-waste will include a fee of XAF 50 000 or USD91 to be paid at customs. There will be an inspection of incoming shipments and an examination of the importer's plan for EOL management of the imported products.

Setting achievable targets

The targets set in the EPR scheme influence the behaviour of producers, recyclers, PROs and other stakeholders. Lofty or unachievable targets can be a threat to the system. Even in the most mature e-waste system like that of the European Union (EU), target-setting has undergone a number of changes over the years, each with its pros and cons. It is in the interest of the country to carry out a target-setting exercise that is inclusive, by either holding forum discussions or inviting input from stakeholders who will be required to comply with the targets. There is no perfect method, so periodic feedback from stakeholders can be beneficial.

2.3 Which types of financing mechanisms work?

Sustainable financing matters because it determines how producers and everyone along the value chain interacts with the e-waste management system.

- **Advanced recycling fee** – Consumers are charged a fee at the point of sale of EEE. This mechanism transfers the cost of e-waste management to consumers, which can be an issue of concern for emerging economies, as it may affect local purchasing power. The amount of the fee transferred to the consumers is usually dependent on the product category.

- **Taxation** – Collected by the government or an authorized body. Some producers prefer this mechanism, since it minimizes their involvement, while others think it lacks transparency and may be impaired by the lack of technical expertise in government. The collected tax is often maintained as a fund (either a dedicated e-waste fund as in Ghana, or a general 'green fund' as in Rwanda).

- **Compliance fee** – This fee is paid by producers to the PRO to cover the cost of managing the e-waste generated by their products. It usually comprises two components – a standard registration fee that is paid on joining the PRO (and for renewal), and a producer-specific calculated amount.

Checklist of financial considerations

Typically, financing mechanisms need to cover the costs of:

- Waste collection, segregation and transfer
- Treatment and recycling and final disposal
- Monitoring and control of the EPR scheme
- Other framework costs:
  - » Public information and awareness campaigns
  - » Training programmes

Examples of how to finance e-waste management

	Who pays?	To whom?	For what?	When?
Definition	• Tax-payers • Consumers • Waste holders • Producers (EPR)	• The State as taxes • State-controlled body • PRO • Service provider	• Collection • Transport • Recycling • Framework costs	• Before EOL • At EOL stage • Part before/ part after
Nigeria	• Producers	• PRO	• EOL management of e-waste and for PRO scheme	• Before EOL
Ghana	• Producers	• Government (eco-Levy)	• EOL management of e-waste	• Before EOL

Encouraging eco-design through EPR

A financing mechanism can be structured in such a way as to encourage eco-design for EEE. The concept of eco-modulated fees can be applied, whereby producer fees are dependent on a product's environmental performance. More 'environmentally friendly' products and packaging are charged at a lower rate than those displaying a weaker environmental performance. Countries like France are applying this approach for textiles, furniture and electrical equipment, although the impact is limited owing to the small variations in fees.

Financing CPR Schemes

Systems led by PROs are often preferred options for both producers and regulators, on account of the perceived advantages of having a dedicated third-party institution managing both material and financial flows.

PRO models vary. For instance, PROs may be profit-making or not-for-profit; and PROs can be centralized or there can be multiple competing PROs, which can lead to market efficiencies.

Industrialized nations with low populations and low rates of e-waste have found a centralized model to be the best, as there are often not enough volumes of used EEE to justify having multiple PROs. If the volume of e-waste is small, countries can also consider operating a State-run system, through a central fund. This may be more cost effective than establishing a PRO.

A key concern in a CPR system is the PRO's ability to allocate fees to producers. This is usually done on the basis of market share, determined by 'put on market' reports that the producers share with the PRO. These reports are highly sensitive. In this case, a "black box" or allocation centre can be introduced, which is confidential and is usually run by an external accounting firm on an 'as needed' basis, i.e. not as a full-time function. The black box needs to be financially supported by PROs.

> ***The critical ingredients required to establish a successful PRO include a local legal instrument that will necessitate the development of the PRO in the first place, a robust governance structure for the PRO. Extensive engagement with a good representation of stakeholders in the value chain is needed, as is a sustainable financing mechanism and a well-designed registry system.***
>
> Ibukun Faluyi, Executive Secretary, E-waste Producer Responsibility Organisation Nigeria.

Examples of PRO features

Type of PRO	Potential strengths	Potential weaknesses
State-fund model Producers pay an eco-fee or eco-levy to a designated waste management fund operated by the government.	• High legal certainty for producers • Limited liability for producers • Level playing field for all producers	• Dependent on political priorities with a risk of funds being allocated to unrelated issues where programmes may be underfunded • Fees that are set by the fund manager may be unrealistic • Limited oversight and transparency • Limited third-party regulatory oversight
Industry-led monopoly model Producers form a not-for-profit entity that operates as a PRO.	• Minimum overheads through economies of scale • High technical standards can be set for recyclers • Often competitive bidding by recyclers to access e-waste streams from the PRO • Transparency around costs and revenues of the PRO for producers who are members • Easier to regulate as a single entity	• Needs collaboration and agreement with all producers • Can create cost complacency and the accumulation of funds in the PRO • Compliance risk is likely for producers when concentrated on a single source
Compliance service provider model Private businesses that provide the services of a PRO for a fee to the producers.	• Competitive market for compliance and treatment that can drive efficiency and innovation • Flexibility for producers to choose one or more service providers	• Greater complexity to regulate producer compliance • Higher overall system administration cost • Potential for race to the bottom regarding treatment costs and standards • Requires large volume of e-waste to be generated in order to be viable

Establishing and operating a PRO

- PROs should begin operations as an independent entity (either not-for-profit or for-profit) and they should hold the licence from the authorities to operate.
- The initial starting capital for a PRO often comes from a core group of founding members (as share capita), client advances (as advance fees) or grant funding (from governments or multilateral agencies) - or even a mix of these.
- The registration of producers with a PRO must be clearly articulated in the regulations, and subject to a deadline. Ample time for compliance with the regulations - typically a year - should be made possible for awareness about new compliance obligations and registration processes for producers.
- PRO fees should be calculated to cover operations such as collection, transportation, treatment and disposal, awareness, auditing and overall management. These fees can be fixed (e.g. a registration or annual membership fee) as well as variable (e.g. based on the product type and volume for each individual producer).
- Fair and competitive contracting with logistics providers and recyclers for the collection, transportation, treatment and disposal of each product category is important. The contracts should include minimum treatment standards and standard operating procedures.
- Contracts with recyclers often have index pricing that provides them with financial assurance when commodity prices are low. Equally, contracts with recyclers should also provide for the sharing of revenue with PROs when commodity prices are high. Contracts with recyclers also often have a cadence for revision of rates, based on the movement of commodity prices.
- Awareness activities by PROs should be designed and planned to target all stakeholders including household consumers, large institutional consumers as well as producers and regulators. Building skills and conducting research with academia should also be encouraged through PROs, to build overall capacity and understanding about the EPR system.
- Enforcement and penalization of non-compliant producers is essential to stop free-riding. PROs should work with regulators and other enforcement agencies to support monitoring and compliance.

CASE-STUDY: BLACKBOX SYSTEM IN NIGERIA

Nigeria's 'black-box' system is an intelligence tool that will be used for tracking products and producers. It allows the PRO and the authorities to establish market share and the EPR fees. The black-box is a database of EEE volumes, and a cost for collection and recycling is set against each type of EEE. When producers put their product data into the software, the system would automatically calculate their fees. The PRO and the government can also validate this self-reported data. The black-box system is independent, which ensures that highly sensitive data on EEE put on market is handled neutrally. It would also be overseen by an agency that is usually selected by a group of producers (this information is not cast in stone though).

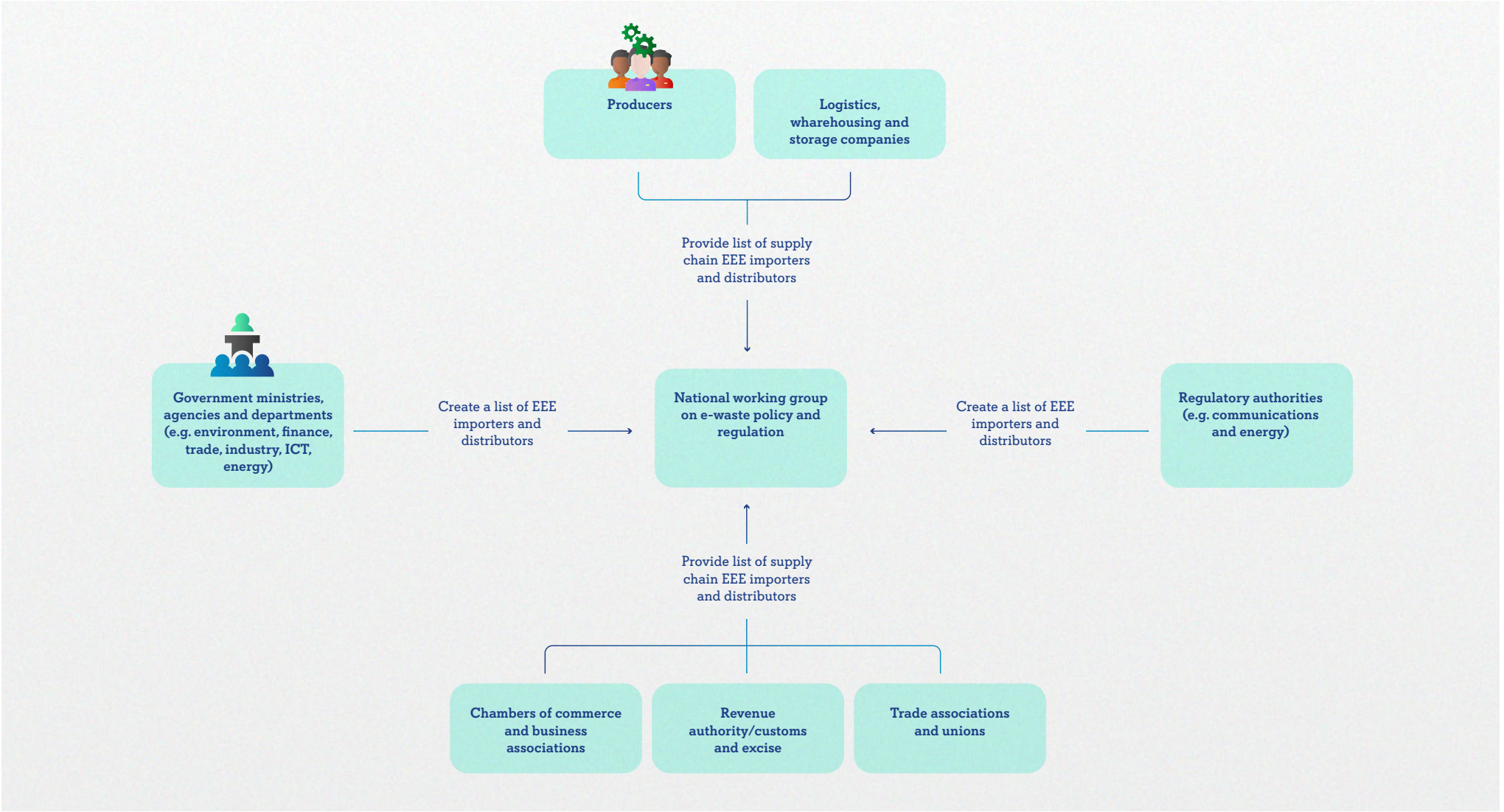
2.4 How do you engage producers?

