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Feasibility Study and Recommendations Report on the Optimal Strategies for EPR for WEEE

in the Caribbean context





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Abstract & Authors

This regional feasibility report provides a thorough examination of the enabling environment for EPR schemes for WEEE within the Caribbean context. This feasibility assessment considers the outputs from the Material Flow Analysis, Economic, Infrastructural, and Technical Assessments and delves into the economic, logistical, and regulatory factors required for the successful implementation of EPR schemes across the countries involved in the project.

The findings of this report indicate that a fragmented, purely national approach to WEEE management is unlikely to be effective in the Caribbean context. Instead, a coordinated regional EPR system, supported by national implementation mechanisms, represents the most feasible and cost-efficient pathway for achieving environmentally sound management of e-waste in Small Island Developing States.

Main authors and contributors:
United Nations Institute for Training and Research: Elena D'Angelo, Elena Fernandez Cubillo, Vanessa Forti, Otmar Deubzer, Ruediger Kuehr

Suriname Waste Management: Lalieta Somwaru

Please cite this publication as:
E. D'Angelo, L. Somwaru, E. Fernandez Cubillo, V. Forti, O. Deubzer, R. Kuehr, United Nations Institute for Training and Research, "Feasibility Study and Recommendations Report on the Optimal Strategies for EPR for WEEE in the Caribbean context", 2026, Bonn, Germany

Acknowledgements:
The authors wish to express their sincere appreciation to all individuals and institutions who contributed to the development of this report.

This work was undertaken as part of the Global Environment Facility (GEF)-funded Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States (ISLANDS) Programme, a global initiative designed to reduce the impacts of chemicals and waste in Small Island Developing States (SIDS) through integrated, sustainable, and innovative management approaches. The Programme is implemented by the United Nations Environment Programme (UNEP) in collaboration with a range of executing partners and participating countries.

Special appreciation is extended to the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean), which served as the regional executing partner and provided overall coordination, technical guidance, and support throughout the implementation of the activities.

Contact information:
For enquiries, please contact corresponding author E. D'Angelo via elena.dangelo@unitar.org

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List of Acronyms

Acronyms	
GEF	Global Environment Facility
ElektroG	Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment
BCRC - Caribbean	Basel Convention Regional Centre for Training and Technology Transfer in the Caribbean
CARICOM	Caribbean Community
CAT.	Category
CTS	Collective Takeback Scheme
CS	Compliance Schemes
EEE	Electrical and Electronic Equipment
EoL	End of Life
EPA	Environmental Protection Administration
ESM	Environmentally Sound Management
ESP	End-of-Life full-Service Provider
EU	European Union
EPRON	E-Waste Producer Responsibility Organization Nigeria
EPR	Extended Producer Responsibility
FRRC	Fee Rate Reviewing Committee
IBTS	Individual Brand-selective Takeback Schemes

Acronyms	
INTS	Individual Non-selective Takeback Schemes
inh	Inhabitant
kg	kilogram
LDCs	Least Developed Countries
MCI	Minimal Collection Incentive
NESREA	National Environmental Standards and Regulations Enforcement Agency
NGOs	non-governmental organizations
OECD	Organisation for Economic Co-operation and Development
PRO	Producer Responsibility Organization
PUWAMA	Public Waste Management Authorities
PPP	Purchasing Power Parity
POM	Put on the Market
SIDS	Small Island Developing States
SUWAMA	Suriname Waste Management Foundation
SCYCLE	Sustainable Cycles
UNITAR	United Nations Institute for Training and Research
UNU-KEYS	United Nations University Keys
WEEE / e-waste	Waste Electrical and Electronic Equipment



Chapter 1.
Introduction on the Project



The Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States (ISLANDS) programme, funded by the Global Environment Facility (GEF), seeks to address the sound management of chemicals and waste in Least Developed Countries (LDCs) and Small Island Developing States (SIDS).

The overarching goal of the ISLANDS programme is the sound management of chemicals and wastes in SIDS. The third component of the programme supports the achievement of this goal by promoting the Safe Management of Products entering SIDS and Closing Material and Product Loops for Products. One of the key waste streams to be addressed under this component is Waste Electrical and Electronic Equipment (WEEE or e-waste).

In recent years, WEEE has emerged as a pressing environmental and social concern in the Caribbean region. With the rapid proliferation and application of technology in households and businesses, the volume of WEEE generated in the region has escalated dramatically. This surge in WEEE poses a significant threat to the delicate Caribbean ecosystems and public health, where there is a limited capacity for the Environmentally Sound Management (ESM) of WEEE. A regional approach to WEEE management in the Caribbean region is crucial due to the small geographic size, population and limited resources of individual SIDS. Regional collaboration on WEEE management can offer greater economies of scale and allow for efficient resource allocation for recycling and disposal systems.

In recent years, WEEE has emerged as a pressing environmental and social concern in the Caribbean region.

Given the structural constraints of SIDS, including limited economies of scale, geographic fragmentation, and constrained institutional capacities, traditional national approaches to waste management are often insufficient. This underscores the need for regionally coordinated solutions.

Overview of the consultancy

In this framework, the Sustainable Cycles (SCYCLE) Programme of UNITAR, Division for Planet, has been contracted by the Basel Convention Regional Centre for Training and Technology Transfer in the Caribbean (BCRC Caribbean) to conduct the activities related to Output 3.1 of the ISLAND project.[1] Representatives of the Suriname Waste Management foundation (SUWAMA), a local organization in Suriname dealing with waste management issues, were hired as individual consultants by UNITAR SCYCLE for assistance and support.

As part of **Deliverable 3**, the "Feasibility study and recommendations report on the optimal strategies for EPR in the Caribbean context" aims at detailing the main aspects of the thorough examination of the enabling environment for Extended Producer Responsibility (EPR) schemes for WEEE within the Caribbean context conducted by the Consultant.

This report builds on the results of Deliverable 2, the 11 National WEEE Assessments which covered the following project countries[2]: Antigua and Barbuda, The Bahamas, Barbados, Belize, Cuba, Dominica, Guyana, Saint Lucia, Saint Kitts and Nevis, Suriname, and Trinidad and Tobago. The National WEEE Assessments provide a comprehensive assessment of WEEE management in each of the project countries, including material flow analysis, economic evaluation, infrastructure assessment, and technical capacities.

Beyond assessing feasibility, **this report aims to provide a clear and actionable pathway for policymakers and stakeholders to design and implement an EPR system adapted to the Caribbean context**.

The report is structured as follow:

- Chapter 1 introduces the project, and chapter 2 gives an overview on the methodology used for the analysis of this feasibility report.
- Chapter 3 introduces the concept of EPR for WEEE and explains the main reasons why this approach is widely used and has proved to be successful to improve the WEEE management at national and regional levels, globally.
- Chapter 4 looks more closely at good practices of EPR implementation for WEEE, at global level – to be used as practical examples to leverage on, in view of developing such system in the Caribbean.
- Chapter 5 delves into the Caribbean context, providing a comparative analysis of the WEEE flows at regional level, the technical and infrastructural situation related to WEEE management, and presents the potential benefits and related costs associated to the improvement of WEEE management.
- Finally, chapter 6 elaborates a set of informed recommendations, built both from the analysis presented in the previous chapters and as a result of a participatory approach with the stakeholders of the 12 project countries, and elaborates a suggested roadmap for building an EPR for WEEE in the Caribbean region.

[1] Output 3.1 is part of Component 3 of the GEF ISLANDS projects 10279 and 10472 – which is focused on "Safe management of Products entering SIDS/Closing Material and Product loops for Products. Output 3.1 specifically deals with "EPR Schemes and regional approach to manage WEEE, pilot tested in selected countries".

[2] As per the Terms of Reference of this project consultancy, Dominican Republic (DR) was not assessed under the Material Flow, Economic, Infrastructural, and Technical Assessment, while it was initially included from the feasibility assessment phase onward. However, DR did not participate in the data gathering phase, and therefore, the only analysis carried out on DR was on the WEEE flows, based on the data already included in the internal database of UNITAR SCYCLE (see Baldé et al. 2024).

Chapter 2.
Methodological Note

The methodology used to develop this report is mixed quantitative and qualitative.

First, a literature review was conducted on existing good practices on EPR for WEEE at the global level.

The quantitative methods concern the quantification of the WEEE flows, presented at comparative level for the 12 project countries, and the high-level cost-benefit analysis to assess the potential economic gains and losses linked to an improved WEEE management in the region.

The qualitative methods, instead, concern the technical and infrastructural assessment of WEEE management conducted through an online survey with the main countries' stakeholders, and a participatory approach with the selected stakeholders to elaborate a common roadmap on EPR for WEEE in the region.

Further details are provided below:

Quantitative methods

WEEE flows quantification and WEEE classification

The methodology applied to compile the WEEE flows assessment and analysis is based on the standardized methodology developed by the SCYCLE team, in cooperation with other international agencies, as also explained in the international statistical guidelines (Forti et al. 2020).

The methodology consists of four steps: 1. calculating Electrical and Electronic Equipment (EEE) Put On the Market (POM) with trade and customs data; 2. defining product lifetime and in-use stock; 3. deriving e-waste generated from POM time-series and obsolescence; and 4. mapping e-waste flows, including formally collected volumes reported by national statistical offices.

Products are grouped in 54 United Nations University Keys (UNU-keys), which group products with comparable average weights, material compositions, end of-life characteristics, and hazardous profile and lifetime distributions. These 54 UNU-KEYS are grouped in the 10 categories of EEE of Annex I of the European Union (EU) WEEE Directive (see Table 1), used in this report for harmonization purposes.

Table 1. EEE and E-waste 10 Categories

E-waste category	Description
CAT. 1	Large household appliances
CAT. 2	Small household appliances
CAT. 3	IT and telecommunications equipment
CAT. 4	Consumer equipment and photovoltaic panels
CAT. 5	Lighting equipment
CAT. 6	Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
CAT. 7	Toys, leisure and sports equipment
CAT. 8	Medical devices (with the exception of all implanted and infected products)
CAT. 9	Monitoring and control instruments
CAT. 10	Automatic dispensers

For more in-depth explanation refer to the E-waste Statistic Guidelines – third edition (Lysaght et al. 2026).

Cost-benefit analysis

The quantification presented in this report is based on the projected amounts of e-waste expected to be generated across the 12 project countries by 2030. Both costs and benefits have been quantified following the methodological approach outlined in the Global E-waste Monitor 2024 (Baldé et al. 2024). Material prices used in the analysis are taken from 2022 data, as reported in the same source.

The economic benefits of e-waste management have been calculated in terms of the value recovered from metals contained in discarded equipment. The composition of e-waste used in this analysis is based on global average data reported in the Global E-waste Monitor 2024 (Baldé et al. 2024). The shares of different materials have been extrapolated and applied to the projected e-waste generation across the 12 countries in 2030 to estimate potential recovery values.

For a more in-depth explanation refer to the Global E-waste Monitor (Baldé et al. 2024).

Qualitative methods

Survey

The aim of the survey was to gather qualitative information concerning the current WEEE management situation in the surveyed countries.

The survey covered the following aspects:

- legislative and regulatory framework;
- institutional and organizational structure;
- financial mechanisms;
- collection, recycling and disposal infrastructure;
- data and monitoring;
- public awareness and participation;
- role of the informal sector;
- readiness towards EPR system;
- environmental and social impacts;
- transboundary movements;
- challenges and barriers;
- regional cooperation.

The survey was submitted to the main actors involved in the WEEE management and in the possible establishment of a regional EPR system in the project countries. This includes national stakeholders from the 12 project countries, including governmental authorities, recycling companies, WEEE importers/exporters, Civil Society Organizations (CSOs), Non-Governmental Organizations (NGOs), representatives from the informal sector etc. Table 2 provides an overview of the countries' responses.

Table 2. Overview of the countries' surveys responses

Country	Number of surveys completed	Number of surveys incomplete
Antigua and Barbuda	3	2
Bahamas	1	0
Barbados	8	1
Belize	2	2
Dominica	1	0
Guyana	0	0
Saint Kitts and Nevis	2	1
Saint Lucia	7	1
Suriname	5	4
Trinidad and Tobago	1	0
Cuba	0	0
Dominican Republic	0	0
Total	**30**	**11**

For the full text of the survey please refer to the National WEEE Assessments 2026.[3]

[3] *At the time of drafting of this report the 11 National WEEE Assessments – 2026 were under finalization and not yet published online, therefore a direct link cannot be provided at this stage. Please consult the website www.scycle.info for the online publications, which will be uploaded after the conclusion of the project in April 2026.*



Regional workshop: participatory approach through a 2-day group work to develop a Roadmap for EPR in the Caribbean.

The 2-day group work on "How could EPR for WEEE be established in the Caribbean?" was organized during the Regional Workshop held in Port of Spain on 4-5 March 2026. The objective of the group work was to come up with a suggested roadmap for EPR design and development at regional / subregional level in the Caribbean, by using a set of guided questions prepared by the consultants.
The guided questions covered the following topics:

Aspects to be considered to design an EPR system for WEEE, as a stable financing system for WEEE management and other related tasks.

1. Who must pay for end-of-life EEE and why?
2. How to organize the cash flow?
3. How to organize the information flow?
4. Who has the responsibility for managing the WEEE? (specify for collection, treatment, awareness raising with consumers, monitoring and enforcement)
5. What is the role of the informal sector?
6. Is a regional / sub-regional approach to be considered?
7. What legal and regulatory approach should be applied?

At the end of the Day 2 group work, all groups presented to the plenary their suggested roadmap for EPR development in the Caribbean. All the outcomes of the presentations and following discussions have been analyzed by the consultants and compiled as informed recommendations and a synthesis roadmap, as presented in chapter 6.

Chapter 3.
What is EPR, and why is it needed for WEEE?

The concept of EPR was first introduced in the 1990's by Germany, Sweden and a few other countries, to solve the difficult problem of garbage disposal by making the producers responsible for the entire life cycle of products (Mallick et al. 2024, Wang et al. 2017). These responsibilities should include informative, physical, economic, liability and ownership responsibilities (Lindhqvist 2000)[4].

Current definitions of EPR differ by organisation and government. In this report, we refer to the Organisation for Economic Co-operation and Development (OECD) definition, which describes EPR as "an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle".[5]

The main aspect to be addressed in an EPR scheme, especially in it starting phase, is the **financing**, as e-waste management does not pay for itself. There are several cost factors involved in the e-waste management, such as: collection, transport, treatment, removal of batteries and other hazardous components (manual labour), liberation of valuable materials in pre-treatment to enable their repair or refurbishment, recycling, treatment and disposal of hazardous and other waste fractions, purchase and maintenance of treatment equipment, buildings, costs for staff and space, costs for compliance etc.

The e-waste management requires investments in expensive assets and goods (e.g. training of staff involved, technical infrastructure and machines). **Profits from sales are volatile**, being strictly linked to the market prices of valuable materials contained in e-waste. Which means that **long-term-secured financing is key** for implementing a sustainable and profitable e-waste management system.

For these reasons, EPR policies have seen a significant growth in the last years, becoming a relevant topic also for **emerging economies**. The EPR policy approach has been widely adopted by governments and companies at global level. It is currently most used for **electronics**, packaging, vehicles, and tyres, but the success of EPR in increasing material recovery rates has triggered a debate about expanding the use of EPR to additional product groups, such as textiles. (OECD 2023).

In the Caribbean context, EPR is particularly relevant as it offers a mechanism to shift the financial burden of WEEE management from governments to producers, thereby enabling more sustainable and predictable financing structures.

Selected key principles of EPR for WEEE

Based on the extensive literature on the EPR subject[6], key principles need to be considered when designing an EPR policy at national or regional level. Some selected key principles are mentioned below in Table 3.[7]

Table 3. Selected key principles of EPR for WEEE

Definition of responsibility	Target setting	Stakeholders' involvement and coordination
Scope and coverage	Target setting	Stakeholders' involvement and coordination
Organization of e-waste management	Informal sector involvement	

Source: Authors' elaboration from OECD 2024 and GIZ 2023

[4] *(Lindhqvist 2000) defined EPR as "a policy principle to promote total life cycle environmental improvements of product systems by extending the responsibilities of the manufacturer 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".*
[5] *https://www.unido.org/sites/default/files/unido-publications/2023-11/GACERE_Circular%20Economy%20and%20Extended%20Producer%20Responsibility_webinar%20report.pdf*
[6] *See the 'Reference' for an extensive list of references related to EPR policies.*
[7] *These main principles are mentioned in OECD 2024 and have been adapted by the authors to the project context.*

First, **responsibilities should be defined to achieve the objectives of the EPR**. These responsibilities can be taken by producers, importers, or even shared among different stakeholders, including consumers and municipalities. This is also relevant to **decide the basic set-up of the EPR**, which includes a number of aspects: its basic form, being it on a voluntary or mandatory basis; the type of responsibilities, collective or individual; who should take the leadership role; who is in charge of the EPR system governance and the number of EPRs to be established, either single or multiple (GIZ 2023).

As an example, (GIZ 2023) did a previous assessment on EPR schemes in SIDS, focused on plastics but which is also mainly applicable to EEE products. (GIZ 2023) highlights that, in SIDS, collective responsibility, rather than individual responsibility, is considered as more suitable – due to the large and diverse number of individual sources of e-waste covered in the region. Therefore, for SIDS, (GIZ 2023) defines PROs as the preferred option to run an EPR scheme, with the main purpose of reducing individual risks of the companies involved.

Second, **setting targets on the collection, recycling and recovery of e-waste should improve the effectiveness of the EPR in increasing the rates of collection and recovery**. To set obligatory targets, a consultation with stakeholders should be performed, together with the quantification of potential costs and benefits.