Under EPR, producers should be given the freedom to openly organize themselves, in terms of establishing a PRO, deciding how to cover the costs of recycling, strategizing their engagement with recyclers and the informal sector, and deciding on the mechanisms for sharing operational information and e-waste data.

Regulation should be aimed at making producers comply. Confusion can arise if producers are not involved in the development of regulation, and this will only delay compliance.

Care must be taken to involve producers that represent all six categories of EEE, such as heating, ventilation and air conditioning, home appliances, ICT equipment, lamps and solar, in consultations. Fair representation of different product categories will ensure that regulations do not unduly favour one form of e-waste over others.

Stakeholder interactions – Producer identification



2.5 How do you build infrastructure and capacity?

Supporting existing 'formal' recyclers

Recyclers that conduct high-quality operations and meet national or international standards with the right environmental permits, are important assets. They should be central to the e-waste management system, and can help develop subsidies to encourage the formalization of collections in the informal sector.

CASE-STUDY: PROACTIVE EFFORTS BY PRIVATE PLAYERS IN FOUR AFRICAN COUNTRIES

Nigeria: Hinkley operates in multiple West African countries. In 2018, the company became the first registered e-waste recycler. It has been involved in discussions on e-waste management from the outset, and has been conducting training programmes for informal recyclers, to make inroads into this sector and improve the quality of their operations.

Rwanda: Enviroserve entered into a public-private partnership (PPP) agreement with the government to set up a state-of-the-art e-waste recycling facility. It has set up collection points across the country and conducted capacity-building activities, as well as providing 70 trainees with skills in environmental protection. It has also worked with government agencies on a nationwide awareness campaign.

Kenya: Safaricom introduces 1.2 million mobile handsets to the market every year. It operates an e-waste recycling project. The company participates in awareness-raising activities, the distribution of flyers and sessions in person and on radio and TV, as well as engaging government. Safaricom also carries out e-waste collection drives in Nairobi by means of a "waste caravan" and entertainment and free gifts for those who hand in e-waste. Safaricom has collected 40 000 tonnes of e-waste a year through its campaigns.

Zambia: TCH E-Waste, Zambia's first legally compliant e-waste collector and processor is currently investing in a fully formalized and compliant e-waste recycling facility. It is working with companies like Lafarge and Airtel in addressing the e-waste problem while offering job opportunities, employment and growth to informal collectors and interested entrepreneurs. TCH E-Waste is also encouraging the Zambian government to develop technical capacity to deliver full platinum-group metal beneficiation.

Focus on the informal sector

In many countries, an unregulated e-waste collection system, or informal sector, often pre-dates policy development. An informal system offers few safeguards to protect workers' health, nearby residents or the environment, but will have well-established collection networks and a significant workforce. This asset should be harnessed and formalized. Any increase in investment in a formal system should work in parallel with building capacity in the informal sector.

THE ROLES FOR THE INFORMAL SECTOR IN E-WASTE MANAGEMENT

Household e-waste collection:
The sector is usually well-connected to the local population.

Operating collection centres:
Where the processing of e-waste is minimal.

Dismantling of e-waste:
This calls for skills such as separation of circuit boards or cable stripping.

Transportation of e-waste:
From drop-off points, door-to-door pick up, and to recyclers.

Training programmes can be co-implemented by the government and the formal players so that the informal sector is able to meet quality controls, particularly in dismantling. Training and capacity building of the informal sector needs to be a continuous effort, with dedicated financing, under the regulation.

A grace period should be allowed for informal sector capacity building prior to the start of EPR enforcement. Without adequate training, downstream processes of the e-waste management system will not function properly and will experience bottlenecks.

QUESTIONS IN REGARD TO FORMALIZING THE INFORMAL SECTOR

- How will previously informal workers be incorporated into the formal system? Will they be hired as individuals or as collectives?
- If they are hired as individuals, who will they work for? Private entities, such as recyclers or the PRO, or a public agency, such as the regulatory authority?
- If they are hired as collectives, what are the formalization procedures? Can formalized informal workers set up recycling businesses, or will they be assigned to formal recyclers?
- If informal-sector workers are allowed to set up recycling businesses, how can the cost of formalization be subsidized without compromising the standards for formal recycling?

Developing local enforcement capacity

Regulation is only effective if it is adequately interpreted at the local by-law level. Local government such as councils or municipalities can play a number of key roles in implementing EPR regulation, from establishing appropriate collection infrastructure to supporting enforcement. While e-waste typically falls outside the remit of local government as it is not considered as domestic waste, it is local government that implements national law at the local level. Local players need to be engaged in policy development. There will also be benefits to teaming up with regional and national representatives from neighbouring countries to share lessons learnt.

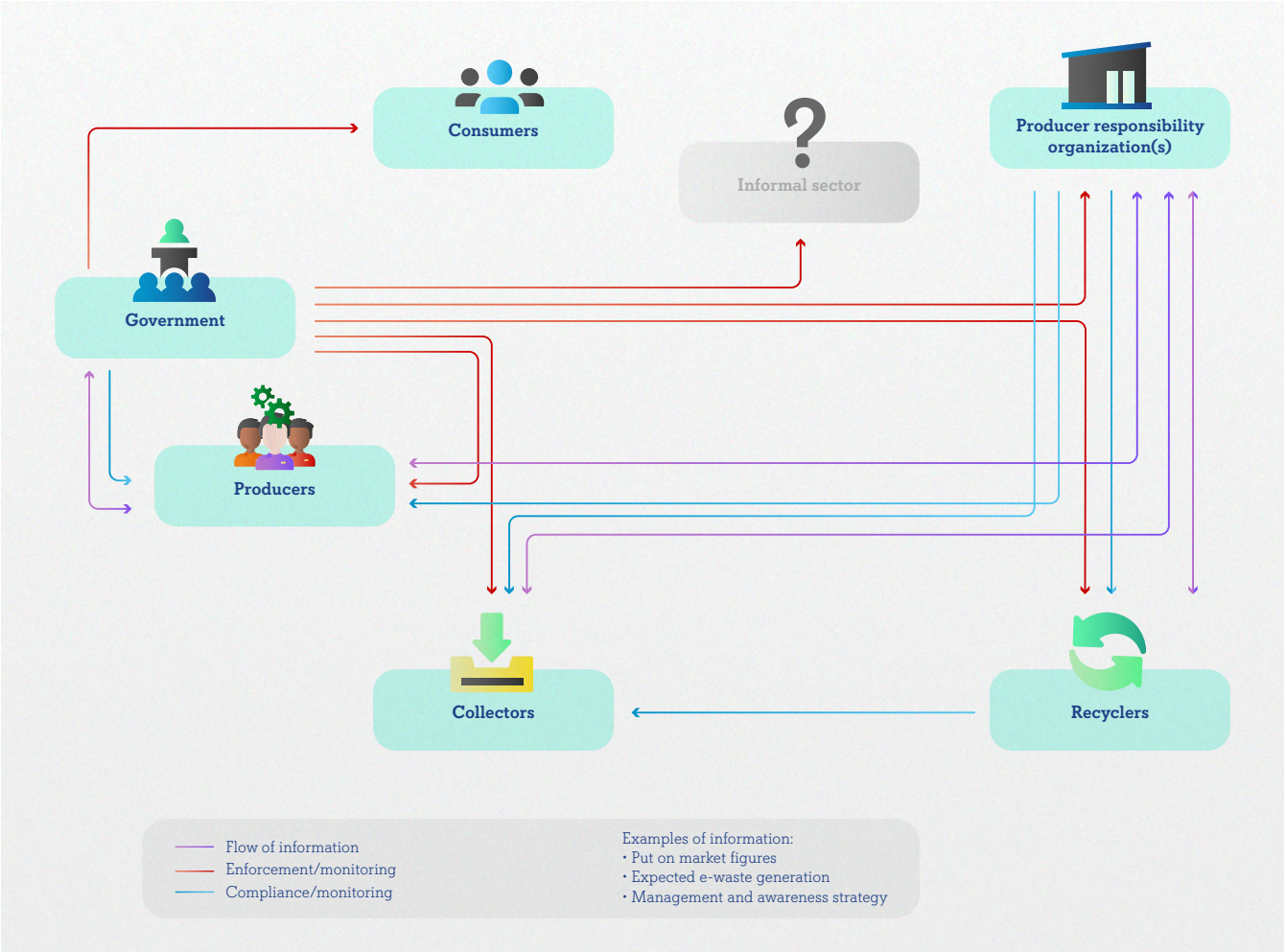
INVOLVING LOCAL ACTORS IN THE E-WASTE SECTOR

- Connect with the ministry in charge of local authorities when formulating policy.
- Invite representatives from key cities to participate in discussions.
- Ensure that roles set out for local bodies do not conflict with any existing regulation.
- Create or empower sub-national centres to oversee e-waste management.
- Provide periodic training on e-waste management.
- Mobilize funds to support local initiatives and for local government networking.

E-waste regulations must be clear and concise, and must be easy to interpret by each actor who has a responsibility. Standards must be in place and activities independently audited. Monitoring of performance and continual improvement are key.

Adel Shafei Othman, Senior Policy Officer, Ministry of Environment, Egypt.

Stakeholder interactions - Flow of information



CASE-STUDY: A DECENTRALIZED APPROACH IN COLOMBIA

Colombia is one of the first Latin American countries to have adopted EPR regulation, with Law 1672 rolled out in July 2013. An interesting facet of this law was its focus on decentralization. While required to operate within the remit of the national law, regional authorities were given the power to implement their own regulations. Central government remains responsible for training, research and technological development, aimed at the comprehensive management of e-waste.

Expanded toolkit

3. Operating the system

3.1 How do you implement EPR regulation?

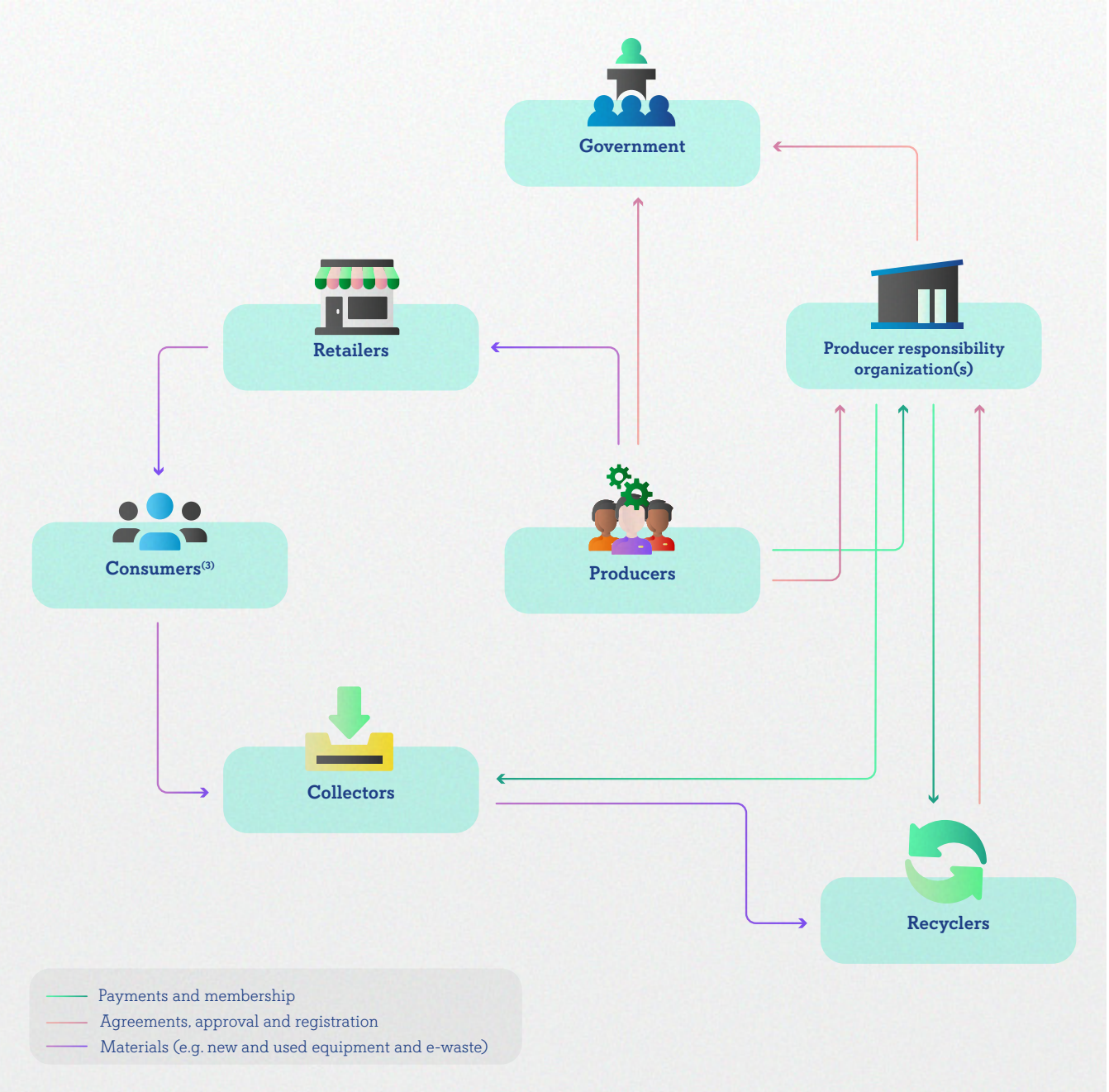
Across emerging economies with fledging e-waste management systems, lack of enforcement is one of the biggest challenges. Under CPR schemes, it should be compulsory for producers to join a PRO. Lax enforcement undermines compliance. Formal recyclers also depend on enforcement to ensure that investments they make to comply with regulations, and to improve standards, are not lost.

Lack of resources represents a challenge for enforcement. Often, the regulatory authority, usually an environmental body, is tasked with enforcing other regulations as well, with the result that the available workforce is limited when it comes to particular waste streams like e-waste. Personnel also require specific training, and the regulatory agency has limited capacity to carry out checks.

All actors in the value chain play a role in identify each other as a role player in e-waste management. Tracking importers is key, and this is more efficient when there is appropriate enforcement in place.

Mboh Hyacinth, Director, Department of Standards and Control, Ministry of Environment, Protection of Nature and Sustainable Development, Cameroon.

Stakeholder interactions - Flow of operations

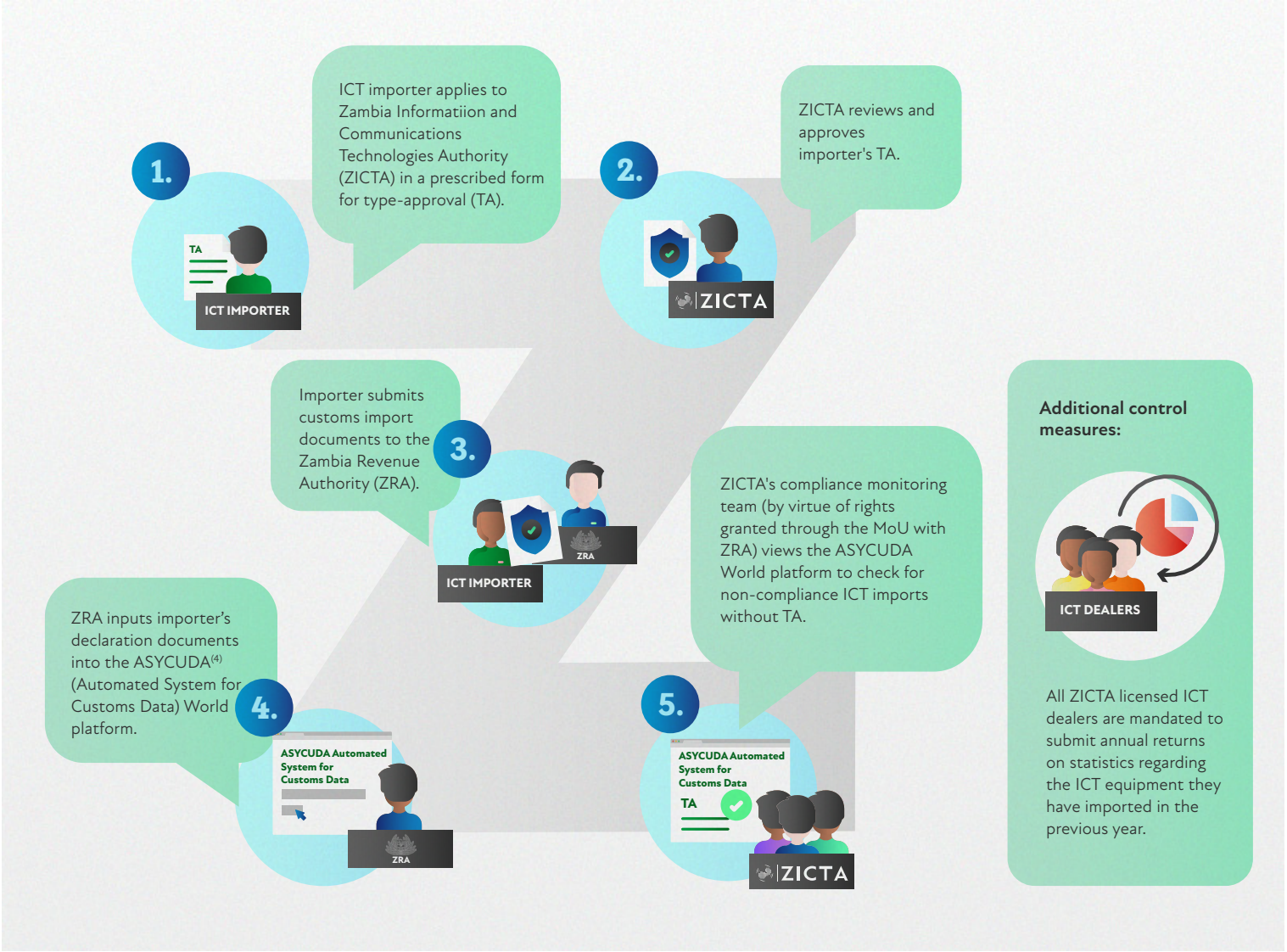


(3) 'Consumers' refers to both individual and bulk consumers and customers.