Third, the **involvement and coordination of all stakeholders is crucial**: a transparent and continuative dialogue needs to be established among all the relevant actors. When establishing EPR schemes, partnerships with governments are an important component. Even when producers take an operational role, governments may need to play an administrative role in overseeing the companies and the NGOs operating the system, also to avoid the risk of free riding[8]. When systems are mandatory, governments should support in establishing enforcement mechanisms.

In South Africa, for example, producers in all sectors and producer responsibility organizations (PROs) need to be registered with the Environmental Ministry. Overall, **the governance of EPR systems need to be transparent**, to allow the possibility to assess their performance.

The **scope and coverage of the EPR needs to be defined**: in the case of electronics, it should be defined whether it covers all the products categories (e.g. in the EU, it covers all the 6 categories as defined in the WEEE Directive[9]). Or, for example, if it is limited only to the most profitable products (depending on value of materials) or if the products are selected based on market share etc. A phase-approach could also be considered, where new products are suggested and included in the scheme over time.

The **financial flows are considered as the core element**, especially when an EPR is established from zero. Financial contributions from companies (producers) are needed to cover all costs and expenditures associated with the activities and services under the scheme. **Criteria to calculate the fees can be based on the weight and quantities of EEE products POM by each company** – but they can also be modulated according to certain products' characteristics (see Box 1 on Eco-modulation principle).

This highlights that EPR should not only be seen as an environmental policy instrument, but as a critical financial mechanism without which effective WEEE management systems are unlikely to be established in the region.

The **monitoring and enforcement** are another key element, to ensure compliance and avoid free riding. The monitoring should cover the entity running the EPR, the obliged companies under the EPR, and the contracted waste management operators. If the EPR is managed by a PRO, usually it requires supervision and defined rules and responsibilities through public authorities. Moreover, obliged companies are usually monitored through a registry, which identify and hold accountable the companies by ensuring compliance. GIZ (2023) defined, for plastic packages, a **registry for importers** as most suitable entry point – considering that imports in SIDS are the largest share of plastic and plastic products. A similar consideration could be applied also to EEE products.

[8] *Free riding is defined as the practice where companies circumvent EPR obligations, by avoiding the costs and fees associated with waste management, while taking advantage of the overall system in place. The risk of free riding is particularly related to the online sales, where compliant producers face higher costs due to the lack of registration and payment of fees by non-compliant sellers.*

[9] *For clarity, the 6 EEE categories are currently adopted under the Directive 2012/19/EU on waste electrical and electronic equipment (recast), also called WEEE Directive. The previous categorization, which used the 10 EEE categories adopted in this project, was used until 2018.*



The organization of e-waste management: **an EPR scheme needs to clearly define how the collection, sorting, recycling, recovery and disposal of WEEE is organized** under the EPR (GIZ 2023). While there are different approaches to be adopted, which can involve either public or private entities, or both, **the most appropriate approach needs to be selected based on the specific domestic or regional context**. As an example, local public authorities already in charge of managing other waste streams could be asked to put the existing infrastructure and experience in waste management at the service of the EPR scheme.

In this framework, however, the **role of the informal workers** not only needs to be considered, being **especially important in the waste sector of developing economies**, but a just transition to the formal sector, to secure their contribution while also mitigating the environmental and social impacts is usually desirable. For example, Brazil's 2010 National Solid Waste Policy is an example of recognising the contributions of and formalising the previously informal waste sector.[10]

EPR implementation models

As specified in the ITU Guidelines for Sustainable E-waste Management[11], two approaches can be used to achieve the objective of making a producer responsible for the entire lifecycle of a product:

- **Individual Producer Responsibility (IPR)** - Each producer is responsible for collecting and recycling their own products. Some pay a third party to do this work.
- **Collective Producer Responsibilities (CPR)** - Producers collect and recycle products together, regardless of brand.

CPR often involves a Producers Responsibility Organization (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. However, they can also be for-profit organizations.

EPR schemes and policies are usually introduced through **established legal frameworks**, which can be either general on waste management, or related to specific waste sectors – such as WEEE. Under Chapter 5, an overview on whether legal frameworks for establishing EPRs schemes are in place in the 12 project countries of the Caribbean is provided.

Given these characteristics, EPR represents the most viable policy approach for improving WEEE management in the Caribbean. However, its success depends on careful adaptation to regional conditions, particularly with regard to scale, governance, and financing.

[10] Main source for this paragraph is (OECD 2024).
[11] The guidelines can be downloaded at the following link.

Chapter 4.
How is EPR for WEEE implemented in other countries?

In this chapter, we present an overview of EPR mechanisms for WEEE already established in other countries and regions worldwide, to be used as best practice and as examples to learn from, in developing a similar system in the Caribbean region.

To this purpose, and considering their specific characteristics, models from the EU Member States (MS), with a specific focus on Germany, from the People's Republic of China, Taiwan and Nigeria are presented below. They have been selected for their peculiar characteristics, that are also used as a basis for developing informed recommendations tailored to the Caribbean system.

The list is of course far from being exhaustive, and the examples are only presented as a sample.

These international experiences provide important lessons for the Caribbean, particularly in relation to governance structures, financing mechanisms, and the role of producer responsibility organizations.

4.1 EPR IN DIRECTIVE 2012/19/EU (WEEE DIRECTIVE)

All Member States of the EU are covered by the WEEE Directive, first published in 2002 and updated in 2012 and 2024 (ongoing). The WEEE Directive establishes targets for the collection, recycling and recovery of WEEE including the financing of sound WEEE collection, treatment and disposal via extended producer responsibility (EPR).[12] Member states are obliged to transpose the WEEE Directive into their national regulations since the WEEE Directive itself is not binding for the Member States. Thus, while the WEEE Directive formulates objectives, the Member States decide how they want to achieve these objectives.

As mentioned previously in chapter 3, a distinctive element of EPR consists of the possibility of obliged subjects, such as the producers / manufacturers, to delegate their responsibility to PROs or Compliance Schemes (CS). The latter typically operates by charging the obliged subject a fee and providing in return the guarantee of compliance with policy targets by managing take-back obligations and handling materials on behalf of the obliged industry, on a collective basis (Favot et al. 2022).

In Europe, the national EPR models can be classified in four categories, as outlined in (Favot et al. 2022):

1. State Fund (eco-tax) model (with or without single executing agency): producers must pay a fee or a tax to a waste management fund and are financially responsible for the End of Life (EoL) of their products. In the case of the presence of a "single executing Agency", a government agency coordinates the waste management program nationwide. Otherwise, the waste management fund finances private and municipal waste management programmes.
2. Single Organization Model: a single compliance organization controlled and financed by the industry sector. The industry organizes and funds the waste management system and is responsible for achieving the targets.
3. Competing Organization Model (with or without coordination centre, and with or without eco-tax back-up): the compliance organizations (PROs) assume the take-back obligation of producers. PROs are usually subject to authorisation, and they compete on the fees charged to producers. This model might contemplate a national clearing house: a coordination body that organises the compliance system to achieve the national coverage of the waste collection and to keep a levelled play field among PROs. If the eco-tax backup applies, producers or PROs on their behalf are charged a fee as a penalty for not achieving the collection targets (Favot et al. 2022).
4. Other models with producer funding, cf. example of Germany – where producers register to a national organisation (with governmental powers) financed through producer fees set by ordinance. In Europe, this system is not directly comparable to other systems.

[12] https://environment.ec.europa.eu/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en



The below figure illustrates the status and types of EPR-models implemented in Europe for WEEE[13].

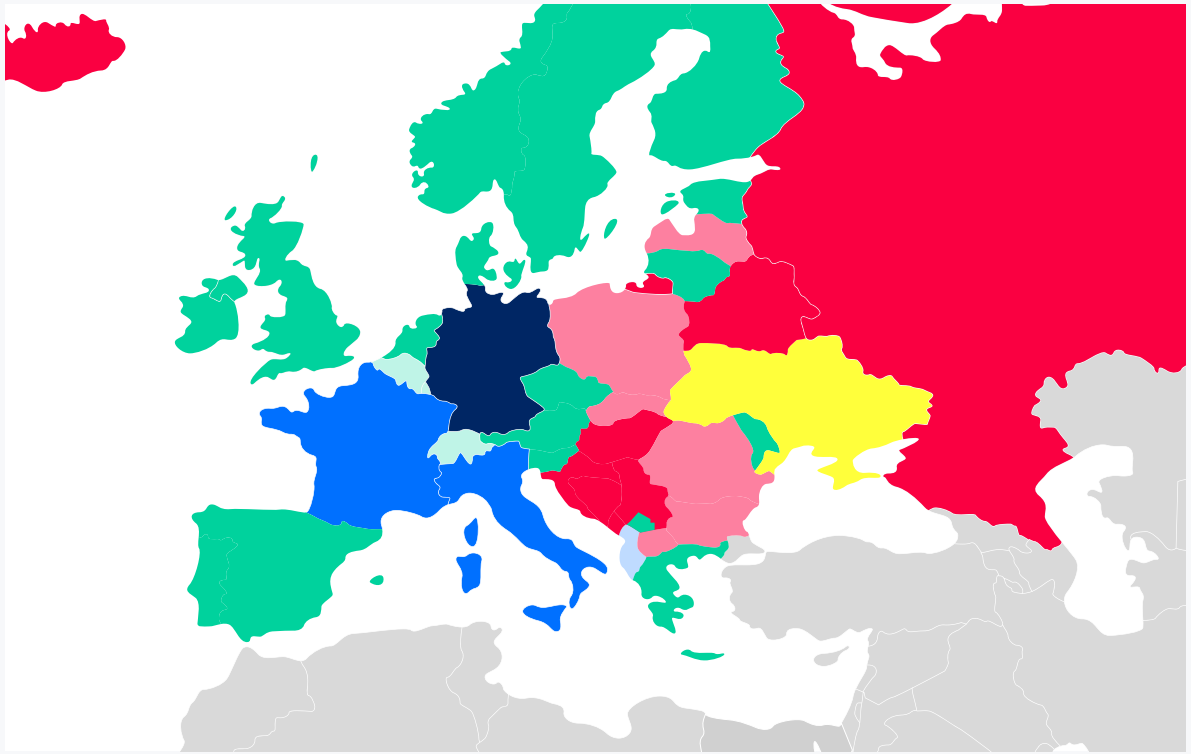


Figure 1. EPR legislation in Europe - Source: SagisEPR.com

[13] www.sagisEPR.com

Transposition of producers' EPR obligations in the EU WEEE Directive in EU Member States

As illustrated in Figure 1, in most Member States, producer responsibility for WEEE is implemented via multiple competing PROs, with only 5 countries opting for a monopolistic scheme: Belgium, Netherlands, Luxembourg, Switzerland and Cyprus. Hungary and Croatia are the only states within the European market without a PRO as they are collecting EPR fees via a governmental fee/tax (Expra 2021; PRO Europe 2019).

The role of PROs is aimed at financing and administrating producers' EPR obligations, as illustrated in Figure 2. In terms of financing, the PROs are typically funded by producers, through fees, which they pay out to treatment operators to perform their logistics, treatment and disposal activities. At the same time, PROs gather information from the pre-treatment operators -including the information of downstream operators down to final treatment operators which send those reports to the pre-treatment operators - regarding the type of categories treated, masses of materials recovered/recycled, or disposed from the treated WEEE or fractions thereof. The below figure illustrates PRO's core responsibilities.

Governments may also charge PROs to finance collection of WEEE from private households, with the objective of holding them responsible also to achieve the collection target and report the collected types and volumes of WEEE.

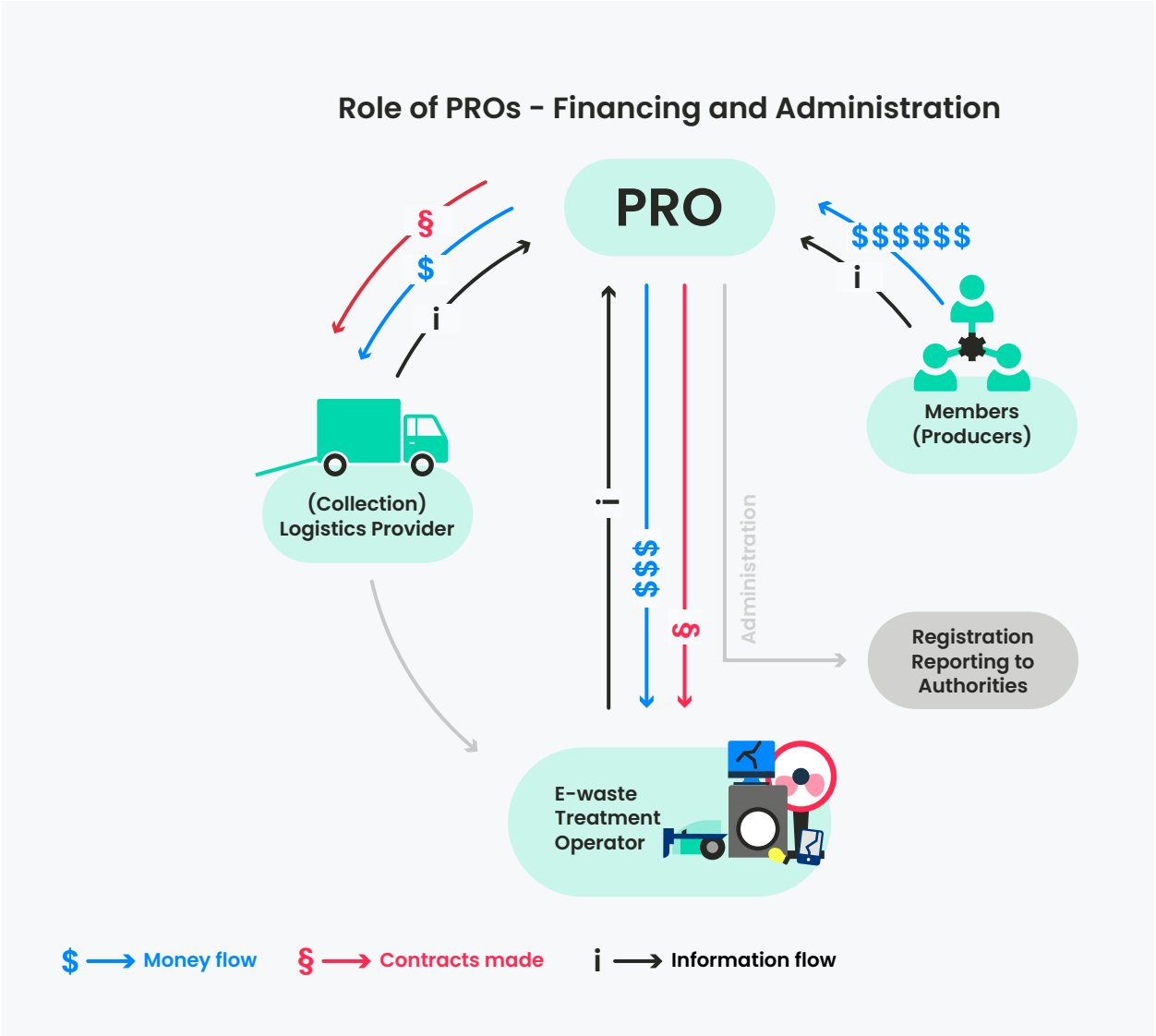


Figure 2. Cash and information flow model – PROs; Source: Deubzer 2026

Transposition of EPR in other EU Member States- Example Germany

Germany transposed the EU WEEE Directive into national law through the "Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment (ElektroG)". The law passed the German Bundesrat and Bundestag (parliament) in spring 2005. Meanwhile, the ElektroG 4 is in force[14] since January 2026.

ElektroG fully implemented the principle of an EPR system and stipulated that producers must meet targets of recovery and utilization and recycling (Xiang et al. 2014). Collection groups only partially follow the 6 EEE categories as defined in the WEEE Directive.[15] Cat. 5 (Small Equipment) and Cat. 6 (Small Information and Communication Technology) are, however, collected in one collection group. PV Panels are collected separately as Collection Group 6, instead of Large Equipment (Cat. 4) with other large devices.

According to the (ElektroG 2005), the **Public Waste Management Authorities** (PuWaMA, mostly municipalities) are responsible for the collection of e-waste. They must set up collection points in their districts to which final holders and distributors may return e-waste from private households in the vicinity (bring back system) (Deubzer 2011). Further, large retailers with at least 400 m² of retail, storage, or shipping space are required to take back old electrical devices and ensure their disposal at their own expense. This also includes online retailers, as well as grocery retailers with a total sales area of 800 m² or more.

In practice, these providers must take back up to three old devices per device category from users free of charge, even without the purchase of a new product, provided that the devices do not exceed a maximum edge length of 25 cm. This mainly applies to widely used small appliances such as mobile phones, tablets, kitchen appliances, and other small electronic devices.

The German system is peculiar in the implementation of the EPR principle: back in the early 90's, the country implemented an EPR system for packaging waste which produced a monopoly in the sector with costs that industry deemed inappropriate. For the WEEE stream, Germany designed a **system promoting competition** and preventing free riders and cherry pickers.

The ElektroG leaves the producers three possibilities to take back e-waste. Producers may set up Individual Brand-selective Takeback schemes (IBTS), Individual Non-selective Takeback Schemes (INTS) or join a Collective Takeback Scheme (CTS), as illustrated in Figure 3.

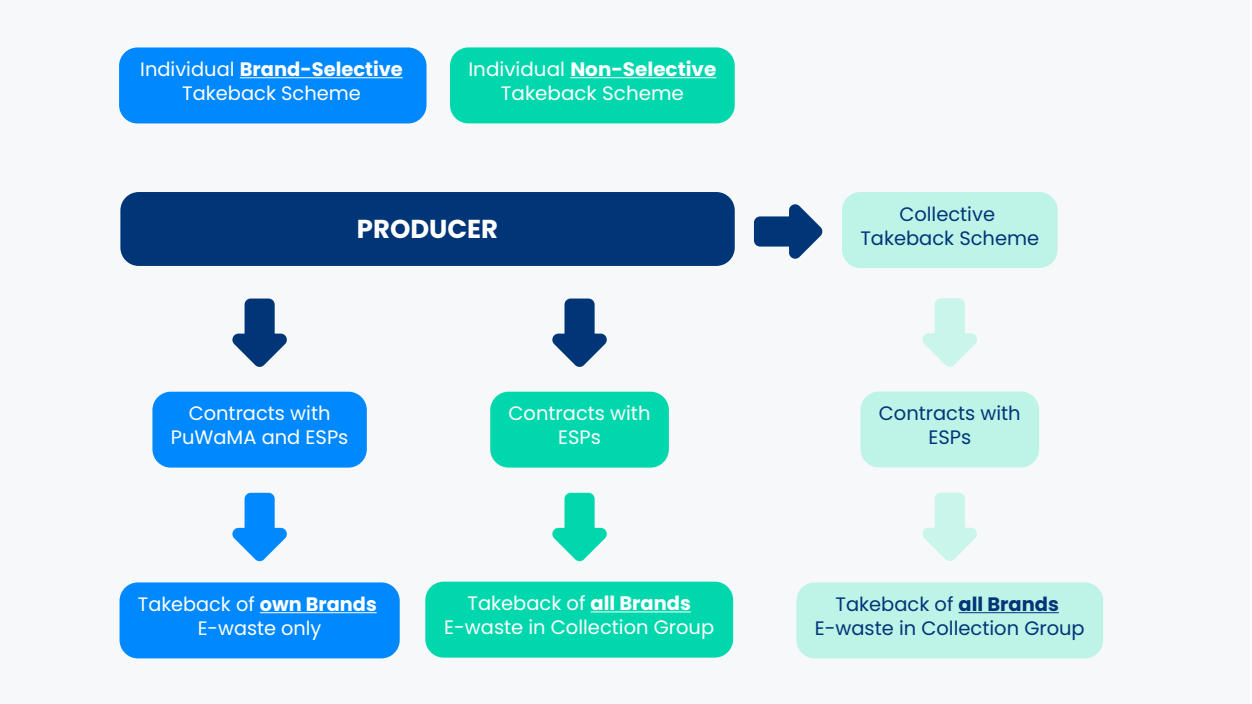


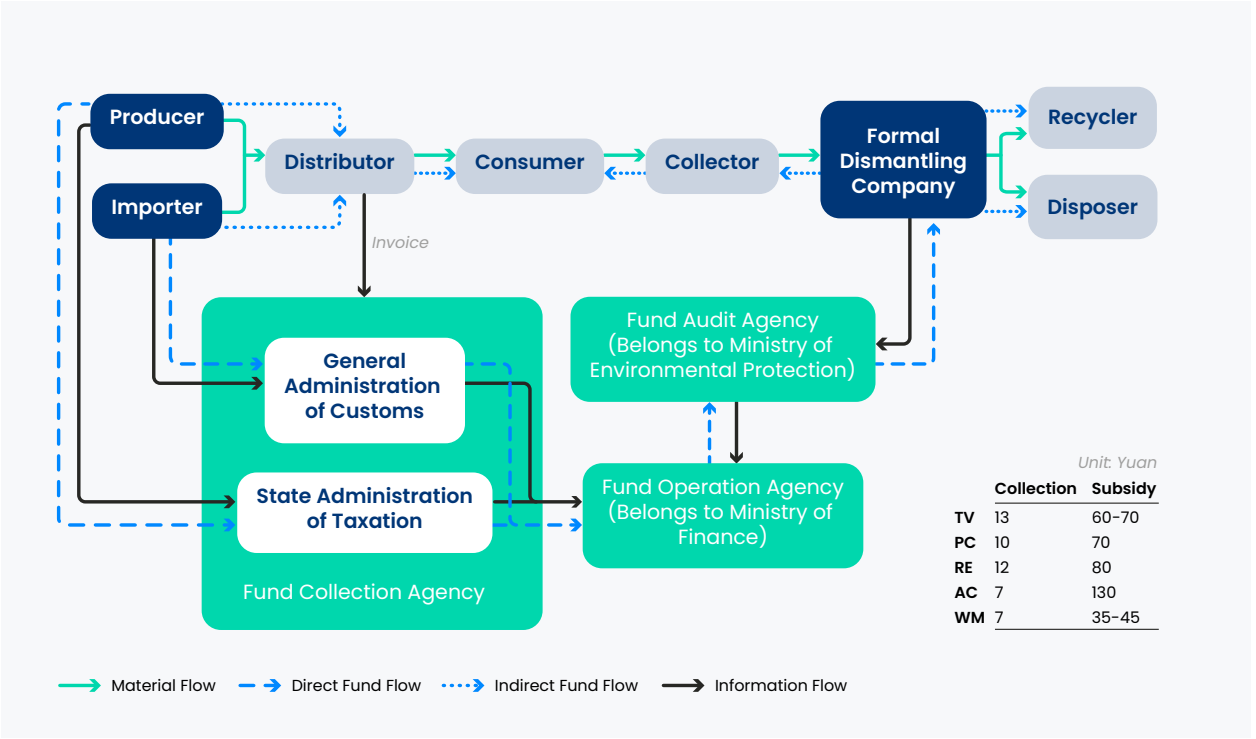
Figure 3. Possibilities for producers in Germany to implement the EPR[16]; Source: Deubzer 2011

[14] *The English version is not yet available.*
[15] *See for instance WEEE2 – Definition and Understanding of the 6 Categories (15.08.2018)*
[16] *ESP stands for End-of-Life Full-Service Provider.*

Most EU member states have only one CTS in place taking back all kinds of e-waste, or several CTS each taking back e-waste from certain categories of EEE. In Germany, to maintain complete competition, the market shares of CTS are limited.

BOX 1 - Eco-modulation principle[17]

Eco-modulation is a financial principle within EPR systems that aims to mirror the true cost of products' externalities by differentiating the EPR fee basing on their specific characteristics. It operates by modulating the fee, creating a higher fee for producers who introduce products that fall short of specific environmental objectives, while offering lower fees to those who market products that align with these goals. **This approach creates an incentive for producers to adopt environmentally friendly practices and design as well as prioritise sustainable materials**. In the EU some eco-modulation criteria applied to the EEE waste stream include presence of hazardous materials and the product lifespan.



Unit: Yuan

	Collection	Subsidy
TV	13	60-70
PC	10	70
RE	12	80
AC	7	130
WM	7	35-45

Figure 4. The EPR system in China for WEEE recovery and recycling: Source: Wang et al. 2017

4.2 EPR IN THE PEOPLE'S REPUBLIC OF CHINA

In 2009, in China, the State Council enacted the "Regulations on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products", which clarified the establishment of a special fund for recovery processing based on the principle of EPR to promote the development of a standard processing industry. In 2012, the Ministry of Finance enacted "Administrative Measures on the Collection and Use of WEEE Treatment Fund", which determined and listed five major household appliances-televisions, air conditioners, washing machines, refrigerators, and personal computers as the first batch on the fund subsidy directory, gradually starting to support and lay out the standard processing industry (Wang et al. 2017).

Figure 4 illustrates the functioning of the EPR system for WEEE in China: the State Administration of Taxation and Customs are, respectively, responsible for collecting data on domestic production and consumption of EEE and imported EEE for remittance to the pool of processing funds supervised by the Ministry of Finance. When China determines the amount received by the WEEE fund, the status quo of a high level of competition among EEE producers and low profit levels in China is given full consideration (Gu et al. 2017).

[17] https://circulareconomy.europa.eu/platform/sites/default/files/2025-06/EPR_Schemes_White_Paper_2025.pdf



In 2016, China's State Council issued the **Plan for the Implementation of the EPR**, which establishes a framework extending manufacturers' environmental responsibilities across their products' entire lifecycle, from design to disposal.

The Plan set the following goals and targets:

- By 2020, the policy system related to the EPR system will be initially formed, product eco-design will make significant progress, and the standardised recycling and recycling rate of key waste products will reach an average of 40%.
- By 2025, the relevant laws and regulations on the EPR system will be completed, the EPR system in key areas will operate in an orderly manner, product eco-design will be widely promoted, the proportion of recycled raw materials used in key products will reach 20%, and the standardised recycling and recycling rate of waste products will reach an average of 50% (IEA 2025).[18]

While no official assessment is available regarding the targets illustrated above, in 2020 the China's Alliance of Technology Innovation in EPR released its annual report on 2020 EPR for EEE industry in the country. According to the 10 surveyed companies, at the end of 2019 they had established almost 22'000 WEEE collection sites covering almost the entire country. Also, according to the report, 70% of the companies have already implemented related tasks in the areas of "energy consumption of products" and "management of hazardous substances," but only 20% to 30% of the companies have implemented corresponding tasks in the areas of "easy disassembly design," "improvement of product recyclability," and "labelling for convenient collection" that contribute to product recycling (Chen 2021).[19]

The fund, besides bringing effective environmental and social benefits, also present huge challenges. The procedure of the Fund system in China is to first forecast the output of WEEE and then predict the cost of collection and recycling of each new product, thus forming the initial WEEE fund levy and subsidy levels. The imbalance and growing gap of fund resulted from the discrepancy between the forecast and the reality, as well as inadequate consideration of the historical stock. In 2021, the subsidies level of fund was adjusted for the third time, with an overall decrease of about 30% (Zhang et al. 2023) (Ministry of Finance 2021).

According to the literature consulted, the Fund established by the Chinese government still needs adjustment, to further support the development of the recycling industry, but also the 'green' development of the production industry (Zhang et al. 2023).

4.3 EPR SYSTEMS IN NIGERIA AND IN TAIWAN

Nigeria

In 2011, Nigeria introduced the National Environmental (Electrical/ Electronic Sector) Regulations, 2011 (S.I. No. 23), defining the principle of EPR[20]. In 2016, related EPR policies were passed, leading to the official EPR program being launched the same year.

In 2022, these regulations were revised and strengthened to explicitly adopt a full life cycle EPR framework, placing legal obligations on producers and other stakeholders to ensure collection, environmentally sound treatment, and final disposal of WEEE, while reinforcing provisions against the importation of non-functional electronics (NESREA 2022).

[18] https://www.iea.org/policies/25069-plan-for-the-implementation-of-the-extended-producer-responsibility-system
[19] https://enviliance.com/regions/east-asia/cn/report_1615 - EN summary.
[20] https://nesrea.gov.ng/wp-content/uploads/2025/05/Electrical_Electronics.pdf

Under the 2022 regulations, producers of EEE, including manufacturers, importers, and distributors, are required to meet specific EPR obligations. They must register with the primary PRO, the E-Waste Producer Responsibility Organization Nigeria (EPRON), and pay a financial contribution known as the Minimal Collection Incentive (MCI) to support e-waste management. In addition, producers are responsible for establishing or supporting collection systems, including take-back schemes and collection centers, and must ensure that hazardous e-waste is directed to licensed recyclers or authorized treatment facilities rather than disposed of in mixed waste streams.

EPRON is the first and primary PRO established to coordinate the operationalization of the EPR system for WEEE in Nigeria. Founded in March 2018, EPRON serves as the industry entity through which producers collectively fulfil their EPR obligations[21].

EPRON's role within the EPR system includes:

- Managing registrations of producers, recyclers, and collection centers to support EPR compliance;
- Coordinating buy-back (payment of specified incentives to informal collectors and consumers (households and private and public officers)), recovery, collection, and recycling programmes. The buy-back serves to encourage WEEE recovery;Serving as the liaison between producers, consumers, accredited recyclers, collection centres, and government regulators.

EPRON activities are supported by regulatory guidance and capacity-building tools such as WEEE training manuals. Recognizing that **over 80% of the e-waste is handled by the informal sector** these tools aim to **formalize this sector, sustain livelihoods and improve standards for environmentally sound e-waste management** (Woggsborg, Schröder, 2018; Olusegun et al 2025).

The **regulatory oversight** of this system is provided by the **National Environmental Standards and Regulations Enforcement Agency** (NESREA), which ensures compliance with EPR obligations.

The figure below displays the system components and their interactions.

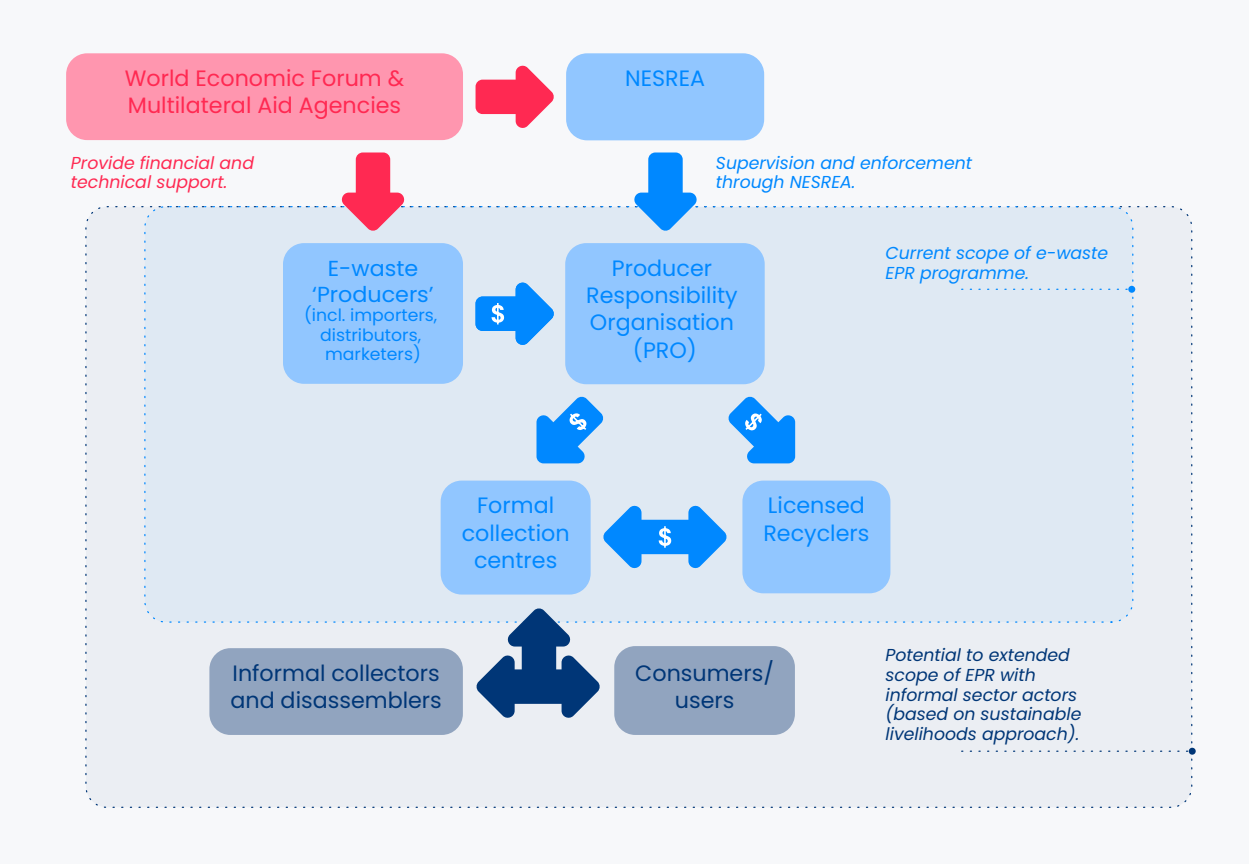


Figure 5. Nigeria's current EPR framework with potential for informal sector inclusion; Source: Woggsborg and Schröder, 2018

[21] https://epron.org.ng/epr-programme/



While legal obligations have been reinforced and stakeholder structures established, practical implementation remains in its early phases, with insufficient recycling infrastructure and weak enforcement. Additionally, continued efforts are needed to fully operationalize fee mechanisms, integrate informal sector actors, and scale formal e-waste management activities.

Taiwan

In 1988, the Waste Disposal Act of Taiwan was amended, requiring manufacturers and importers of EEE to bear financial responsibility for recycling of WEEE and the formal EPR system for e-waste was launched in 1998.

The core of Taiwan's system is the "4-in-1 Recycling Program," introduced in 1998, which operationalizes EPR by linking four key actors: (1) households and communities that sort waste at source, (2) municipal collection teams, (3) private recycling enterprises, and (4) a government-operated Recycling Fund Management Committee (Environmental Protection Administration) (Tsai, 2020).

The producers and importers of EEE pay advanced recycling fees (ARF) to the Recycling Fund Management Committee (RFMC) of the government.

The Fee Rate Reviewing Committee (FRRC), organized by representatives from government, academia, producers, and consumer groups, annually determines the fee rate and subsidy for each recyclable product. Fees are paid before products become waste, i.e., during the product's market phase and payments are based on quantities placed on the market (sales/import volumes).

This information is then passed on to the RFMC, which not only collects ARF, but also provides subsidies to the collectors/recyclers for collecting and recycling e-waste. The Environmental Protection Administration (EPA) operates the overall EPR program and supports enactment and revisions of laws and regulations. Consumers in this framework are obliged to hand over their e-waste to official collectors who segregate and forward the e-waste to recyclers. Consumers may receive incentives/rewards for bringing back their e-waste to collectors (market-based – incentive) and benefit from the convenience and efficiency of the system, however there is no fixed national payment scheme.