STREAMLINING ENFORCEMENT

- Put contracts, agreements and protocols in place to ratify actions laid out in regulations *(e.g. an MoU between the PRO and the regulatory authority or with the recyclers)*.
- Identify the need for training and capacity building, as well as finance for the initial few months of the EPR scheme.
- Increase the size of the workforce within the regulatory authority before enforcement.
- Rally support from original equipment manufacturers (OEMs) in obliging producers to register with the new scheme.
- Link enforcement with other processes, such as mandatory registration if the producer is to receive approval from the customs authority.
- Roll out penalty mechanisms for non-compliance.
- Request support from international initiatives and partnerships.
- Request support from multilateral or bilateral funding agencies.

Enforcement in Zambia: Importer registration steps



(4) *More information about Asycuda.*

3.2 How do you build capacity in e-waste management?

National learning institutions can ensure that capacity-building programmes are delivered regularly. These institutions may design courses which can then be marketed to different groups. A technical diploma on handling e-waste may be offered to interested individuals, while short courses can be designed for producers, government employees and agency workers. Curricula should be set at national level by a reputed and empowered institution, which then facilitates training-of-trainer sessions with other institutes across the country.

International organizations can also support training for national stakeholders. It is also important to build regional capacity when it comes to training so experiences and best practice in Africa can be shared.

3.3 How do you generate public awareness about e-waste?

Generating public awareness and a shift towards responsible behaviour is a colossal task. It involves a multistakeholder partnership with all players in the e-waste management system, both public and private.

PRO/producer website. The exact type of awareness measures should be stipulated in the EPR regulation – stating how and who. Transparency on actual recycling costs is important because these costs are often passed on to the consumer.

An extensive behaviour-change plan is expensive and requires investment in various types of media, print, TV, radio and on-the-ground awareness programmes, such as door-to-door campaigns, posters and collection drives. The plan should be executed by a single entity in order to ensure accountability. The costs of the plan can be factored into the producer's fee.

> ***The more consumers know about e-waste, the more informed decisions they make. It is therefore critical to reach out to them though all available channels - print, electronic, social media and focus group discussions. Information will result in positive culture change for the safe handling and disposal of e-waste.***

Michael Koech, Manager, Environment and Climate Change, Safaricom, Kenya.

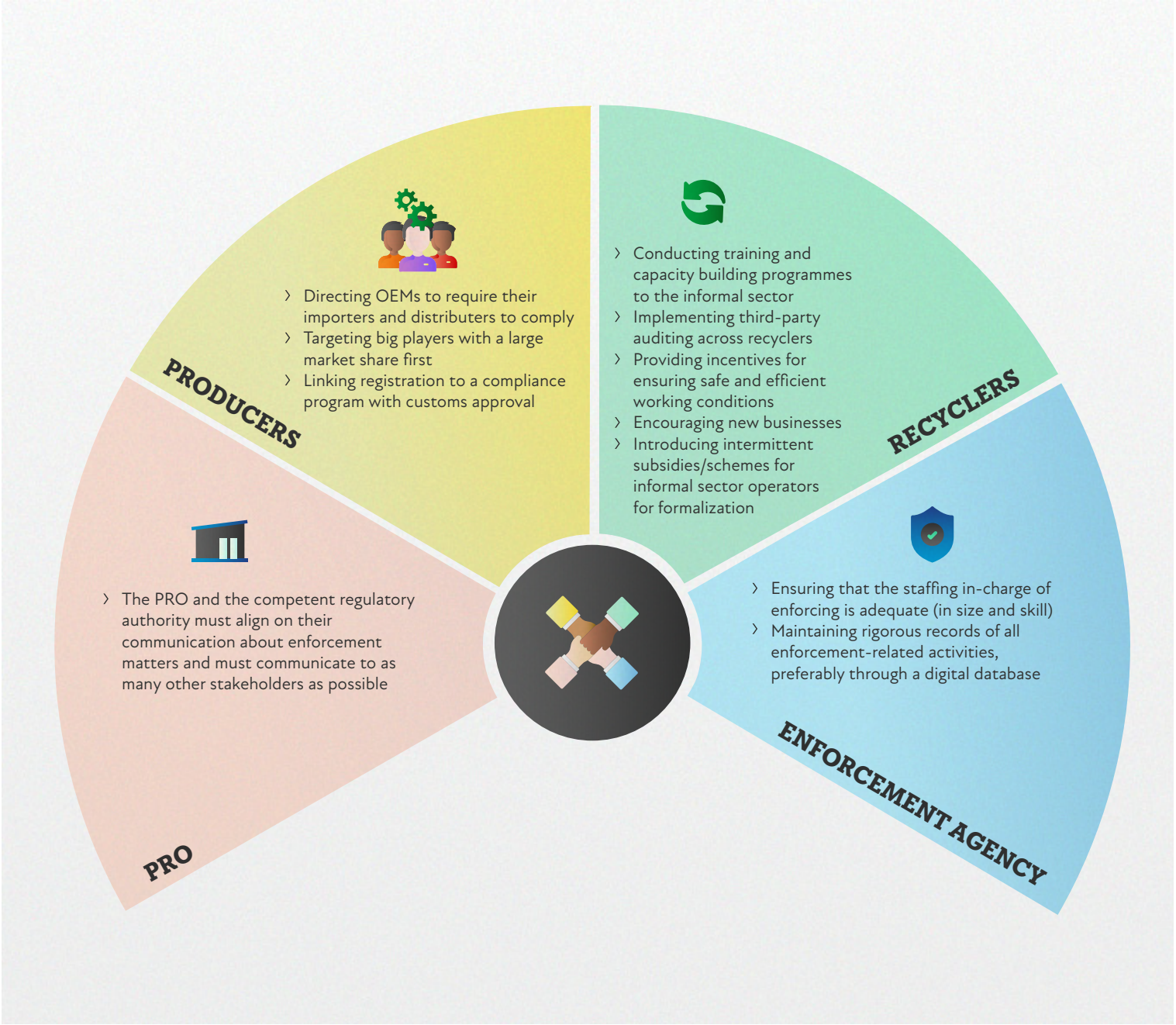
4. Monitoring and reviewing

4.1 How do you handle non-compliance?

Non-compliance with EPR regulations is a common challenge. Appropriate penalties help. However, the mechanism for a complex issue like e-waste should be nuanced enough so that the 'punishment' is commensurate with the 'issue' involved. Lenient fines may lead to continued non-compliance, while hefty fines or revoking of licences may devastate the sector, especially small businesses.

A graduated system imposes small fines or warnings for low-impact indiscretions, while cracking down on flagrant non-compliance with high fines, cancellation of licences or law enforcement. This helps ensure that small, unintentional mistakes are not treated with the same gravity as intentional efforts to 'cheat the system'. Penalties should not deliver a 'sentence' (although that may be needed in very severe cases), but act as reminders for the next time businesses decide whether to default.

Key stakeholders in enforcement



CASE-STUDY: A NUANCED APPROACH TO NON-COMPLIANCE IN HUNGARY

Hungary demonstrates a nuanced approach to non-compliance. It has set activity-based fixed penalties, to ensure fair and consistent responses. Fixed penalties are imposed on producers or distributors for non-fulfilment of obligations in regard to registration and reporting (USD663), take-back (USD85), collection (USD1160) and treatment (USD995). Partial fulfilment of registration and reporting can be punished by a penalty of up to USD663[5]. Incorrect management of WEEE incurs a penalty according to the waste amount.

4.2 How do you boost technical expertise and regional collaboration?

Advances in technology are improving how e-waste is recycled. Regional collaboration among recyclers to share skills and practices is important. There are already forums in place that can help.

Harmonization of PRO schemes across neighbouring countries could be advantageous. There is potential to aggregate waste, making processing cost-effective; and to implement an integrated enforcement plan. In this way, key information, such as data on products put on the market or the compliance burden on producers, can be exchanged.

Some countries with low e-waste generation rates prefer to export their waste if this solution is cheaper than developing recycling locally. Countries with established e-waste recycling systems like the EU or Japan are preferred destinations. Another option could be a regional approach, whereby waste is transported to a neighbouring country acting as an e-waste 'hub'. For any nation to operate as a hub, it would need to have an established recycling infrastructure that can accept volumes beyond its own e-waste generation. These hubs should first maximize local recycling, otherwise the intermediary costs would be too high. Other important issues such as transportation costs and movement of the waste through customs into the 'hub' country, would also need to be resolved.