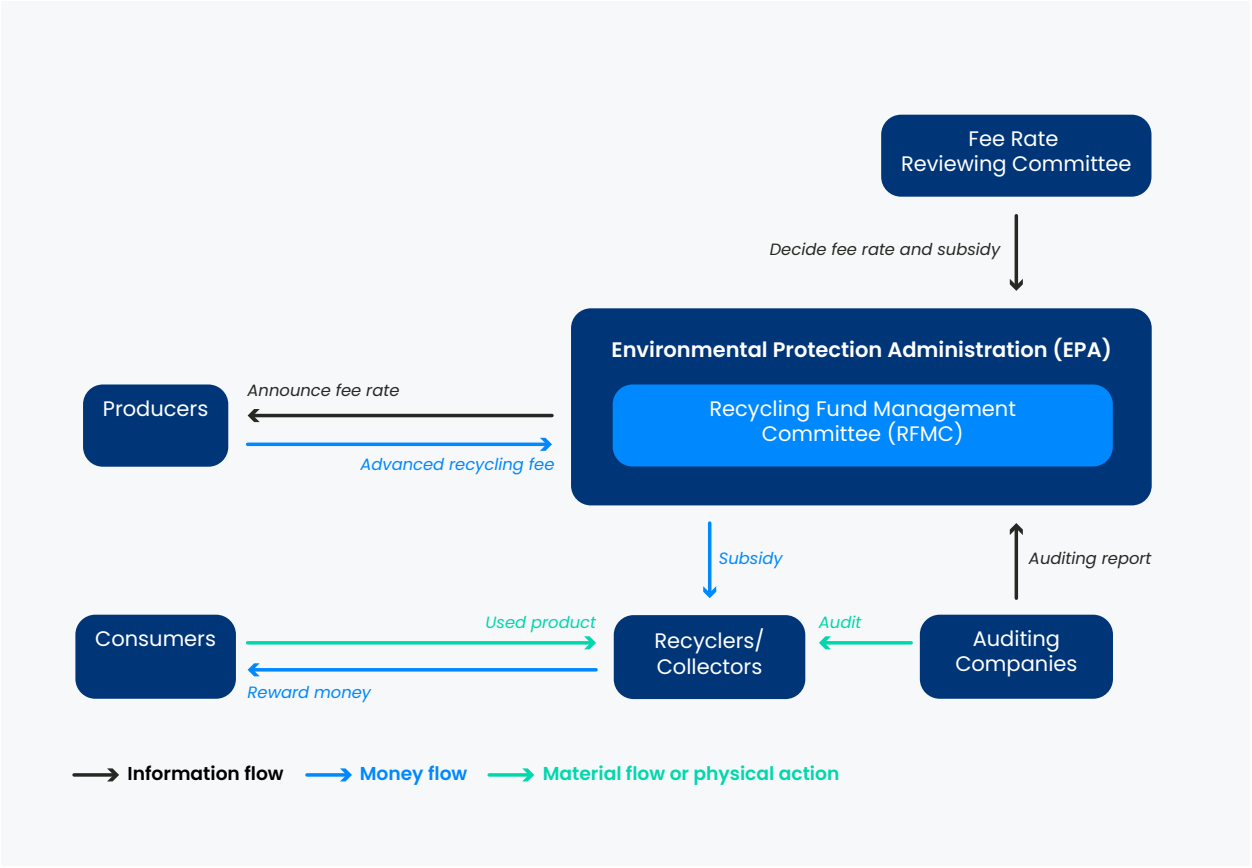
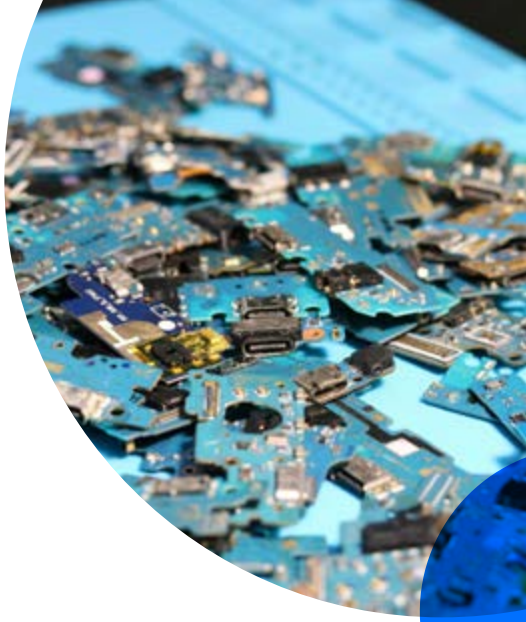


Figure 6. Extended producer responsibility (EPR) system in Taiwan; Source: Hsin Rau et al. 2019

The Taiwanese EPR system covers a wide and expanding range of electronic products, including large household appliances, IT equipment, lighting, and consumer electronics. Over time, Taiwan has achieved high collection rates exceeding 60 % and recycling performance and recycling volumes of approximately 140,000 metric tons annually (Tsai 2020). The EPR mechanism which ensures financial sustainability is also backed with a highly developed collection infrastructure and mature recycling industry infrastructure (20 specialized e-waste recycling facilities exist), strong institutional coordination, public awareness and circular economy integration (Forti et al 2020).

Across the reviewed systems, several common success factors emerge: (1) a stable and enforceable legal framework, (2) a well-defined financing mechanism based on producer contributions, (3) strong institutional coordination, often through PROs, and (4) clear targets and monitoring systems. These elements should form the foundation of any EPR system developed in the Caribbean.

Chapter 5.
What is the status of EPR for WEEE Management in the Caribbean region?



This chapter explores the current situation in the Caribbean region around EPR and the current WEEE management situation. More specifically, section 5.1 provides an overview of regulatory frameworks in the project countries, regarding waste management, WEEE and EPR specifically. Section 5.2 outlines a comparative analysis of WEEE flows in the project countries, highlighting quantities of EEE POM and e-waste generated in each country, with details on the types of categories and in relation to the countries' economic situation. Moreover, it provides a qualitative comparison related to the technical and infrastructural aspects of WEEE management in the region. Finally, section 5.3 describes the high-level cost-benefit analysis conducted under this project, to highlight the potential benefits and related costs on projected quantities of duly recycled WEEE up to 2030.

The analysis described in chapter 5 was presented to countries' representatives during the in-person regional workshop held in Port of Spain on 4-5 March 2026. The analysis confirms that, despite increasing e-waste volumes, the institutional and regulatory frameworks required for effective WEEE management remain largely underdeveloped across the region. These findings have provided the solid basis for the groupwork, organized during the regional workshop, where key countries' representatives, divided into groups, and designed their own roadmaps for setting-up an EPR scheme at the regional or sub-regional level in the Caribbean, building upon current national situations on WEEE management. All the outcomes provided during the group work have been analysed by the consultants and compiled in chapter 6, resulting in a list of informed recommendations on how to develop and implement an EPR model for WEEE in the region.

5.1 OVERVIEW ON REGULATORY FRAMEWORKS

Table 4 provides an overview of the regulatory frameworks in each of the project countries, showing a clear **lack of WEEE legislations in the region**, but also the general **lack of EPR policies**, both on EEE and on other products.

Only the Dominican Republic has a specific legislation on WEEE in place, which includes a dedicated section on establishing an EPR policy (see BOX 2).

BOX 2 - The WEEE regulatory framework in the Dominican Republic

Decree 253 of 2023 came into force the same year in the Dominican Republic. It establishes the regulatory framework for the comprehensive management of WEEE, based on the implementation of the principles of EPR and the principle of shared responsibility. The five pillars of the regulations include: EPR, Waste collection and management, Public Awareness, Environmental Standards and Enforcement and Penalties.

Table 4. Overview on regulatory framework – waste management / WEEE / EPR

Country	Legal framework on waste management in place	Legislation on WEEE in place	EPR policies in place: on EEE / on other products
Antigua and Barbuda	YES - National Solid Waste Management Authority Act (2005)	No	No
The Bahamas	YES - Environmental Health Services (Collection and Disposal of Waste) (Amendment) Regulations (2013)	No	No
Barbados	YES - Waste Management Act No.18 (2004)	No	No
Belize	YES - Environmental Protection (Hazardous Waste) Regulations 2009	No	No
Cuba	YES - Law 150, "Natural Resources and Environment System" (2022)	No	No
Dominica	YES - Solid Waste Management Act, N. 1 (2002)	No	No
Dominican Republic	YES - Law no. 225-20 General Law on Integral Management and Co-processing of Solid Waste (2020)	YES - Decree 253 of 2023	YES (WEEE and other waste streams)
Guyana	YES - Act's Hazardous Waste Regulation (2000)	No	No
Saint Kitts and Nevis	YES - Solid Waste Management Act – 1996	No	No
Saint Lucia	YES - Saint Lucia Solid Waste Management Authority Act (2008)	No	No
Suriname	YES - Environmental Framework Act (2024)	No	No
Trinidad and Tobago	YES – Waste Management Rules and Regulations 2021	No	No

This regulatory gap represents one of the most critical barriers to establishing effective WEEE management systems. At the same time, the existence of general waste management legislation across all countries provides a valuable foundation upon which EPR systems could be built.

One positive aspect is the existence in all countries of regulatory frameworks related to waste in general, mainly to municipal solid waste or, more specifically, to hazardous waste. This could represent a solid starting point, to leverage on for the development of an EPR policy, as it was the case, for example, in the European context.

In the EU, in fact as an example, the Directive 2024/884/EU on WEEE amending the previous Directive 2012/19/EU, under article 7, specifically states that "each Member State shall ensure the implementation of the **'producer responsibility' principle** and, on that basis, that a minimum collection rate is achieved annually". [22] Thus the EPR is a core obligation under the WEEE Directive for both producers and importers.

However, from a broader perspective, the EPR concept was already introduced under **article 8 of the EU Waste Framework Directive of 2008**, revised in 2018 and 2025. Article 8a of the Directive defines general minimum requirements for EPR schemes (see further details under chapter 6).

[22] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32012L0019

5.2 COMPARATIVE REGIONAL ASSESSMENT ON WEEE MANAGEMENT

5.2.1 WEEE flows 2010 – 2030 in the 12 project countries

EEE POM and E-waste Generated in the 12 countries

This paragraph describes the flows of EEE Put On the Market (POM) and e-waste generated in the 12 countries, represented from 2010 to 2030 in Figure 7. Overall, 2022 is used as a reference year, as it is the last year for which historical data is available for every country, and all countries analysed rely on imports of EEE.

For The Bahamas, Barbados, Belize, Cuba, Dominica and Suriname, official trade data provided by national authorities were used to calculate the put on the market. The years for which national data is provided differ by country. From 2025 (2023 in the case of Cuba) to 2030 the data are an estimation based on the previous trends.

When official trade data were not available, POM data between 2010 and 2022 is based on the country's historical data from the Comtrade database, estimated with the apparent consumption methodology. Comtrade data were used for Antigua and Barbuda, Dominican Republic, Guyana, Saint Kitts and Nevis, Saint Lucia, and Trinidad and Tobago. From 2023 to 2030 the data are an estimation based on the previous trends.

The total POM and e-waste generated in the 12 countries is based on the sum of all countries' data. **The amount of EEE placed on the market** has been increasing annually, except for a notable decrease in 2019 and 2020[23], and **has doubled from 143.81 million kg in 2010 to 287.60 million kg in 2022**. The amount of EEE projected to be sold in the 12 countries in **2030 reached 353.10 million kg**.

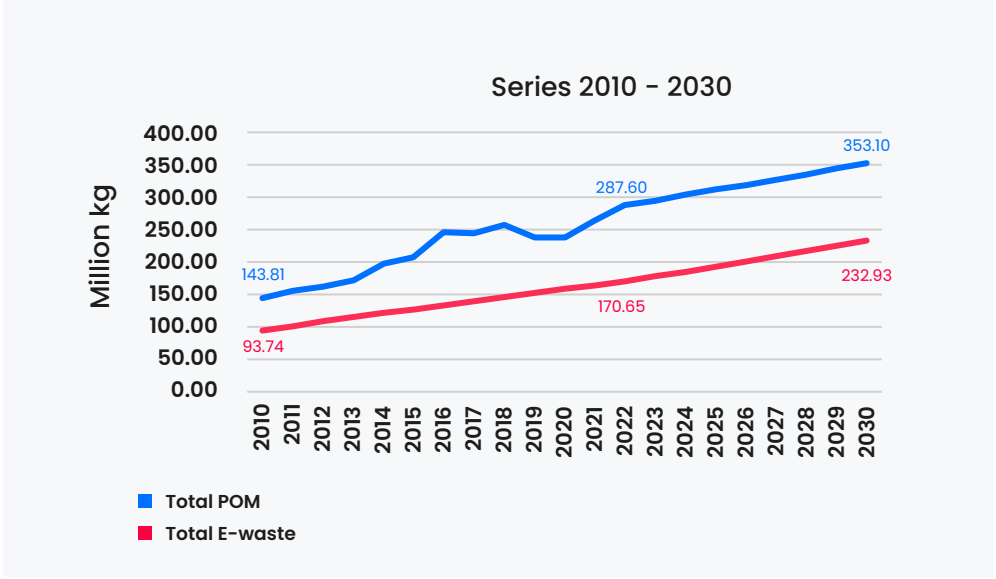


Figure 7. POM and E-waste Generated and Projected in the 12 countries, 2010-2030

The e-waste generated in the 12 countries is also based on the sum of all countries' data. The amount of **e-waste generated** annually has been increasing steadily through the years, **almost doubling from 93.74 million kg in 2010 to 170.65 million kg in 2022**. The amount of e-waste generated in the 12 countries is projected to **reach 232.93 million kg in 2030**.

The continuous increase in e-waste generation highlights the urgency of establishing effective management systems. Without intervention, environmental and economic impacts are expected to intensify significantly by 2030.

[23] The decrease in 2019-2022 is mostly due to figures from Dominican Republic and Cuba. However, no explanation was provided by countries on this specific aspect.

Figure 8 shows the e-waste generated per country, in million kilograms, in 2022. Overall, the Dominican Republic is the main generator of e-waste in the 12 countries, accounting for 58% of the total e-waste generated. The second largest e-waste generator is Trinidad and Tobago, with 14% of the total e-waste generated, and the third is Cuba, with 8% of the total. This is not surprising, as the Dominican Republic and Cuba are by far the most populated countries out of the 12 countries, and Trinidad and Tobago's population is also significantly higher than the other countries.

The other nine countries account for 20% of the e-waste generated in the 12 countries in 2022, with each country accounting for less than 5% of the total e-waste generated.

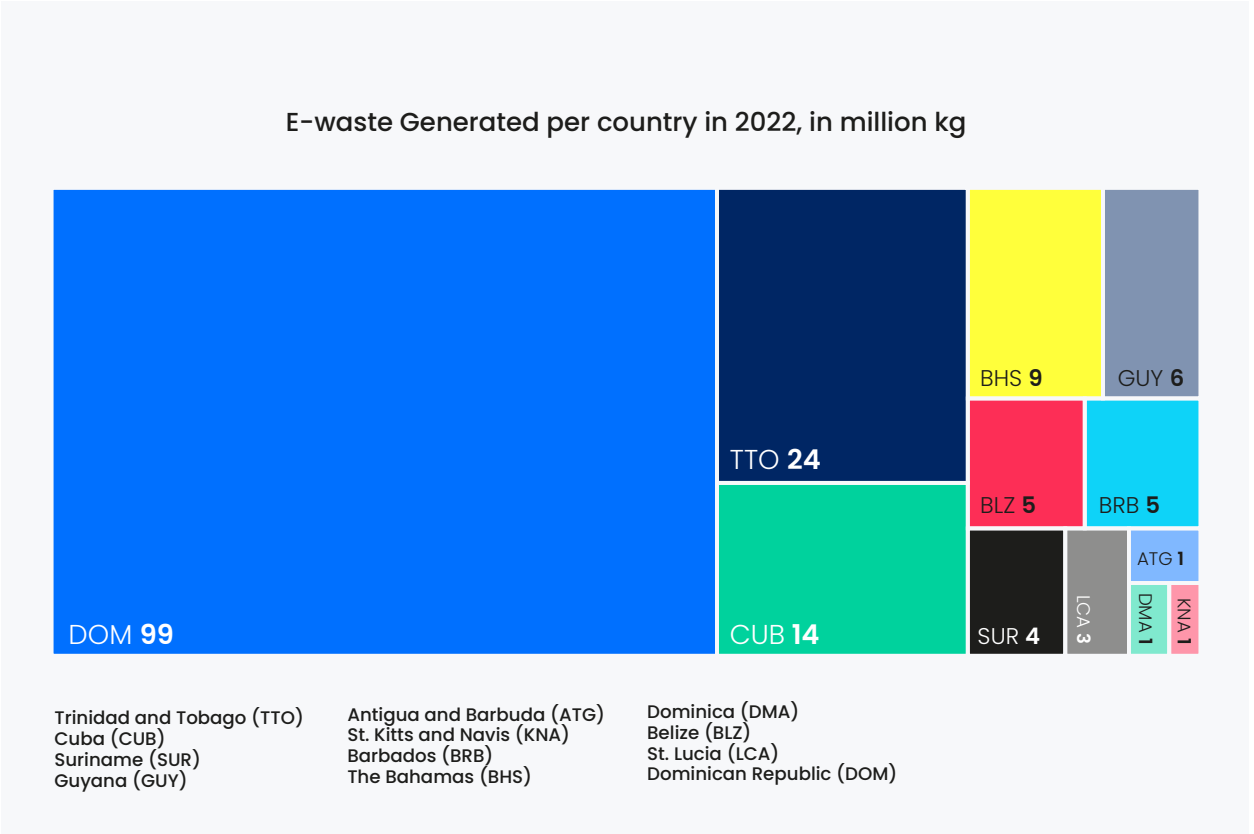


Figure 8. E-waste generated per country in the 12 countries in 2022, in million kg

E-waste Generated per inhabitant in the 12 countries

Table 5 highlights a clear difference between the main e-waste generating countries and those generating the most e-waste per person. As already explained, the most populated countries are the ones that account for the most e-waste generated, mainly due to the larger population. However, **when looking at e-waste generated per inhabitant, The Bahamas leads with 22.59 kg generated per person**, despite having a much smaller total e-waste generated, followed by Barbados and Trinidad and Tobago. This contrast shows that total e-waste depends largely on population size, while per capita generation shows differences in the country's consumption patterns.

E-waste generation per capita shows a general positive correlation with the Purchasing Power Parity (PPP) - an economic measure that compares the relative value of currencies by equalizing the purchasing power of different countries - indicating that **countries with a higher PPP tend to generate a higher amount of e-waste per inhabitant**.

These variations suggest that policy responses may need to be adapted to national consumption patterns, while still being coordinated within a regional framework.

Table 5. E-waste Generated per inhabitant in the 12 countries, 2022

	Country	Total e-waste Generated (Million Kg)	E-waste Generated per capita (Kg/ Inhabitant)
1	The Bahamas	9.04	22.59
2	Barbados	4.77	15.91
3	Trinidad and Tobago	23.61	15.74
4	St. Kitts and Navis	0.72	13.95
5	St. Lucia	2.53	12.65
6	Antigua and Barbuda	1.24	12.43
7	Belize	4.83	12.08
8	Dominica	0.95	9.46
9	Dominican Republic	98.77	8.82
10	Guyana	6.50	8.12
11	Suriname	3.95	6.58
12	Cuba	13.75	1.25



As it can be seen in Figure 9, the e-waste generated per inhabitant varies between 1.25 kg/inh in Cuba and 22.59 kg/inh in The Bahamas. There is a moderate positive correlation between these two aspects (R^2 = 0.49) suggesting that while purchasing power parity has a significant influence on e-waste generation, other factors, such as consumer behaviour, also influence it.

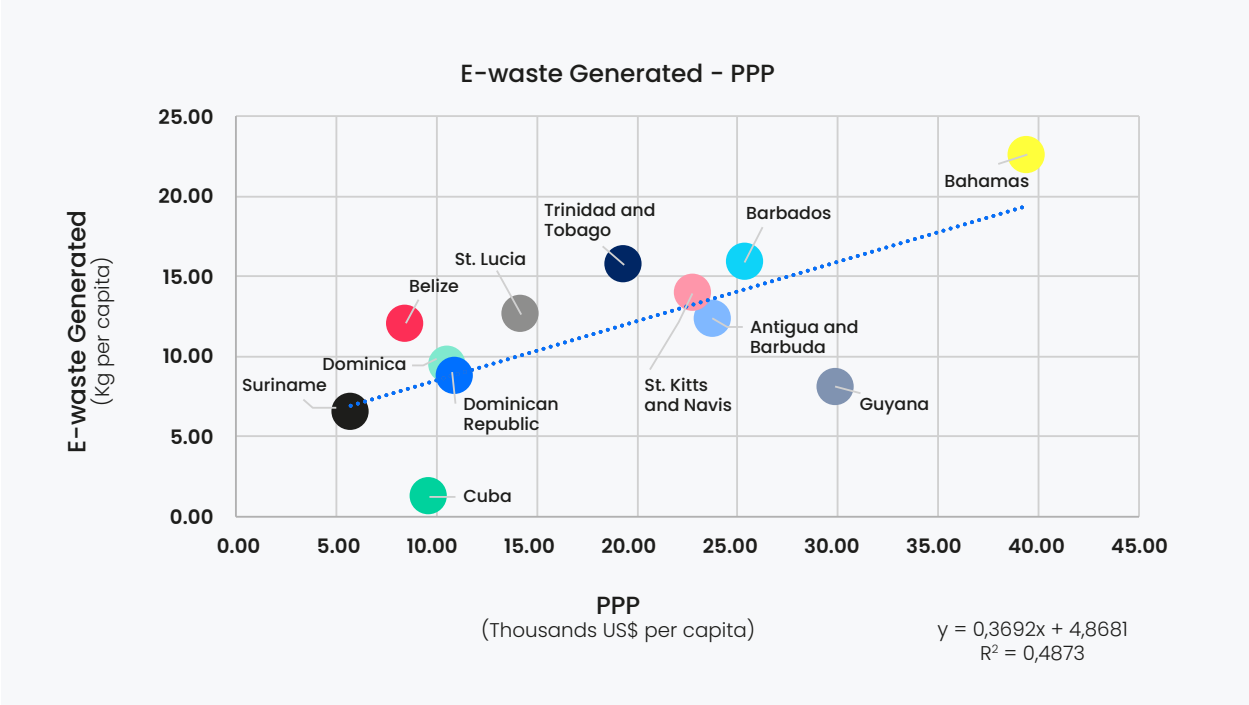


Figure 9. E-waste Generated per inhabitant in relation to the PPP per country, 2022

E-waste Generated per Category in the 12 countries

Large household appliances (Category 1), consumer equipment and photovoltaic panels (Category 4), and small household appliances (Category 2) have the highest share of e-waste generation in 2022 in the region, accounting for 72% of the total e-waste generated. Figure 10 shows the share of the ten categories in the total e-waste generated.

Between 2010 and 2022, the fastest growth in e-waste generated was observed in electrical and electronic tools (Category 6), toys, leisure, and sport equipment (Category 7), and large household appliances (Category 1). Category 6 six folded, Category 7 became four times larger, and Category 1 one doubled.

Large household appliances (Category 1) are by far the largest contributor to e-waste generation, accounting for 47% (81.01 million kg) of the total e-waste generated in 2022. This is primarily due to the high average weight of the products included in this category (e.g., fridges, washing machines, dishwashers). The second and third largest contributors are consumer equipment and photovoltaic panels (Category 4) and small household appliances (Category 2), each representing 12% of total e-waste generation (20.81 million kg and 20.312 million kg respectively).

IT and telecommunications equipment (Category 3) account for 9% of the total e-waste generated in the region in 2022 (15.67 million kg). This is followed by lighting equipment (Category 5) which represents 8% of the total e-waste (13.75 million kg). Toys, leisure, and sport equipment (Category 7) contribute 5% of the total (7.91 million kg), while electrical and electronic tools (Category 6) account for 4% of the total (6.76 million kg).

Smaller contributions are observed for monitoring and control instruments, representing 2% of the total e-waste generated (3.97 million kg), while medical devices (Category 8) and automatic dispensers (Category 10) account for less than 1% of the total e-waste generated (0.31 million kg and 0.16 million kg respectively).

Overall, similar e-waste generation patterns are observed across the countries included in the analysis, with the exceptions of Cuba and Suriname. In the case of Cuba, data was only available for Categories 1, 2, 3, and 5, which results in contribution shares that differ from the overall regional trend.

For Suriname, the contribution of Category 1 equipment to the total e-waste generation is significantly lower than in other countries, accounting for only 27% of the national total in 2022. Categories 3, 5, and 6 have a higher share of e-waste generation in the country compared to the regional trend.

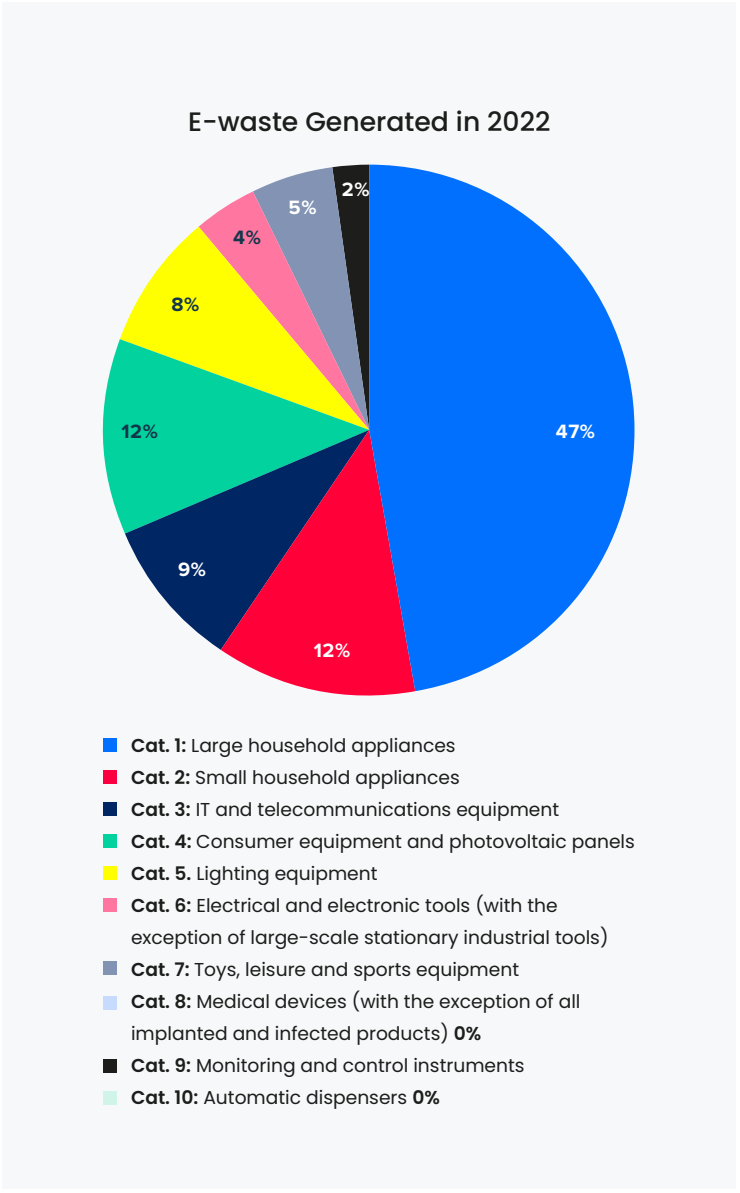


Figure 10. E-waste generated in the region per category, 2022

5.2.2 WEEE Technical and infrastructural comparative assessment among 11 project countries

This paragraph is based on the technical and infrastructural comparative analysis conducted in 11 of the project countries under this project.[24] The analysis aims to provide a structured overview of the current situation across countries, identifying strengths and constraints, to inform the design of an EPR system.

An overview of the main findings is presented below. More in-depth information is compiled in the table included as an Annex 1. The extensive country analysis is also available in the National Assessment Reports developed under this project.[25]

Financing mechanisms and EPR

None of the assessed countries have implemented an **EPR** scheme or producer fee system for financing WEEE management.

WEEE management across the countries is mainly **government funded** or **self-funded by the private entities**. Cuba is the only country in which government funded operations cover nationwide WEEE collection/acceptance, treatment (dismantling) and export of valuable components.

In The Bahamas, government funded WEEE operations cover storage and treatment. In **Antigua and Barbuda, Belize, Dominica, Guyana, Saint Kitts and Nevis and Saint Lucia**, **government funded operations include the collection/acceptance of WEEE** often comingled with other wastes and storage at the landfills.

Other than government funding, these countries also rely on:

- landfill tipping fees,
- waste collection fees paid by businesses or households, and
- international aid and project-based grants.

In Barbados, Trinidad and Tobago, Suriname and Guyana, WEEE management, which includes collection, treatment and export, is self-financed by private companies: recyclers finance their operations through resale of valuable components recovered from collected e-waste.

Collection and disposal

In 6 out of the 11 project countries - namely **Antigua and Barbuda, Belize, Dominica, Guyana, Saint Kitts and Nevis and Saint Lucia** - **WEEE is predominantly disposed of through municipal waste streams and ends up co-mingled with other waste at landfills.** Segregation, where it occurs, is typically done at landfill sites rather than at source. White goods, a term used to refer mainly to large EEE equipment such as fridges, washing machines etc (i.e. category 1 and category 4) are often separated informally, due to their metal content. While **Guyana** does have three WEEE collection and dismantling companies, with both formal in informal collection channels operating in parallel, it was mentioned that the majority of WEEE ends up at the landfill.

The Bahamas presents a partial exception, as the New Providence Ecology Park (NPEP) includes a dedicated WEEE acceptance and dismantling unit. However, the system operates on a drop-off only basis and remains limited in scale, with no nationwide collection network.

[24] *While initially planned in this phase of the project, Dominican Republic did not participate to the data gathering process and therefore information on the country was not made available and is not included in this analysis.*

[25] *At the time of drafting of this report the 11 National WEEE Assessments – 2026 were under finalization and not yet published online, therefore a direct link cannot be provided at this stage. Please consult the website www.scycle.info for the online publications, which will be uploaded after the conclusion of the project in April 2026.*

Barbados, Suriname and Trinidad and Tobago show comparatively higher levels of private sector engagement. In Barbados, approximately 30% of WEEE collection is handled by private companies, supported by door-to-door bulky waste collection and drop-off points. Suriname hosts six private WEEE collection and dismantling companies, with both formal and informal collection channels operating in parallel. In Trinidad and Tobago there are six main operators involved in the handling of e-waste, but only one has formal permits duly registered. The main activities of these companies still focus on the collection, manual dismantling, and export of valuable fractions such as printed circuit boards (PCBs) and metals. No domestic end-processing facilities have yet been established. **Cuba stands apart as the only country with a nationwide, state-managed WEEE collection system. Transfer stations (small pre-waste processing facilities) across the country accept WEEE**, which is then dismantled and forwarded to recycling companies under the oversight of the Ministry of Industries. Despite this institutional maturity, low purchase prices for WEEE discourage household participation and lead to illegal dumping.

While The Bahamas, Barbados, Trinidad and Tobago, Cuba, Suriname and Guyana do have WEEE collection and dismantling companies, a portion of their WEEE still often ends up at their landfills.

Across all countries, **the informal sector plays a central role**, particularly in collection, sorting, and manual dismantling. Informal waste pickers recover metals, components like motors and circuit boards, often selling these materials back into the formal recycling chain. However, none of the countries has initiatives in place, at present, aimed at integrating the informal sector into the formal system.

Data management and reporting systems

Apart from Cuba, **no country has a standardized national reporting framework for EEE placed on the market or WEEE collected and treated**. Data collection, where it occurs, is fragmented among ministries, landfill operators, and private recycling companies, with limited verification or aggregation at national level.

Cuba maintains the most structured data system, with recycling companies required to report data on WEEE collected, processed and exported to the Ministry of Industries and subject to regular inspections. However, in this context, informal flows and illegal dumping are not captured.

In **Antigua and Barbuda, Belize, Dominica, Saint Kitts and Nevis, Saint Lucia, Suriname, Trinidad and Tobago, and Guyana, stakeholders consistently indicated the absence of regular reporting systems**. Even where responsible institutions are identified, reporting is irregular or incomplete.

Barbados collects some data through the Ministry of Environment, but monitoring is not systematic. Based on the information shared by private entities involved in the collection and recycling of e-waste in the project framework, the authors estimated that only **0.3–3.1% of generated WEEE was collected and treated between 2019 and 2024**.

Treatment and economic impact

In the majority of the assessed countries, including **The Bahamas, Barbados, Dominica, Guyana, Suriname, Trinidad and Tobago, and Cuba, manual dismantling is the primary treatment method.** Recovered fractions typically include ferrous and non-ferrous metals, cables, motors, compressors, and printed circuit boards (PCBs). Metals are often sold to local metal scrap dealers, while the other fractions are exported.

Barbados exports high-value materials such as Printed Circuit Boards (PCBs) to downstream processors in the US, which are fully compliant with R2 and ISO standards. Low-value residues are sold to local recyclers or are landfilled.

The financial viability of WEEE management systems varies considerably across countries; however, in most of the assessed countries these systems remain at an early stage of development and are not yet economically sustainable, with the exception of Barbados and Cuba.

In most countries, both the formal and informal sectors focus almost exclusively on the recovery of high-value metals, particularly copper and PCBs, with the informal sector typically supplying recovered materials to the formal sector for further processing and export. Profitability therefore depends almost entirely on these high-value fractions. Low volumes leading to irregular supply undermine financial viability, as observed in Guyana, Belize, and Trinidad and Tobago.

Barbados and Cuba demonstrate the strongest economic potential. Barbados benefits from higher material recovery values and established export channels, while Cuba's centralized system shows profitability at current processing volumes, with clear margins between purchase prices and sales values for recovered materials. Across all countries, stakeholders emphasized that **economic viability would improve significantly under regional cooperation**, pooled export mechanisms and the introduction of EPR-based financing.

5.2.3. Cost-benefit analysis

This section explains the cost-benefit analysis conducted for the project. The methodology applied is a high-level cost-benefit assessment covering the 12 countries included in the project, presented in an aggregated way. The calculations are based on the projected amounts of e-waste expected to be generated across these countries by 2030. Both costs and benefits have been quantified following the methodological approach from the Global E-waste Monitor 2024. Material prices used in the analysis are taken from 2022 data, as reported in the same source.

The economic benefits of e-waste management have been calculated in terms of the value recovered from metals contained in e-waste. The composition of e-waste used in this analysis is based on global averages reported in the Global E-waste Monitor 2024. The shares of different materials have been extrapolated and applied to the projected e-waste generation across the 12 countries in 2030 to estimate potential recovery values.