4.3 How do you continuously improve the system?

Leveraging existing networks - Using existing collection systems can lead to cost savings and more intensive utilization of resources. For example, the postal network could be an option if it has (a) a strong network, (b) courier systems and (c) links with ICT regulators/ministries of communications. Post offices can act as drop-off points for e-waste. This could be of service to rural populations, especially for off-grid solar equipment and mobile phones.

Automation and data sharing - The government should start to identify opportunities for automation and the creation of an e-waste information system, ideally combined with other waste streams. This can involve e-waste inventories, producer registration, EPR fee handling, licensing of repair, refurbishment and recycling actors and government ministries. Automation and real-time data sharing make enforcement easier.

National working groups - To ensure the long-term sustainability of the EPR system, a national working group should be established. The working group can discuss opportunities and challenges. It should bring together the public and private sectors, academia and civil society to discuss e-waste management and revisit the EPR system.

Valuing different types of e-waste - Value and profit can be generated from some used EEE through reuse and recycling, especially in the case of washing machines, mobile phones and some ICT equipment. Accordingly, the EPR system should subsidize the environmentally sound management of hazardous waste as a priority, channelling it to formal recyclers.

CASE-STUDY: A CENTRALIZED REPOSITORY OF WASTE DATA IN SOUTH AFRICA

The South African Waste Information System (SAWIS) was set up in 2005 as a centralized database that records all information across the e-waste management system. Through SAWIS, the Department of Environmental Affairs is able to capture routine data on volumes of e-waste generated, recycled and disposed of on a monthly basis. All actors in the value chain, including waste generators, collectors, recyclers and exporters, share their waste-handling data through a web-based platform.

4. Country fact sheets

Click on the country of your choice.
The country fact sheets profile the e-waste management practices of 10 countries in Africa.

This information, reflecting in-country activity in recent years, provides relevant lessons and ideas on how to tackle e-waste.

Cameroon

What can we learn?

- Leveraging existing systems, processes and institutional mechanisms for e-waste management can help streamline the efforts needed to build a new EPR system.
- Cameroon's technical visa system has seen proven success with ozone depleting equipment, and is being adapted for e-waste, although implementation has been challenging to date.
- Care should be taken to ensure that when pre-existing systems are adapted, they are adequately contextualized, since different waste streams entail different concerns.

Regulatory mechanisms

- *Management of Waste Electrical and Electronic Equipment, Order No. 005, October 2012:* A licence/technical visa is required for the manufacture, importation and sale of EEE covered by the regulation; EEE that is essential for the protection of the State is excluded, including military equipment.

Financial mechanisms

- Most ongoing e-waste collection efforts are directed towards large EEE users, namely private enterprises and large administrations, rather than individual end users. As a result, business models are geared to this professional market, which is very different from the domestic market: e-waste is collected directly from producers, who pay for collection and recycling services.

Formal e-waste management

- A specialized e-waste recycling facility, The Ewankan Centre, developed by the French association Solidarité Technologique, was inaugurated in March 2019. It aims to achieve a capacity of 5000 tonnes of e-waste per year. The association also intends to build and equip a second plant in the business hub of Douala.
- Twelve waste collection points are planned for implementation in Yaoundé and Douala.
- The WEEECAM project aims to design and set up a large-scale, sustainable e-waste recycling activity, which could be replicated in most developing countries.

Awareness raising

- Since 2010, Orange has partnered with Emmaus International and Ateliersdu bocage to host mobile phone waste collection workshops in Africa. In the absence of quality local recycling systems, the collected waste is shipped in bulk to France to be recycled in accordance with EU standards.
- MTN Cameroon and Ericsson have been working together under the Product Take Back programme to minimize the potential environmental impact associated with the disposal of EEE.

Egypt

What can we learn?

- The Egyptian Government's approach towards e-waste management has recently progressed to approach the majority stakeholders in the value chain including household consumers and increasing awareness campaigns to encourage citizens to hand over their e-waste voluntarily. The E-Tadweer app, which is a green market application to create a win-win situation for consumers, retailers and recyclers, provides discount vouchers to consumers who recycle their e-waste. This is a good example of a consumer-focused recycling scheme. This is in parallel with the government's strategy for national waste management for the environmentally sound management of wastes, including e-waste, and in the decentralization context of the new waste collection system all over the country.
- Currently, the Ministry of Environment and the Ministry of Communications and Information Technology, together with relevant stockholders, are working collectively and have established a national committee to develop, harmonize, strengthen e-waste regulations and technical measures among all over types of waste. This inter-ministerial platform responds to the requirements of the new waste law 202/2020 to ensure the effective implementation of the waste management policy, both from a socio-environmental and an economic standpoint.

Regulatory mechanisms

- A new Act 202/2020 "Waste Management Law" has been approved by the Egyptian parliament. It entered into force in October 2020 with clear mention of extended producer responsibility as a general obligation for all the stockholders involved. In addition to this, the existing dedicated Decree 165/2002 Prohibiting the Importation of Hazardous substances and wastes controls the import or trade in Egypt of, among others, waste from electrical assemblies or electronic or scrap containing components such as accumulators, banned batteries, mercury-switches, glass pipes from cathode ray tubes, other activated glass and Polychlorinated Biphenyls (PCB) capacitors.
- A new institutional structure "Waste Management Regulatory Agency-WMRA" was established in 2015 to respond to waste management challenges including e-waste.
- The Ministry of Communications and Information Technology adopted the Egyptian Green ICT Strategy 2010 to deal with ICT equipment from cradle-to-cradle.

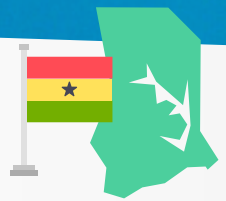
Formal e-waste management

- In general, the rate of generation of e-waste is still greater than the existing technical capacities of recycling. There are seven e-waste recycling facilities in Egypt operating officially (i.e. which have been licensed to practice sound management recycling of e-waste) and five other facilities that are being licensed.
- The new legal and institutional development (New Waste Management Law 202/2020 and the establishment of the Waste Management Regulatory Agency) opens channels and sets standards for the engagement of the informal sector whilst encouraging formalization to support the collection modalities of e-waste.

Awareness raising

- There is a variety of awareness raising programs, activities, projects, campaigns and initiatives, which have been implemented in cooperation with a variety of stakeholders. These target relevant groups with direct relation to the environmentally sound management of e-waste.
- Mobile operators are playing a significant role in Egypt, Mobinil, now Orange Egypt, launched an e-waste learning center. The centre establishes skills development to teach techniques for e-waste sorting, dismantling and refurbishment. Vodafone has organized take-back initiatives for mobile phones and batteries.

Ghana



What can we learn?

- The amounts of the eco-levy have had to be lowered substantially in order to meet the concerns of retailers. The original values which were between USD0.15 and USD12 were found to be very high.
- It was originally thought that the levy would be paid by OEMs. However, they do not export directly to Ghana, so it is the importers and distributors who bring EEE into Ghana that have to pay the levy Instead.
- African governments should consider developing friendlier PPP models that are easier to put into operation.
- Formalization of the informal sector and capacity building for informal-sector operators is crucial for developing a financially stable formal system.

Regulatory mechanisms

- *The Hazardous and Electronic Waste Control and Management Act (Presidential Decree - Act 917/2016)* covers e-waste to facilitate the development of a novel and innovative approach for the sustainable management of e-waste.
- The following instruments have also been implemented to cover different actors and parts of the e-waste value chain: *Hazardous, Electronic and Other Wastes (Classification) Control and Management Regulations 2016 and Technical Guidelines on Environmentally Sound E-Waste Management for Collectors, Collection Centres, Transporters, Treatment Facilities and Final Disposal in Ghana, 2018.*
- The Environmental Protection Agency (EPA) is tasked with enforcing the regulations. Under Act 917/2016, the EPA takes preventive measures, maintains an e-waste database, monitors e-waste management, encourages the adoption of new environmentally sound technologies, ensures adequate recovery and disposal facilities are available and endeavours to establish financing for emergency assistance.

Financial mechanisms

- Act 917/2016 (Part two) introduces an eco-levy on the import of used/EOL EEE and e-waste. Currently the eco-levy is a fixed percentage of the value of the imported EEE.
- The Customs Division of the Ghana Revenue Authority spearheads enforcement of the e-waste eco-levy.
- The National Incentive Payment System for Electronic Waste (NIPSEW) promotes collection and recycling by offering scrap dealers a price for eligible types of e-waste and subsidizes the collection and additional costs associated with recycling.

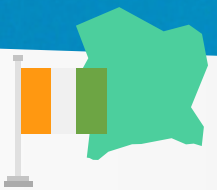
Formal e-waste management

- There are concentrated efforts towards establishing formal infrastructure, such as the construction of a Handover Centre for e-waste (commenced in 2020) and the Agbogbloshie Recycling Centre. Formal recyclers that handle e-waste in the country include Atlantic Recycling International Systems, City Waste, FIDEV Recycling and Blancomet Recycling Ltd.
- The Electronic Waste Round Table Association (EWROTA), a body of formal-sector e-waste management companies was established in January 2020. EWROTA consists of 10 companies.
- The EPA carries out training and sensitization programmess and events for key stakeholders. Most projects running in Ghana have capacity building/ training as a key project element.

Awareness raising

- Many non-governmental agencies have been involved in awareness-raising activities, such as SGS Renovo Ghana, which is authorized to help companies tackle e-waste issues and comply with government regulations. Airtel and Ericsson are running their global Ecology Management Product Take-Back programme in the country.
- The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) has been a crucial player in transforming e-waste in Ghana, having conducted stakeholder dialogues with a focus on the informal sector. It is using theatre as a medium to raise awareness and generate organic solutions for e-waste management issues.