Valuable and Critical Metals in E-Waste

By 2030, 233 million kilograms of e-waste are projected to be generated in the 12 countries. These are estimated to contain approximately 119 million kilograms of valuable metals. These metals can be divided into two categories: viable recovery and non-viable recovery. Non-viable recovery represents resources that are lost in the e-waste management process due to inefficiencies and losses that occur during waste collection, transport, and treatment operations.

As it can be seen in Figure 11, **iron, aluminium, and copper are the most abundant metals in e-waste, accounting for 115 million kg out of the 119 million kg valuable metals, and have high recovering rates**. Meanwhile precious metals such as gold, palladium, and rhodium are present in smaller quantities as seen in Figure 12 , only representing 5 thousand kg in total, but are highly valuable.

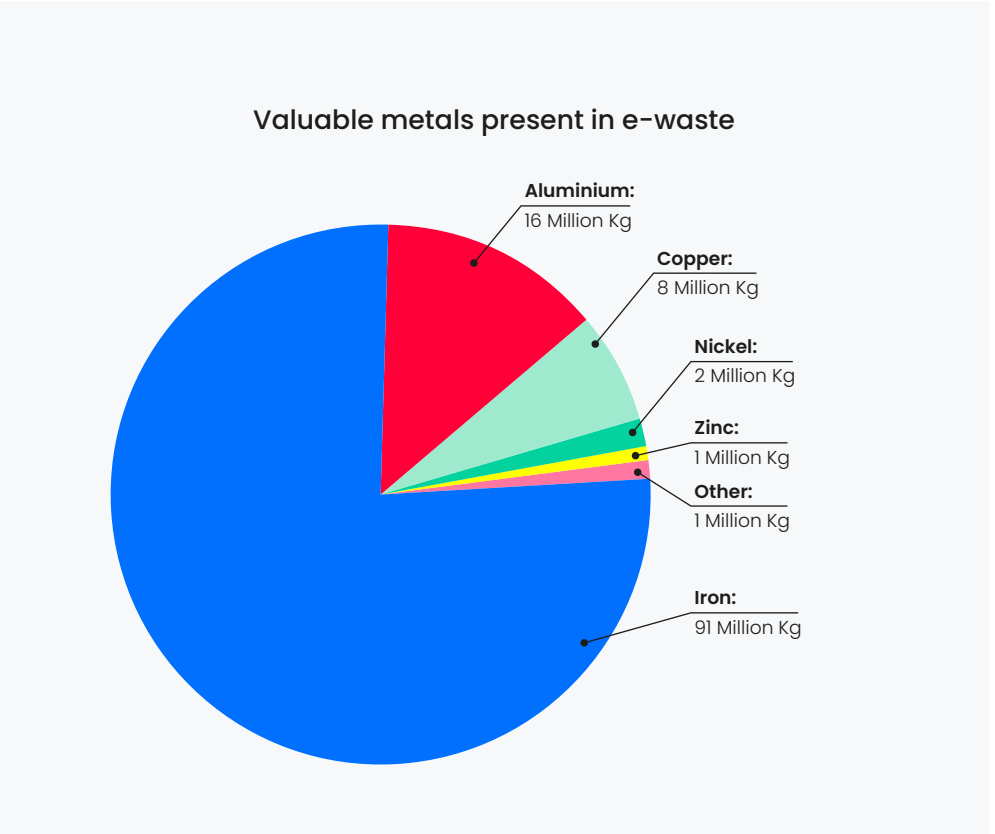


Figure 11. Valuable metals present in e-waste, 2030 projection in the 12 counties

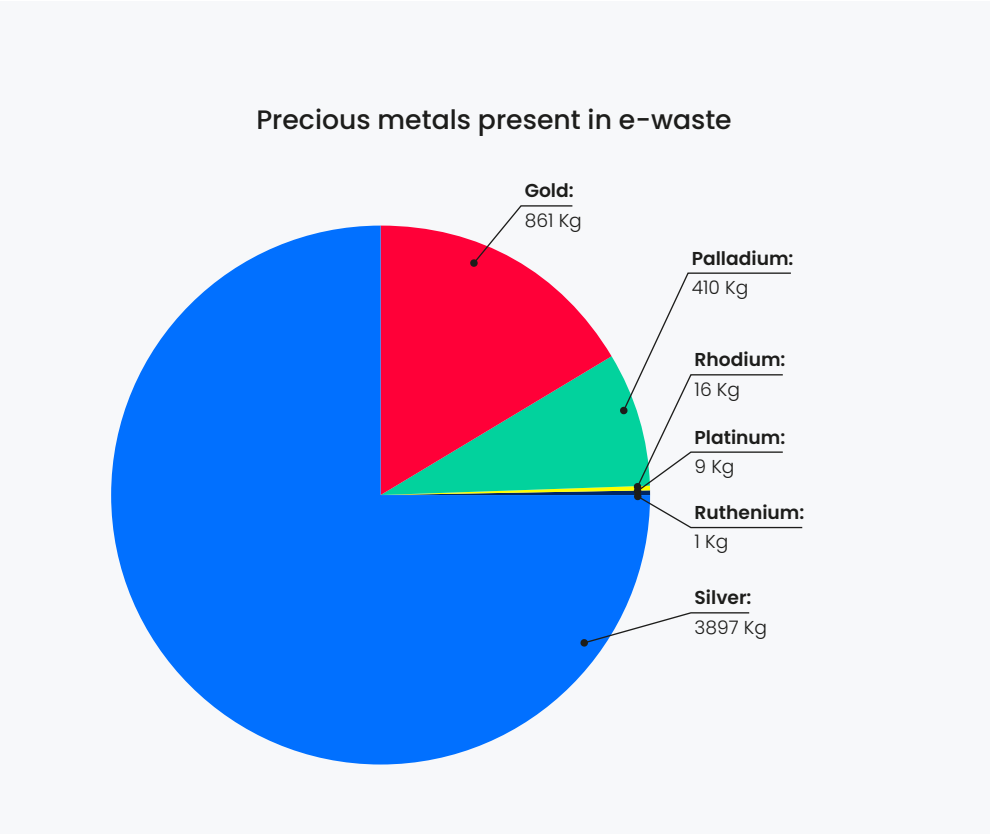


Figure 12. Precious metals in e-waste, 2030 projection in the 12 countries

Cost of Sound Collection, Transport and Treatment

While e-waste treatment offers substantial economic benefits through material recovery, it also entails significant operational costs. These costs are incurred across the entire value chain, including collection, transport, and treatment of e-waste. Investment requirements vary considerably depending on existing infrastructure, geographic dispersion, and the scale of operations. For example, solid waste transport in one of the project countries costs between 2.88 and 3.30 USD per km and, based on 2022 data from two pilot countries in the European Union, the formal recycling of 47 million kilograms of e-waste is estimated to cost approximately 14 million USD.

Potential Economic Benefits

Assuming a formal recycling rate of 20% in 2030 (based on the global average, Baldé et al. 2024) of total e-waste generated in 2030 and based on the projected generation of 233 million kg of e-waste, approximately 47 million kilograms of e-waste could be potentially recyclable in the 12 countries by 2030. This volume would contain an estimated 20 million kilograms of valuable metals.

The estimated economic value of these 20 million kilograms of recoverable valuable metals is 29 million USD (based on 2022 material prices). Figure 13 represents the potential gross economic value of these metals, excluding the costs mentioned beforehand. **Overall, iron, copper, and aluminium have the highest potential economic value, 27 million USD, as they are the most present metals in e-waste**. Meanwhile precious metals such as gold, palladium, and rhodium have a lower overall potential, 2 million USD, but a higher potential per kilogram.

The net economic profit operations is lower than the 29 million USD of gross value. The above-mentioned cost for sound collection, transport and treatment, including also the cost for treatment and disposal of non-valuable but hazardous materials contained in the WEEE from which these metals are part of, reduce the generated net profit.

Potential Environmental Benefits

Beyond economic returns, environmentally sound e-waste management systems deliver significant environmental benefits. Formal recycling prevents environmental damage, supports the recovery of secondary raw materials, reduces dependence on virgin material extraction, and helps avoid harmful emissions. These benefits are calculated following the methodological approach outlined in the Global E-waste Monitor 2024 (Baldé et al., 2024).

Achieving 20% formal recycling in 2030 across the 12 countries could prevent approximately 69 million kilograms of CO_2-equivalent emissions. This emission reduction results from avoiding energy-intensive primary material extraction and production.

E-waste contains hazardous substances that pose serious environmental and health risks when improperly managed. **Formal recycling of 47 million kilograms of e-waste would safely manage approximately 32.5 kilograms of mercury contained in electronic equipment, preventing its release into the environment** where it can contaminate water sources, accumulate in food chains, and cause neurological damage to exposed populations.

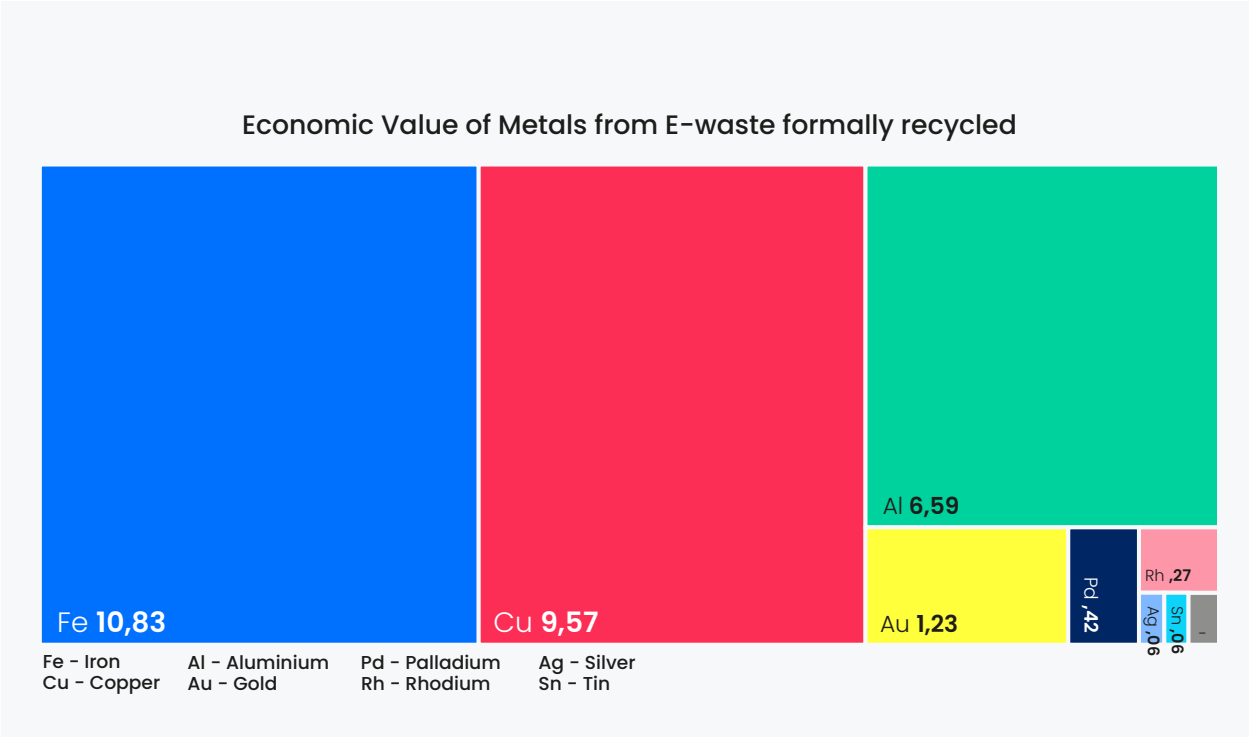


Figure 13. Economic value of metals from e-waste formally recycled, 2030 projection in the 12 countries

This analysis provides a high-level overview of the potential costs and benefits of e-waste management in the 12 countries, based on an internationally recognized methodology (Baldé et al. 2024). It shows that formal e-waste management has significant potential economic and environmental benefits for these countries, but it also entails associated costs. Establishing a stable financing mechanism, for example through an EPR system, would therefore make it possible to set up profitable businesses as part of a more sustainable e-waste management system.

To achieve this goal, a more targeted regional methodology would enable a better estimation of the actual costs and benefits of e-waste management at national and regional levels. However, this was not feasible within the framework of the current project due to the lack of in-depth and accurate national data on costs and benefits related to e-waste management operations. Consequently, further efforts in data collection and systematization in this field are recommended.

Chapter 6.
How could EPR for WEEE be established in the Caribbean?

Building on the analysis presented in the previous chapters, this section outlines a strategic pathway for the development and implementation of an EPR system for WEEE in the Caribbean region.

The findings of this report indicate that a fragmented, purely national approach to e-waste management is unlikely to be effective in the context of SIDS, due to limited economies of scale, geographic fragmentation, and constrained institutional capacities.

A coordinated regional approach, supported by national implementation mechanisms, therefore emerges as the most feasible and cost-effective solution. Such a system should be based on a predominantly collective EPR model, while allowing for the gradual introduction of individual producer responsibility elements where appropriate, in order to strengthen incentives for circularity and product stewardship.

To try answering the question 'How could EPR for WEEE be established in the Caribbean?', the consultants adopted a **participatory approach**, involving representatives from the 12 countries in a dedicated group work during the in-person regional workshop held in Port of Spain, on 4-5 March 2026.

Participatory research is defined as a **research method that involves conducting research in conjunction with the people whose lives and activities are under investigation**, prioritizing their views and recognizing them as experts in their own environments. This approach aims to develop locally sensitive theories and promotes inclusive, transparent, and empowering processes.
Source: International Encyclopedia of the Social & Behavioral Sciences (Second Edition), 2015

Building upon the findings of the feasibility assessment, as presented in chapter 5, the consultants developed a list of guided questions, with the objective of identifying possible existing structures in the region that could be relevant for EPR.

The guided questions covered the following aspects, and were addressed by countries' stakeholders during the 2-day workshop:

Aspects to be considered to design an EPR system for WEEE, as a stable financing system for WEEE management and other related tasks.

1. Who must pay for end-of-life EEE and why?
2. How to organize the cash flow?
3. How to organize the information flow?
4. Who has the responsibility for managing the WEEE? (specify for collection, treatment, awareness raising with consumers, monitoring and enforcement)
5. What is the role of the informal sector?
6. Is a regional / sub-regional approach to be considered?
7. What legal and regulatory approach should be applied?

During the workshop, the stakeholders, following the guided questions and looking at EPR implementation models from other countries and regions (e.g. Europe, PRC, Nigeria etc. – see also chapter 4), developed **their own suggested roadmaps for EPR development in the Caribbean and presented them to the plenary**. The consultants analysed the main outcomes of the group work, and the results of the analysis were compiled in the shape of a comprehensive roadmap for EPR for WEEE in the Caribbean, coupled with informed recommendations for the regional implementation.

The development of an EPR for WEEE in the Caribbean is herewith represented as a 'building process', where different 'blocks' can be used (or not used) together, and the ways they are used may influence the shape and the actual functioning of the adopted EPR. This roadmap needs to be considered as a starting point, built on the results of the feasibility assessment on WEEE flows and WEEE management in the 12 project countries, and shaped on the needs and inputs expressed by the stakeholders involved in the WEEE sector.

This is not a conclusion, but rather a starting point, as said, to inform subsequent pilot projects at national and regional level, in order to test the different options and assess the feasibility of an EPR scheme for WEEE, tailor it as much as possible to the regional and national characteristics, make it durable and financially sustainable.

BOX 3 - Key Messages – EPR for WEEE in the Caribbean

- A purely national approach to e-waste management is not sufficient in the Caribbean context; regional coordination is essential to achieve economies of scale and system efficiency.
- A predominantly collective EPR system, supported by Producer Responsibility Organisations (PROs), represents the most feasible starting point for implementation.
- Selective integration of Individual Producer Responsibility (IPR) elements can strengthen incentives for eco-design, product stewardship, and circularity over time.
- A phased implementation approach is critical to ensure feasibility, allowing for gradual development of legal frameworks, infrastructure, and institutional capacities.
- Strong governance, sustainable financing mechanisms, and regional cooperation are key success factors for establishing an effective and resilient EPR system.

BOX 4 - Recommended phased implementation approach

To ensure feasibility and effective implementation, the development of an EPR system in the Caribbean should follow a **phased approach**, allowing for gradual capacity building, institutional development, and stakeholder engagement. Below a short description of a phased implementation approach is provided, with example of relevant actions to be implemented. More details on the concrete actions are provided in the below 'blocks.

Phase 1 – Preparation (0–2 years)

Development of legal frameworks, stakeholder alignment, institutional setup – including regional coordination bodies, develop baseline data and monitoring systems and preparing for pilot initiatives.

Phase 2 – Implementation (2–5 years)

Introduction of producers/importers' registration, establish EPR financing mechanisms through fees' collection, setup of operational collection and recycling systems, testing of pilot initiatives.

Phase 3 – Scaling and Optimization (5–10 years)

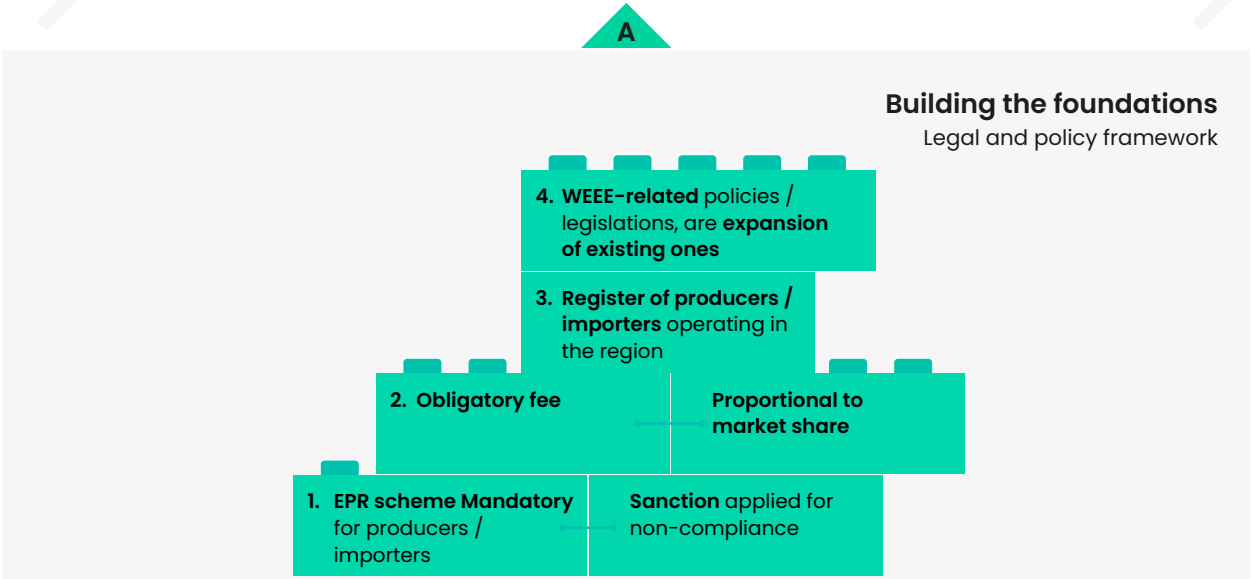
Expansion of system scope, regional harmonisation, integrating informal sector into the formal system, continuous improvement based on monitoring through selected KPIs.

6.1 EPR FOR WEEE: ROADMAP FOR THE CARIBBEAN AND RECOMMENDATIONS FOR REGIONAL IMPLEMENTATION

Based on the analysis presented in the previous chapters, a coordinated regional EPR system with national implementation mechanisms emerges as the most feasible and effective approach for the Caribbean context. This approach should be based on a predominantly collective system, while allowing for the gradual introduction of individual producer responsibility elements where feasible.

What legal and regulatory approach should be applied?

- **EPR should be mandatory**, with possible incentives provided via local environmental laws and financial instruments. This would ensure compliance and standards application, which would prevent free-riding and would create predictable financing. **Sanctions** should be applied for non-compliance.
- As an alternative, a phased approach could also be used, starting with a voluntary approach for a maximum of e.g. 10 years and then transitioning to a mandatory approach. However, this phased approach is considered particularly risky, creating inequality and not effective in the end.
- In terms of the legislative framework, at **national level** specific legislations on e-waste should be developed, under the existing recycling policies, or linked to existing waste management rules or legislations, rather than creating new ones.
- The current EPR guidelines for WEEE established in the Dominican Republic could be taken as an example, but also examples from other region in the word – depending on the preferred system to be established (e.g. government led, with competitive PROs etc.)
- At **transnational level**, easier processes could be established for transboundary movements within the EPR country members, in line with the procedures envisaged under the Basel Convention, e.g. by streamlining / harmonizing to existing PIC procedures envisaged for all e-waste.



Who must pay for end-of-life EEE and why?

- **Producers, importers and distributors/suppliers** are all considered responsible for the products POM and therefore should contribute financially to the end-of-life products management. In terms of **why** they should pay, some main reasons where highlighted:
  - ***producers*** *are considered as primarily responsible for the end-of-life of products they've placed on the market; making them financially responsible would help reducing government costs, by also facilitating reuse and recycle systems.*
  - *EEE are primarily imported to the Caribbean, this is why* ***importers*** *are held responsible as they act as the 'producers', by placing the products on the market; importers' fee would also be easier to regulate, through the customs and import system.*
  - ***distributors*** *are key points of sale to consumers, and they could play a key role in take back and collection.*
  - *both environmental and moral responsibility should drive willingness to pay by both producers as consumers.*
- A focus must be put on **importers**, as in the Caribbean they act as producers for putting products on the market, so their **fee should be quantified based on what is imported** on small, medium and large scale.
- **Online distributors**, who can include online platforms or shops selling EEE through the Internet and can be considered a specific form of distributors, need to be involved as well, to avoid the risk of free riding. To keep track of online distributors they should be requested to register to the EPR scheme as well. Fees on consumers for online purchases were also suggested.
- As part of a step-by step implementation, the personal responsibility of **consumers** was also highlighted: initially, consumers should contribute financially through fees or taxes to e.g. WEEE collection (including import taxes on consumers), and over time the consumers' part should be all covered by the regional (EPR) system.
- **International aid** is also seen as a possible source of financing, but only in a start-up phase, because it is not sustainable in the long run.

B

Building the foundations

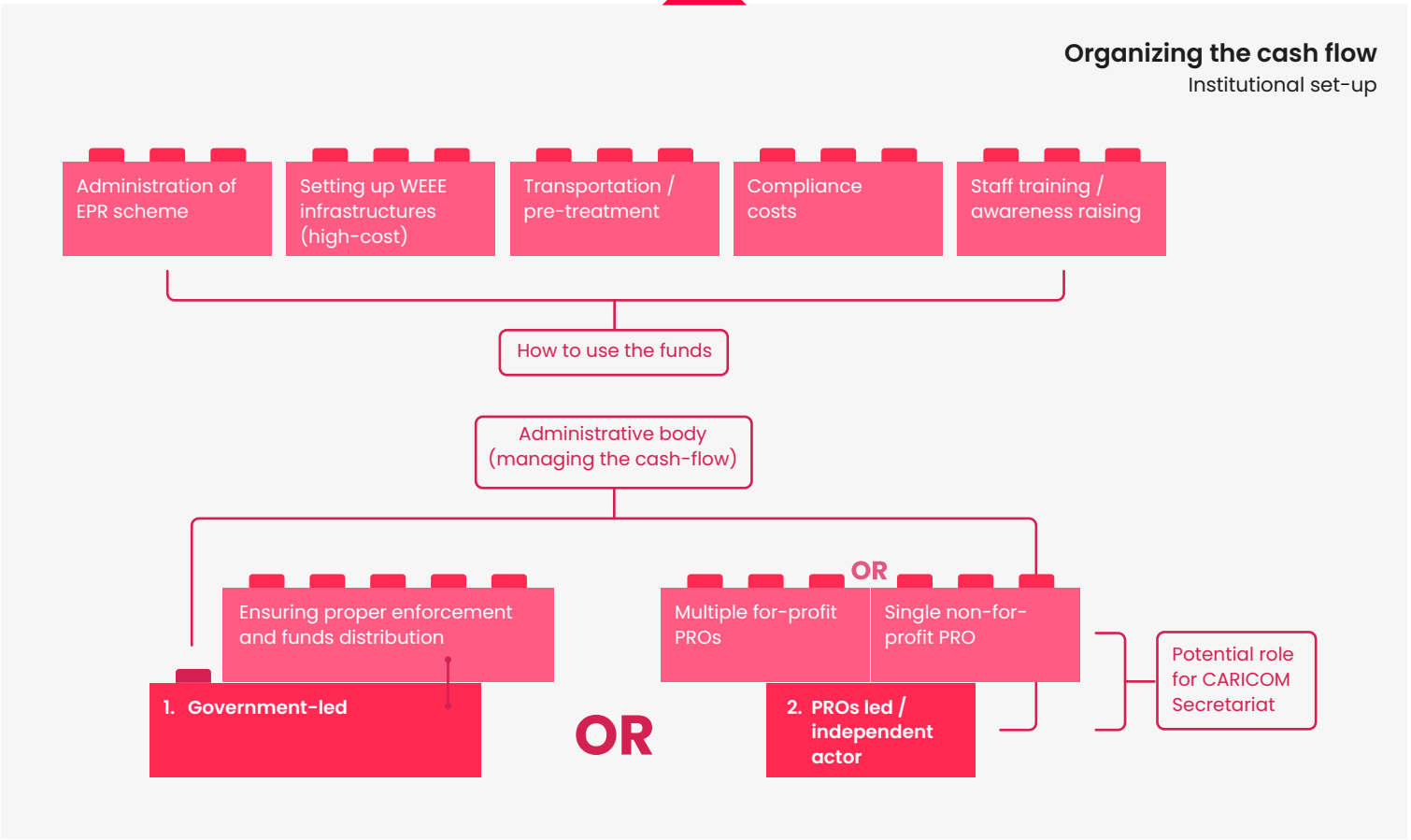
EPR financing entities



C

How to organize the cash flow?

- The Competing Organization Model, with **multiple for-profit PROs**, was suggested by most stakeholders as the preferred option for managing the cash flow. Some stakeholders indicated, instead, a system with PROs **specialized per waste stream and/or per WEEE categories**.
- There was no consistency in defining the **governments' roles**: some stakeholders highlighted the need for government-**independent PROs** administering the cash flow, with no involvement of the public sector due to lack of trust and the risk of inefficiency in management of resources by public entities. Other stakeholders, on the contrary, encourage a **government-led EPR scheme managing the funds, to ensure proper enforcement and cash distribution**.
- In terms of **how to use the collected funds**, stakeholders suggested, as priority actions:
  - *The **setting up of infrastructure** for WEEE collection and treatment. In fact, infrastructure are considered cost-intensive and currently lacking any form of external (mainly public) financing.*
  - ***The logistics / transportation** of WEEE and pre-treatment operations, to be ensured over a longer and stable period.*
  - *Costs of compliance for treatment operators, as well as training of treatment operators' staff.*
  - *The **administration of the EPR scheme,** both at national and regional level.*
  - *The **awareness raising** at different levels, of consumers but also producers/distributors and competent authorities' staff.*



C

BOX 5 - EPR implementation models - Caribbean context

While collective producer responsibility (CPR) schemes are generally considered more suitable for Small Island Developing States due to limited market size and institutional capacity, the potential role of individual producer responsibility (IPR) should not be dismissed in the Caribbean context.

IPR schemes, in which producers are responsible for the take-back and treatment of their own products, can create stronger incentives for eco-design, product durability, and material recovery. By directly linking producers to the end-of-life management of their own products, IPR may enhance circularity and accountability.

However, significant challenges remain. IPR systems struggle to address historical e-waste (orphan products), and may be difficult to implement in markets characterized by a large number of small importers and distributors, as is the case in many Caribbean countries.

Despite these limitations, the Caribbean context may offer unique opportunities to explore hybrid approaches. For example, IPR principles could be applied selectively to large producers or specific product categories, while a collective system addresses legacy waste and smaller market actors.

Such hybrid models could combine the efficiency and inclusiveness of collective systems with the innovation incentives of individual responsibility and therefore warrant further consideration in the design of EPR systems for the region.

CPR > short term realistic
IPR > long term realistic
Hybrid > probably the best solution

How to organize the information flow?

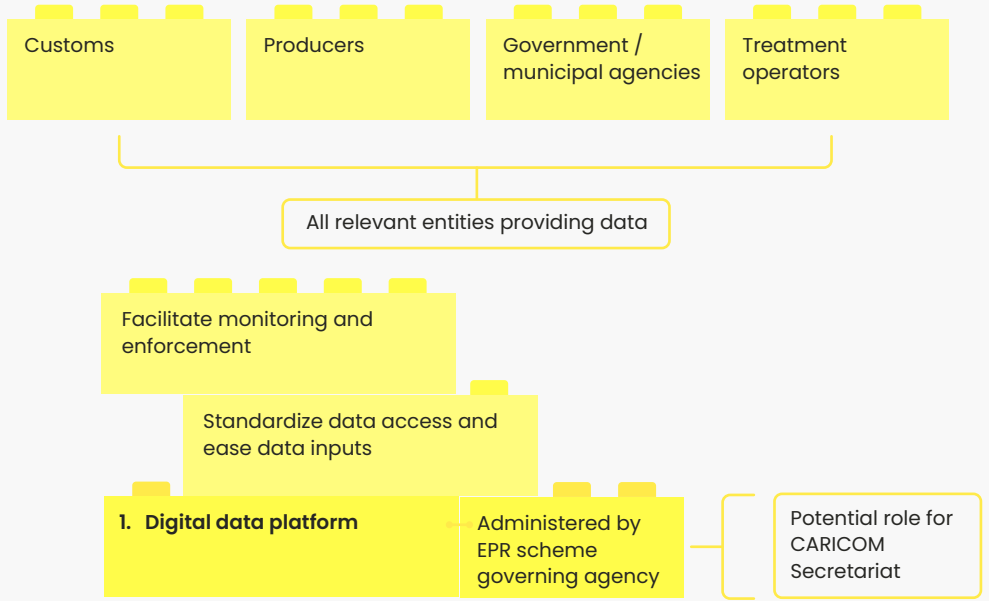
- The information flow may encompass a broad range of data to be collected and shared, including but not limited to:
  - *data on EEE import/exports and POM, WEEE collection system data*
  - *treatment and recycling data (quantities per WEEE category, pre-treatment outputs, treatment methods used, data on hazardous fractions etc.)*
  - *producers/importers/distributors registrations to the EPR scheme and compliance information (e.g. compliance fees paid, reporting frequency etc.)*
  - *financial flows and EPR management fees (fee structure, reserve funds level, audited statements etc.)*
  - *data on informal sector (mapping of informal sector actors and operations, incentives, trainings performed etc.)*
  - *monitoring, auditing and enforcement data …*
- To facilitate the information flow, the establishment of a **digital platform** is recommended, **to standardize the data accessibility and to ease the data inputs**. A few practical examples were provided by stakeholders:
  - *it could be shaped as cloud-based software, administered by the central-governing PRO;*
  - *or it could be established as a centralized online platform hosted by the CARICOM Secretariat, to facilitate registration and permitting licenses for businesses involved in EEE.*

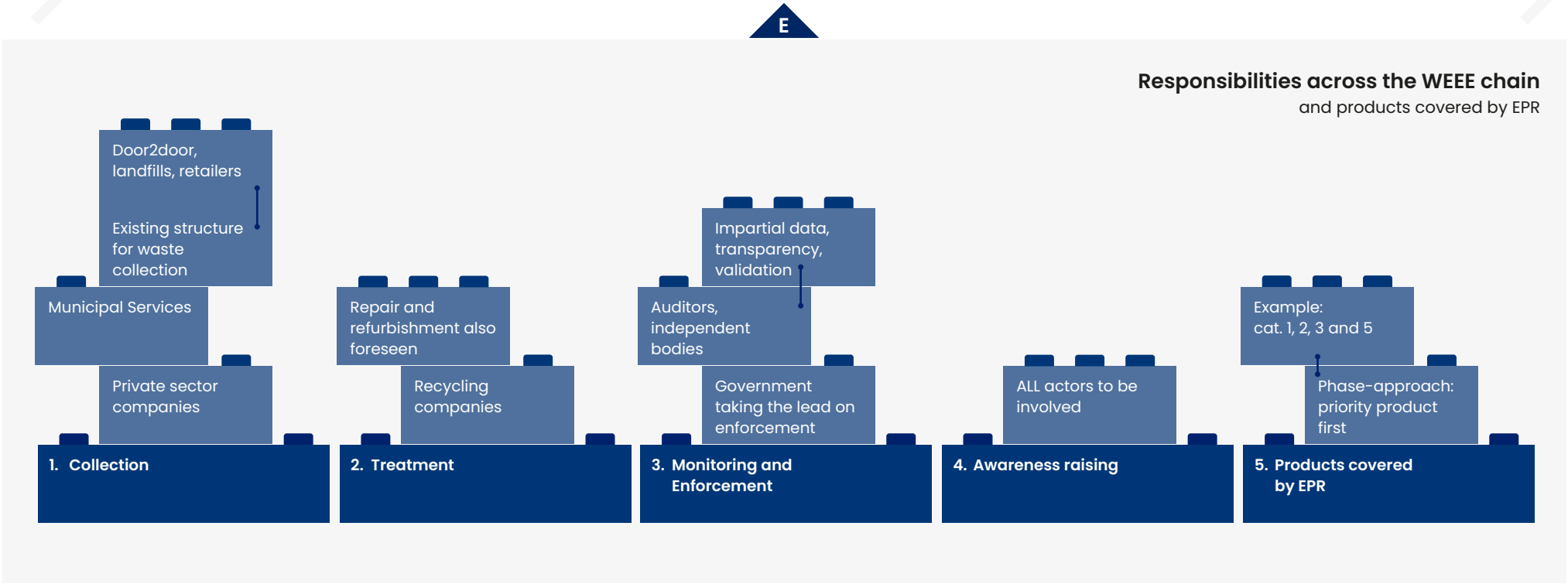
  Overall, the identification of a dedicated entity to maintain and administer such centred platform should be addressed at the very beginning, to allow the correct functioning of the information flow, in both directions 'in' and 'out'.
- Such digitalized and centralized system would **facilitate the monitoring and enforcement** of the EPR scheme, and possibly the correct pay-out of the collected EPR and consumer fees to logistics providers, treatment and disposal operators upon evidence of performance.
- Information related to EEE and WEEE must be collected from all the **relevant entities** involved along the value chain and the import/export procedures, including customs, producers, government agencies etc. Information owners should ideally fill in the relevant data and information, and a regular control / auditing system should be ideally set up, once the system is in place and ongoing to verify if the information provided is correct.

D

Organizing the information flow

Digitalization





Who has the responsibility for managing the WEEE?