Côte d'Ivoire



What can we learn?

- With small e-waste volumes to deal with, Côte d'Ivoire introduced an ecotax to be levied on imports of new or used EEE and pneumatic equipment.
- Côte d'Ivoire also streamlined its e-waste management system by establishing a recovery and recycling channel for e-waste and used tires, expected to create 5,000 green jobs.
- Countries must use the most popular and effective avenues to generate awareness and action among consumers. Here mobile phone operators have teamed up with popular supermarkets to deliver change.

Regulatory mechanisms

- *Decree N° 02017-217 of 05th April 2017 on the environmentally sound management of waste electrical and electronic equipment* aiming to encourage producers/importers to be responsible. All producers/importers of EEE need to be inscribed on an e-waste register. The government wants to ensure that Côte d'Ivoire will no longer receive e-waste and will acquire necessary resources for the control, management and extermination of such waste.
- For the period 2016-2020 the National Waste Management Strategy provides that a specific supply chain is developed with respect to e-waste. This would be based upon the principle of EPR.

Financial mechanisms

- SGS Renovo has been chosen by the government to collect an advance eco levy on all EEE specified in Décret 2017-217 on behalf of the Republic of Côte d'Ivoire. It is also authorized to perform physical inspections and verifications in the country of export. The Government of Côte d'Ivoire is acting through its environment ministry, the Ministère de l'Environnement et du Développement Durable.

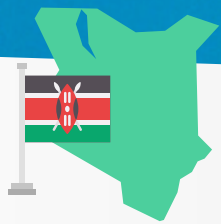
Formal e-waste management

- Currently, household and industrial waste is collected and transferred by several service providers to the municipal dumpsite, where informal workers recover valuable materials to sell on within the second-hand and secondary materials market on a local scale and abroad.
- There is a lack of up-to-date data on e-waste both at the national and local level. At the local level there is a lack of sophisticated technology for e-waste processing and the bulk of it is manually dismantled, although it is known that some e-waste components are sent abroad to be treated.
- In 2018, the government started a project on the ecological management of e-waste and used tyres that would help create 10,000 green jobs in the waste sector and also ensure environmental protection.

Awareness raising

- Since 2010, Orange has partnered with Emmaus International and Ateliersdu bocage to host mobile waste collection workshops in Africa. In the absence of quality local recycling systems, the collected waste is shipped in bulk to France to be recycled in accordance with European environmental standards. These workshops, opened in five countries including Côte d'Ivoire, have collected and enabled the recycling of more than two million mobile phones.
- Mobile phone operator MTN has been a key player in raising awareness on e-waste, having tied up with Ericsson, Promusa supermarket and the recycling company Ewa-Paganetti at different points to run campaigns. The third edition of their campaign was launched in December 2020.

Kenya



What can we learn?

- Kenya is characterized by strong demand for EEE owing to high disposable incomes among millennials. Growing demand for EEE in Africa certainly needs to be mirrored by EPR frameworks.
- The need to involve stakeholders in the design and development of e-waste policies is a crucial lesson from Kenya. Regulations for e-waste management have been delayed owing to concerns and criticism from key stakeholder groups, such as the informal sector. This delay only exacerbates the issues surrounding the unsafe handling of e-waste, given the increasing demand for EEE in the country.

Regulatory mechanisms

- *The E-waste Guidelines, 2010* are the only currently approved official policy relating to e-waste, although they are not legally binding. Kenya developed draft *E-waste Regulations* in 2013, and has since also drawn up a *National E-waste Management Strategy in 2019 and Extended Producer Responsibility (EPR) Regulations* in 2020. However, these are yet to be approved.
- The National Environment Management Authority (NEMA) is the main authority for waste management in Kenya. NEMA has the role of auditing, oversight and coordination of all PROs and EPR compliance schemes and is responsible for setting collective national EPR objectives and maintaining an updated public register of all registered PROs.
- The Ministry of Environment and Forestry banned imports of second-hand electronic equipment from January 2020.

Financing mechanisms

- The draft EPR regulations stipulate that producers can comply using either IPR or CPR schemes and there can be at most one PRO for each product category.
- The registration fee for individual compliance schemes is set at KES 5 000, and KES 10 000 for PROs. The annual renewal fee is set at KES 10 000 for both.

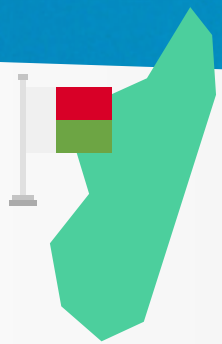
Formal e-waste management

- Currently, the e-waste management system in Kenya is primarily founded on subsistence activities in the informal sector, formal recycling operations, and voluntary take-back (involving for example Nokia, HP, Safaricom) and recycling initiatives.
- Some larger collectors have formalized their operations and may collect e-waste through government public auctions and tenders, directly from larger companies, or by partnering with smaller collectors.
- Some key players in the e-waste recycling domain include the WEEE Centre, E-waste Initiative Kenya (Ewik), Sintmund Group, Sinomet Kenya and the East African Compliant Recycling (EACR) company.

Awareness raising

- In 2012, the Communications Commission of Kenya launched a nationwide public awareness campaign to educate Kenyans on the risks associated with using counterfeit mobile phones. Samsung and Nokia rolled out take-back schemes and awareness programmes to combat counterfeit handsets in the same year.
- In June 2020, the *Guidelines for mainstreaming waste management in curricula at all levels of education and training* were formulated.
- Many sector players such as the WEEE Centre and EACR provide awareness-creation and training services. EACR, in particular, offers training programmes and take-back systems in partnership with Dell and HP, respectively. Philips and Nokia, along with Dell, HP and EACR, have formed an alliance to lobby the Kenyan Government for appropriate regulations to frame EACR's recycling concept.

Madagascar



What can we learn?

- The advantage of nation-to-nation collaboration and knowledge sharing has been demonstrated by the operator Vohitra Sarl, which participated in a staff exchange programme from 2018 to 2020 with the WEEE Centre in Kenya, learning about the use of personal protective equipment and methods of e-waste recycling, besides basic dismantling and sorting.
- Madagascar's Decree No. 2015-930 adopted in 2015 is a dedicated law on e-waste, and specifically highlights the 'polluter pays' principle. It outlines penalty mechanisms for non-compliance, thereby enshrining a critical element of enforcement in the national law itself.

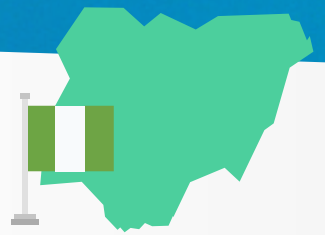
Regulatory mechanisms

- Madagascar is one of the first African countries to have passed a draft bill relating to e-waste into law, by Decree 2015930 on waste EEE.
- The Ministry of Environment and Sustainable Development is the main government authority in charge of the monitoring and control of all national e-waste management mechanisms.
- Import bans on e-waste are active in Madagascar under the Basel Convention, through the National Bureau for the Basel Convention.

Formal e-waste management

- Currently, e-waste management, financing and business in Madagascar are primarily founded on subsistence activities by informal players and a handful of formal recycling operations.
- At present e-waste is not collected separately from other waste streams with respect to consumer households and scattered sources.
- There are few formal operators such as Vohitra Sarl and Gasy Madio.
- Waste recycling and treatment is still in its infancy, the main focus being on dismantling and primary sorting. As things stand, there is no technology available to recover precious metals or manage hazardous waste, most of which ends up in landfills or open dumps.

Nigeria



What can we learn?

- The EPR system, especially the PRO (the E-waste Producer Responsibility Organisation Nigeria - EPRON), has enjoyed the support of the OEMs from the outset. However, for Nigeria, the OEMs are not the 'producers'. Only with the introduction of the 2020 (draft) EPR policy will OEMs become producers in law. As a result, producers have been reluctant to register with the EPR scheme. Most of the sign-ups have occurred as recently as 2020 owing to increased pressure from Nigeria's National Environmental Standards and Regulations Enforcement Agency (NESREA).
- Through the Global Environment Facility (GEF) fund, Nigeria is commissioning various critical and necessary research, which will be crucial in ensuring the robustness of the EPR system. This includes a study on calculating compliance fees for producers and another for the data-management systems to be used.

Regulatory mechanisms

- Key policies governing the sector include the *National Environmental (Electrical/Electronic Sector) Regulations (S.I. No 23 of 2011)*, the *Import of Used Electrical Electronic Equipment (UEEE) Guidelines, 2011* and *the Harmful Waste (Special Criminal Provisions) Act, 2004.*
- There are several documents in draft stage, including the *National Electrical/Electronic Waste Management Policy and Guidance for the implementation of the EPR programme for the electrical sector.*
- At the national level, the Federal Ministry of Environment is tasked with ensuring implementation of the draft policy. NESREA, as the regulator, is responsible for the planning of targets, issuance and enforcement of the guidelines, monitoring the performance of the EPR programme, running education campaigns through EPRON, and approving third party management and auditing entities for the black box system.

Financing mechanisms

- A not-for-profit PRO, EPRON, is positioned at the heart of e-waste management in Nigeria. Key responsibilities of EPRON include registering all key stakeholders (producers, recyclers, collection centres), preparaing a black-box system database with relevant information (on producers and recyclers), conducting periodic third-party audits, supporting awareness campaigns and other related activities.
- Currently, EPRON is focusing on getting all producers in the country to join the EPR scheme. Within the framework of the GEF fund, a study is being undertaken to determine a methodology for calculating the compliance fee for producers, who at the moment pay only a registration fee.

Formal e-waste management

- The e-waste management sector is predominantly informal, with limited infrastructure.
- There are two licensed recyclers in Nigeria, Hinckley Recycling and E-Terra Technologies
- A USD15 million project funded by the GEF and the United Nations Environment Programme (UNEP), is being executed to support the implementation of EPR. It is working with the private sector to develop cost-effective value retention businesses, including recycling and disposal systems for EEE, while ensuring that informal workers, such as e-waste collectors and recyclers, have opportunities to improve their livelihoods and working conditions, as well as their health and safety.

Awareness raising

- The Nigerian Government, GEF and UNEP are launching a circular economy system for electronics in Nigeria. This will focus on the implementation of EPR regulations and will work on designing robust recycling and disposal systems for e-waste.
- MTN Nigeria provides financial support to the Lagos State Environmental Protection Agency (LASEPA) on e-waste policy implementation and plays an active role in industry advocacy.

Rwanda

What can we learn?

- Rwanda has demonstrated a successful PPP arrangement for the e-waste sector. This could be further explored to incentivize investment in the recycling sector.
- The Rwanda Utilities Regulatory Authority (RURA) conducted an extensive national inventory survey in 2014, which determined the yearly e-waste generation rate to be 10 000 tonnes, with an annual increase of about 6 per cent. This study has informed further developments in the sector in more recent years.

Regulatory mechanisms

- There are two primary instruments that govern the e-waste sector: the *National E-waste Management Policy for Rwanda, 2018 and Regulation No. 002 of 26/4/2018 Governing E-Waste management in Rwanda, 2018.*
- Other key documents include the *Five-year National E-waste Strategy, 2015* and the *Draft Ministerial Order determining modalities for management of E-waste in Rwanda.*
- RURA, as a part of its mandate in the ICT sector, oversees the enforcement of e-waste regulations. Under *Ministerial Guidelines No. 1 of 25/10/2011*, RURA also enforces the type-approval process for EEE products imported into the country.

Financing mechanisms

- The national framework for the sector makes provision for granting financial incentives to individuals who collect e-waste from the community and bring it to the plant for recycling. The incentives are based on weight, with community members offered USD100 for 13–15 kilograms of e-waste collected.

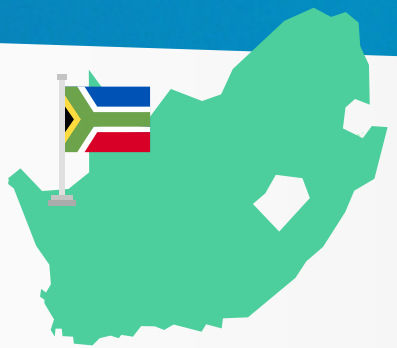
Formal e-waste management

- Under the e-waste policy, Rwanda's Green Fund invested close to USD1.5 million to establish an environmentally friendly e-waste collection centre and dismantling facility through a PPP agreement with Enviroserve Rwanda. The facility, constructed in Rwanda's Bugesera District, is capable of recycling 15 000 tonnes of e-waste every year.

Awareness raising

- In March 2020, the Government of Rwanda launched a nationwide awareness campaign, aimed at establishing an e-waste collection point within two months.
- The Ministry of ICT and Innovation, in collaboration with Ministry of Trade and Industry, has carried out preliminary e-waste management awareness initiatives among government institutions.
- Enviroserve Rwanda Green Park has also been involved in training and awareness programmes in the country.

South Africa



What can we learn?

- Industrial waste management plans (IWMPs) were scrapped in favour of an EPR scheme, since they were not perceived to be adequately robust. At the same time, individual plans from EEE companies are being put aside in favour of a CPR.
- South Africa has also adopted a PRO model across various waste streams such as lighting, appliances and packaging. This demonstrates how an EPR scheme can be adapted to meet the needs of different sectors.
- South Africa also has a centralized waste information system – although there have been concerns regarding the effectiveness of this system in accurately and transparently capturing meaningful data.

Regulatory mechanisms

- The *National Environmental Management Waste Act* mandated that EEE companies prepare an IWMP and submit it to the government. On receipt of the IWMPs, it was felt that the plans were not rigorous enough for implementation, and the government subsequently decided to develop an EPR scheme for the sector instead. The regulations for this EPR scheme is still in development.
- Industry associations such as the E-Waste Association of South Africa (eWASA), the E-waste Alliance and the Information Technology Association of South Africa (ITA) are very active in engaging the government to adopt a comprehensive regulatory framework.
- The Minister of the Environment, Forestry and Fisheries and her department have the overall responsibility for ensuring the implementation of the National Waste Management Strategy.

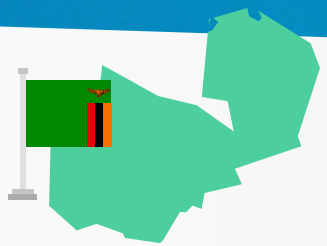
Formal e-waste management

- The key players in the formal collection domain are large integrated waste management companies, such as Interwaste, Oricol Environmental Solutions, SmartMatta (formerly Re-ethical) and Waste Plan. Aside from this, small private operators such as Cape E-waste refurbish and process e-waste collected directly from consumers.
- There are two companies in South Africa with the technical capability to extract precious metals from obsolete printed circuit boards (PCBs): SA Precious Metals and Rand Refinery, although only the former is doing so.

Awareness raising

- A first-of-its-kind e-waste recycling and management centre is set to be created at the Vaal University of Technology (VUT) Southern Gauteng Science and Technology Park.
- eWASA has partnered with local technology experts in various sectors to take technology that has been locally available in South Africa and develop it into a world-class commercial solution for the extraction of precious metals from printed circuit boards (PCBs) found in e-waste, as well as other fractions that require specialist treatment.

Zambia



What can we learn?

- Capitalizing on the presence of global producers and overseas OEMs who sell products locally, such as Ericsson, can be a way of leveraging better e-waste management in the country. A number of them have worldwide schemes that include creating awareness about e-waste and mechanisms for responsible EOL management of e-waste.
- Extensive stakeholder consultations consultations in the course of the development of regulations helped the Zambian Government to avoid pushback from stakeholders when these regulations were passed. Zambia has also been proactive in exploring different avenues to track and control the entry and movement of used and new EEE products.
- The Zambia Environment Management Agency (ZEMA) has been working alongside the Zambia Information and Communications Technology Agency (ZICTA) on type-approval for the entry of commercial-use ICT equipment.

Regulatory mechanisms

- *The Environmental Management (Extended Producer Responsibility) Regulations, Statutory Instrument No. 65 of 2018 (EPR Regulations)* mandate the adoption of an EPR scheme for packaging material, non-returnable glass and plastic bottles, cartons, beverage cans, waste oils, pesticides or chemical containers, used tires, EEE and their resultant waste.
- The Ministry of Water Development, Sanitation and Environmental Protection, through ZEMA, is responsible for enforcement of the EPR regulations.
- ZEMA is tasked with holding stakeholder consultations and ensuring enforcement of regulations.

Formal e-waste management

- Zambia ships its e-waste to Namibia for recycling and disposal. This is facilitated by a partnership between ZEMA and Namigreen, a Namibian e-waste recycling company.
- The first ever Zambian electronic waste recycling company, called TCH E-Waste Zambia, was launched in 2019, in collaboration with the EU. The e-waste management system focuses on collecting, sorting and exporting parts of e-waste and shipping for final disposal in an environmentally friendly manner.
- TCH has also partnered with AST Recycling, South Africa, to work on tackling the issue of e-waste recycling in Zambia.

Awareness raising

- Airtel Networks Zambia has partnered with Ericsson on a 'Product Take-Back' programme to create awareness about proper disposal of e-waste and to minimize the potential environmental impact associated with the disposal of decommissioned EEE in the country.

5. Regional harmonization

Potential for regional integration

There may be potential for regional integration among countries, in order to address the issue of e-waste. Possible benefits include the pooling and consolidation of e-waste management efforts.

BENEFITS OF REGIONAL COORDINATION

- Improving the quality of recycled products through competition.
- Increasing economies of scale.
- Opening up larger, more diverse markets.
- Increased trade flow and integration.
- More capital through consolidation.
- Better information, technology and knowledge sharing.
- Potential for promoting a diversified workforce.

Key policy interventions and initiatives

Flagship programmes such as the African Circular Economy Alliance (ACEA), which is a government-led coalition, the United Nations Sustainable Development Goals (SDGs), the African Union's Agenda 2063, the African Continental Free Trade Area (AfCFTA), the African Ministerial Conference on the Environment (AMCEN) and the transformational technologies of the fourth industrial revolution may all help shift the dial on e-waste.

In May 2008, ICT ministers, under the auspices of the African Union, adopted a reference framework for the harmonization of ICT regulations. The aim was to align policies and liberalize markets. Coordination among nations will be vital if competitive regional markets are to develop.

Regional harmonization will also enhance intra-African trade. In 2020, the African Telecommunications Union (ATU) published e-waste guidelines for ATU member states.

International and regional agreements

The Basel and Bamako Conventions, and to some extent national regulations, are the major regulatory tools for controlling the transboundary movement of hazardous waste in Africa. These conventions came about as a result of public outcry over hazardous waste being exported to Africa. There is now a need to facilitate regional harmonization and transboundary movement of waste that ensures its environmentally sound management, such as the legitimate movement of e-waste across Africa for the purpose of recycling. This could include establishing legal frameworks, guidance, standards and procedures for regional harmonization.

Potential for regional e-waste recycling

Regional harmonization can help to achieve economies of scale, build supply and demand capacities and raise competitiveness. Regional recycling hubs could help connect the continent, facilitate cross-border trade, investments financial flows and migration. They could be developed instead of local facilities.

A harmonized approach can also enhance capacities to generate and share data on e-waste as well as harmonized legislative standards across regions. This could also accelerate private-sector investment when companies realize the potential to scale up and boost intra-regional African trade, which is sorely lacking.

11.7 per cent

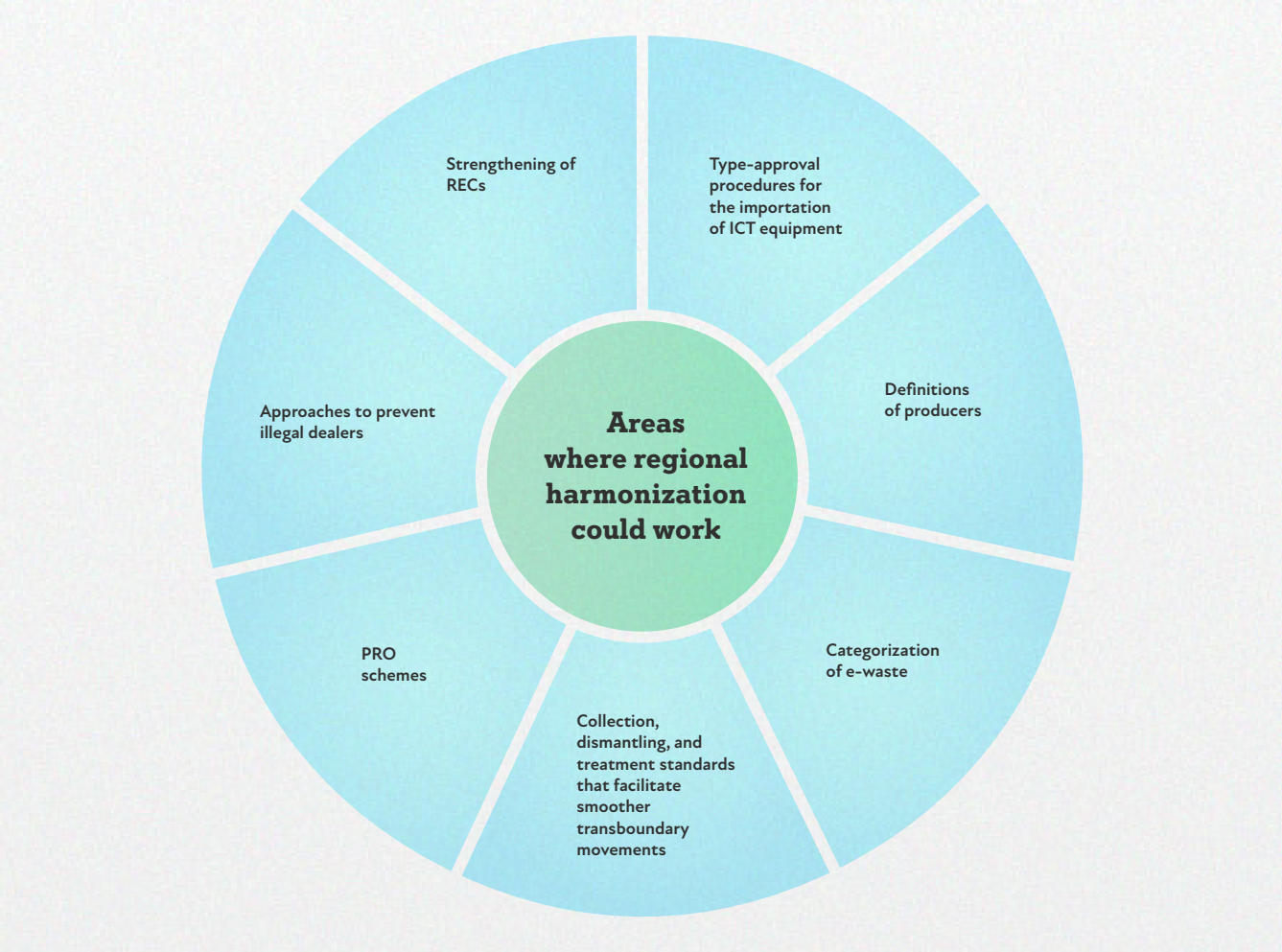
African regional trade
As a percentage of total trade - Lowest of any global region[6]

Regional harmonization could also help overcome limitations in terms of collection, sorting and high-end recycling. Logistical barriers arise due to lack of pooled resources: scale matters.

African countries are also grouped into regional economic communities (RECs), which play a crucial role in a wide range of integration activities. These RECs could serve as platforms for launching harmonization efforts in Africa in the field of e-waste. They could also promote the establishment of regional standards and develop systems and processes, as well as sharing regulatory information.

In the same way as in the EU, harmonization opportunities exist for Africa in the e-waste management domain, *inter alia* in regard to data requirements, standards, regulatory approaches, infrastructure and institutional arrangements, including regional clustering of recycling facilities.

How could regional e-waste management function?



Initiating harmonization

Harmonization could be initiated at the REC level. Once successful, it could then be promoted across the whole of Africa. However, practical steps need to be taken to overcome challenges to the regional harmonization of e-waste management.

In addition to infrastructure, countries may need to address non-tariff barriers and take actions to align regulatory approaches, as well as services and markets, by implementing harmonized reforms.

Some interventions may not call for significant financial resources: what is needed is political will and the prioritization of a regional agenda. However, other interventions will require additional technical and financial support and coordinated policy dialogue at the country and regional level.

[6] *Understanding the barriers to regional trade integration in Africa.*

6. Conclusions

As part of the toolkit, a number of summary takeaway points are highlighted here:

- Understanding how e-waste is currently managed is a crucial starting point for all countries looking to establish or revitalize their e-waste management system.
- There is no one-size-fits all solution to building a robust e-waste management system based on EPR. Although there are good practices and lessons from across the world, it is important that countries take these examples and adapt them to their local situations, having regard to their e-waste generation rates, recycling capabilities, the presence of 'producers' and expectations of stakeholders.
- An e-waste system built without a participatory approach is likely to be hampered by a series of issues, such as lack of stakeholder buy-in, unrealistic expectations and regulations that do not adequately reflect the reality on the ground.
- An overarching policy is necessary, but specific guidelines and implementation action plans are important, too.
- The choices made for the sector should be founded on two crucial elements – data from on the ground, and inputs from stakeholders.
- Enforcement is incumbent on the government mandate, and adequate resources and financing need to be set aside for this aspect.
- Building an e-waste system is not a one-time effort. Governments need to invest in continuous improvement of the system, prioritizing knowledge sharing, regional collaboration, technical know-how, and system intelligence.
- Robust regulations with a clearly articulated EPR scheme are now essential. The regulations need to answer all questions relating to:
  - » Who is covered by the regulations?
  - » What are the roles and responsibilities of key stakeholders?
  - » What are the targets to be achieved?
  - » What is the financial mechanism being applied?
  - » What is the institutional set up being implemented?
  - » How are support efforts (like behaviour change communication and capacity building) to be implemented?
- International standards can provide additional guidance on how to implement EPR systems and sustainable e-waste management, including ITU Recommendations L.1021: Extended producer responsibility - Guidelines for sustainable e-waste management, L.1030: E-waste management framework for countries, and L.1031: Guideline for achieving the e-waste targets of the Connect 2030 Agenda.

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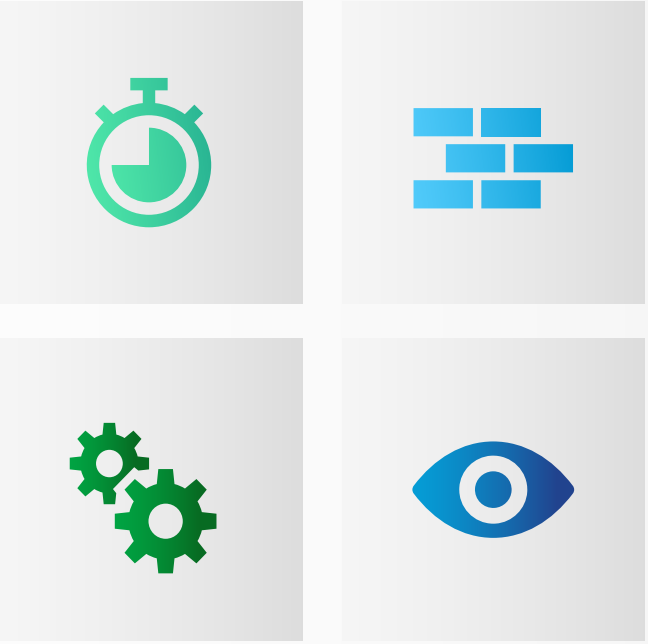

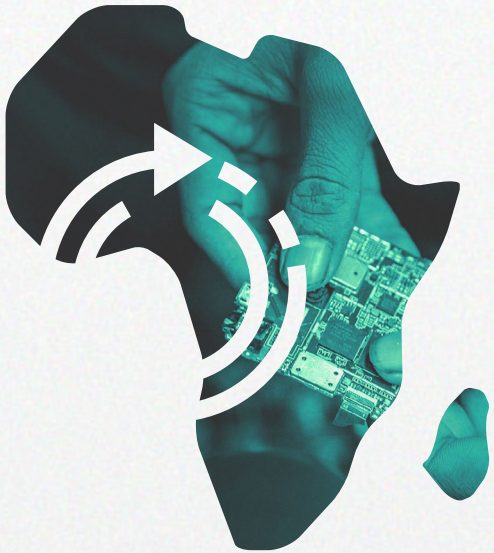

WORLD ECONOMIC FORUM

ITU

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
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