Collection

- Private sector's **recycling companies** should be responsible for the collection of e-waste
- Public entities, and specifically **municipal services** should also be responsible for / involved in the WEEE collection
- **Structures for WEEE collection already in place** in some of the project countries (see chapter 5.2.2) could be replicated and/or expanded:
  - *Door-to-door collection, especially for the so-called 'bulky waste'*
  - *Disposal of WEEE at landfills, after separate collection already, with dedicated sections for WEEE. The collected WEEE could then be re-distributed to formal / informal pre-treatment or treatment operators, for proper (pre-)processing.*
  - *Systems for separation at source*
  - *Collection of WEEE by the retailers / distributors*

Treatment

- Treatment operations are primarily responsibility of the private sector, namely the **recycling companies**.
- Informal workers play also an important role e.g. in supporting early-stage treatment and processing
- However, treatment activities should not only be limited to recycling, but also to **repair** and **refurbishment**. For this reason, NGOs, who are already involved to some extent in repair and refurbishment activities, could also play a key role.

Monitoring and enforcement

- In terms of **enforcement** of EPR-related policies and procedures, all stakeholders agreed that the **government should take the lead**. However, independent bodies like PROs are also suggested as key players for enforcing policies and procedures
- In terms of **monitoring**, and ensuring impartial data collection, transparency and validation, **auditors or independent bodies**, including local PROs, are mainly suggested, as well as **governmental entities**

Awareness raising

- There is overall agreement in saying that **ALL actors should be involved in awareness raising activities**, including government and solid waste management authorities, private sector including but not limited to treatment operators, and NGOs.

Products covered by EPR

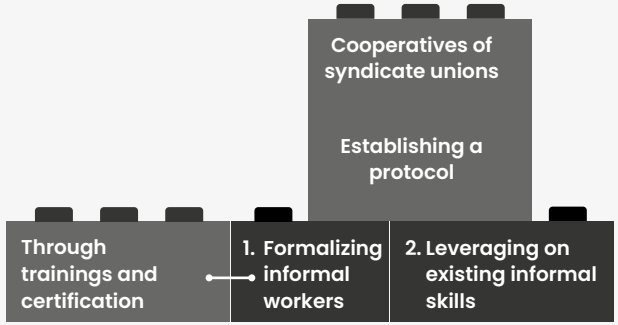
- One option could be to adopt a **phased approach, starting with 'priority' product categories** (e.g. EEE category 1, 2, 3 and 5), considered more valuable
- A desktop assessment should be used to determine priority WEEE – this should be linked to the set-up and improvement of an overall WEEE flows monitoring at national and regional level (see also the National WEEE Assessment – 2026 published for each project country)

What is the role of the informal sector in the WEEE management system?

- The informal sector is recognized as a key actor in the WEEE management in the Caribbean region. Informal workers play an important role e.g. in supporting early-stage processing and increasing the e-waste collection.
- One option could be to leverage on informal workers' skills, without intervening on what is already working well (e.g. high collection rates achieved by informal workers), while only stepping in e.g. in the treatment phase, when problems, for instance related to hazardous components, arise
- Moreover, suggestions to **formalize informal workers through trainings and certification** are made, with related benefits and challenges:
  - ***Benefits***: *Protect livelihood of informal workers' families; improve environmentally sound management techniques (BAT/BET); provide incentives for formalization, including financial ones*
  - ***Challenges***: *Resistance to initiate 'formalization' processes; transitionary period and possible lack of willingness to comply; standardisation of processes required; challenges in monitoring the formalization process*
- The governments or the PROs could develop a **protocol** for the formal and informal sector to be integrated and to work together: informal workers could help in improving tracking e-waste at local level. However, further research on the current role of the informal sector in each country is encouraged, in view of establishing tailored measures for formal-informal integration.
- Formalization could also take place through the creation of **cooperatives** or **syndicate unions** for informal workers.

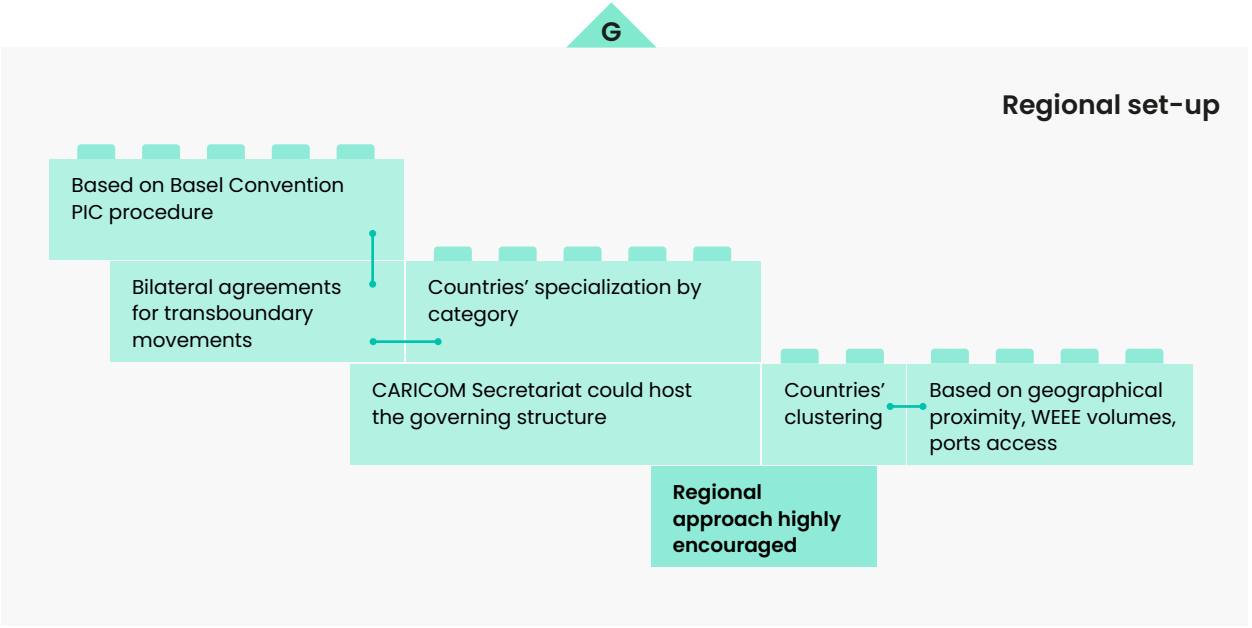
F

Informal sector:
Playing a key role



Is a regional / sub-regional approach to be considered?

- A **regional approach is highly encouraged**. Among the main reasons: the low volumes of WEEE generated in most countries, especially small islands; the limited land space; the high treatment costs and the shared shipping routes.
- Different suggestions are made on how to possibly organize the EPR system at a regional and sub-regional level. Suggestions collected by stakeholders are reported below. While the list is not exhaustive and does not represent a ready-to-go option, it gives a good understanding of the views of involved stakeholders, and in the consultants perception, it represents a good starting point for 'building' a regional approach to EPR at regional level:
  - *CARICOM, the Caribbean Community grouping 21 countries[26], could host the governing structure, establishing a digital platform to allow producers/importers direct registration and the issuing of permits for compliant treatment operators financed through the EPR system. The registration could also include the direct registration of their EEE POM.*
  - *At national level, countries could work to improve collection, initial dismantling and hazardous components removal, while the sub-regional hubs could rather e.g. focus on subsequent pre-treatment operations that require more sophisticated and hence more expensive mechanical equipment for shredding and mechanical separation, and final metals processing. Export for treatment of metal fractions, however, should also be considered as an option. Overall, arrangements for transboundary movement of WEEE, if envisaged, needs to be put in place, in line with the requirements of the Basel Convention.*
  - *Countries could be clustered, e.g. in a Northern-Caribbean cluster (e.g. Dominican Republic hub) and a Southern-Caribbean hub (e.g. Trinidad and Tobago hub): clustering should leverage on ports access, volumes of e-waste generated, existing infrastructure and geographical proximity. Such approach would optimize costs and measures*



  - ***Country specialization for various categories of priority e-waste streams** is also a suggested approach, mindful of resources, technical and technological limitations, land size etc. In this case, bilateral agreements under the Basel Convention are encouraged, to facilitate WEEE transfer among countries.*

    As a practical example, the stakeholders suggested for instance the division below, based on current countries' main specializations and related factors:
    - » *Guyana – Cat. 1 Large Household Appliances*
    - » *Dominican Republic - Category 2, Small Household Appliances*
    - » *Trinidad and Tobago- Category 4, Consumer equipment and photovoltaic panels*
    - » *Suriname / Barbados – Category 3, IT and telecommunication equipment*

[26] https://caricom.org/

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Annex.
Comparative table on WEEE technical and infrastructural assessment in the 11 project countries

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Antigua and Barbuda	• **NO official WEEE collection mechanism** in place. WEEE is disposed of with other wastes (comingled) at the landfill. • At the landfill, WEEE, especially white goods (e.g. washing machines, refrigerators, etc.) are separated and stored in separate containers • Wills Recycling Limited (a private metal scrap company) collects WEEE for shipment. • I**nformal sector actors are active in collection, sorting and dismantling** of WEEE, however the size of this sector is unknown.	Financial instruments currently in place to finance WEEE management: • **Government funding** • Landfill tipping fees. • International aid and grants.	• Stakeholders confirmed that there is no reporting system on e-waste in place in the country.	• WEEE management system in Antigua and Barbuda is at a nascent stage, there are **no WEEE dismantling or recycling facilities.** • Wills Recycling Limited does some very minimal processing, basically sorting collected WEEE before shipment abroad, with no dismantling. • No cost-recovery mechanisms are in place for WEEE management.
The Bahamas	• **NO official WEEE collection mechanism** in place • Households and companies either bring their WEEE to the landfill, pay a contractor to do so, or have it picked up by local informal waste collectors. • Lots of **people store their WEEE in their backyards** and will not easily dispose of it, because of its potential value. • Only **one landfill at New Providence Ecology Park (NPEP)** has a **dedicated unit for WEEE** acceptance and dismantling. • Informal workers are involved in the collection, sorting and dismantling of WEEE. WEEE is collected by **informal workers to salvage metals such as copper and aluminium**, after which the remains are disposed of at the landfill.	Financial instruments currently in place to finance WEEE management: • **Government funding** • Landfill tipping fees. • Private sector contributions. • International aid and grants.	Ministry of Tourism, Investments & Aviation stressed the need to partner with the DEPP - Ministry of Environment and Natural Resources, **to develop a coordinated effort toward waste management in the tourism sector**, including WEEE. Beneficial to establish a data dashboard, for stakeholders in the tourism sector to register when they purchase EEE, to keep track and better organize their end-of-life management.	• WEEE management system in its formative stages, with limited formal infrastructure and operational maturity. • **All categories of WEEE are accepted at the NPE**P. The facility currently operates a **drop-off only model**, limited scale of operations. • **Manual separation and dismantling** are the primary processing methods used. • Main output fractions: ferrous metals; cables; hard drives; PCBs; compressors; copper and copper alloys; inductors; other fractions (e.g. rubbers, glass, speakers, ink, motors). • No information available on quantities recovered and average sale prices. • Operational expenditure at NPEP is **supported by public funding**, and there is currently **no cost recovery mechanism in place** such as producer fees or extended producer responsibility (EPR) frameworks.

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Barbados	• At present, **there is no formal or official collection scheme for e-waste in place** in Barbados. • However, the company Caribbean E-waste Management company confirmed that they do perform collection of e-waste (covering approx. 30% of the collection in the country). Moreover, **there are dismantling and recycling facilities in place** at country level, which are **partially** implementing BAT and BEP techniques. • The main system for WEEE collection in the country is the **door-to-door collectio**n, mainly for the so-called 'bulky' waste, and through **drop-off points**.	• The **management of WEEE in Barbados is only self-financed: companies** finance themselves through their business activities. No additional funding mechanisms is foreseen. • There might be some externally funded projects (e.g. UN-funded projects taking place), but they are limited in scope and time.	• Data on WEEE in Barbados are collected by the Ministry of Environment and National Beautification, Green and Blue Economy. However, at present, there is **no regular monitoring system on e-waste in place** at national level.	• Based on the data collected during this project, between 2019 and 2024 in Barbados **a range of 0,3 to 3,1% of e-waste generated was collected and treated** by two recycling facilities. • The **minimum collection fee** for individual customers **is 30 USD, this fee can reach up to 500-1000 USD**, depending on the service offered. • All e-waste in Barbados is **manually processed** using basic dismantling techniques. There is no evidence of mechanical sorting or advanced pre-treatment, and no category-specific treatment protocols. • However, one of the interviewed companies is selling components to a downstream company in the US, which is fully compliant with **R2 and ISO standards**. • In this project, two recycling facilities have been consulted, one treats mainly **motors** and the other **mixed e-waste**. • Motors are sold at an average price of **500 USD per tonne**. Main output fractions recovered from motors include cables, compressors, casings, aluminium and aluminium alloys, copper and copper alloys, ferrous metals, and other non-copper and non-aluminium alloys. • Other types of e-waste are only partially treated within the country. After initial dismantling and processing, the **material is exported to the United States for further processing**. Exports prices vary due to gold prices fluctuations - **ranging from 1,000 to 5,000 USD.** • There is notable economic potential for in Barbados' WEEE sector.

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Belize	• **NO official WEEE collection mechanism** in place. • Metal recyclers sometimes **collect WEEE and dismantle for the metals**. One transfer station (**Mile 24**) allows for **storage of WEEE** (bulky waste) and for **residents to recover parts and metals**. • Informal workers are involved in the **collection, sorting and dismantling** of WEEE for metals, batteries and other parts that are usable. Metals are sold to the formal sector metal recyclers. The remains of WEEE are disposed of at the landfill.	Financial instruments currently in place to finance WEEE management: • **Government funding.** • Waste collection fees. • Landfill tipping fees and • private sector contributions.	• According to stakeholders, there is **no reporting system** in place for **EEE and WEEE**. The **Department of Environment (DOE)** were indicated as responsible for inspection of recyclers and reporting. • The Belize Recycle and Waste Management Association, recommended **San Pedro** (given its status as a high-traffic tourist destination and significant WEEE producer) for an initial **pilot project**. The pilot can serve **for evidence-based policy making**, which can be adopted and implemented nationwide.	• WEEE management system is almost **non-existent**. Belize must build this market from the ground up, as **no formal collection, treatment or other infrastructure** currently exists. • No information available on quantities of metals recovered by both formal and informal sector and average sale prices. • Amounts of WEEE generated are too low compared to market demands, causing previous WEEE recycling initiatives to fail.
Cuba	• Cuba has **an official WEEE collection and dismantling** (processing) **system** in place, which is managed by the Recycling Business Group (RBG), a **state-owned business group**, and a subordinate to the Ministry of Industries (MINDUS). Operations are nation-wide. • WEEE is collected and dropped off (accepted) at **transfer stations** throughout Cuba and is **required** to be dismantled into **plastics, metals, and electronic components.** • Dismantled WEEE is transferred from transfer stations to recycling companies for further dismantling, treatment, resale and export. • The informal sector consists of waste pickers, that recover metals and electronics and sell them back to the formal sector for shipping. • Extended lifetimes of electronic components result in WEEE contributing the smallest share to recycling streams. • The low price paid by transfer stations for 1 kg of WEEE (7 Cuban Pesos (CUP), approximately USD 0.06) often discourages households from formal disposal, resulting in illegal dumping in the environment.	• The main financial instrument in place to finance the management of WEEE is **government funding** (via taxes, municipal budgets and public funds).	• The recycling companies collecting and processing WEEE are responsible for collecting data and reporting to MINDUS. • MINDUS does regular inspections at these companies.	• All categories of WEEE are accepted at the transfer stations and recycling companies. • Residual metals and cables are removed from the WEEE (especially circuit boards) and sorted into different grades for sales. This is done manually. • The Havana Recycling Company (HRC) alone has a processing capacity of 12 ton of WEEE per year. • The average sale price of 1 kilogram of low grade WEEE is estimated at 214 CUP (USD 1.79). The price for copper is estimated at 750 CUP per kilogram (USD 6.25). • The **operational costs** (costs to buy the WEEE at 7 CUP per Kg, fuel for transportation, wages for 3 people) are averaged at **5500 – 6000 CUP (USD 46 – 50) per month** at the HRC. • The existing WEEE recycling system appears **very profitable with potential economic gains**, should processing volumes increase and markets be secured for recovered materials.

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Dominica	• **No formal separate WEEE collection system** is in place in the country. • Households and companies drop off their WEEE at the Dominica Solid Waste Management Corporation (DSWMC) for free. A processing fee is to be introduced. • There is a **designated WEEE storage** area at the **landfill**, where WEEE is stored. WEEE used to be dismantled for shipping, however high operational costs led to this activity being discontinued. • WEEE often also comes comingled with other waste at the landfill, which is segregated by landfill personnel and stored at the designated area. • Illegal dumping of WEEE, especially white goods forms a challenge. Residents do this to avoid paying landfill fees. • Residents often hoard their WEEE, storing large amounts of white goads improperly at their homes for long periods of time.	Financial instruments currently in place to finance WEEE management: • Landfill tipping fees and • private sector contributions.	• **There is no regular reporting system in place on EEE and e-waste at national level.** In the collective survey, it was reported that the responsible bodies for collecting data on e-waste are the WEEE collection and treatment companies. However, the DSWMC also collects data on WEEE accepted and stored.	• All categories of WEEE are accepted at the DSWMC landfill; and the facility currently operates a drop-off only model. • The DSWMC has plans to introduce a utility fee for domestic waste. • A 1.5% environmental levy exists in Dominica; stakeholders suggest that it should potentially be allocated to e-waste management. • The collection cost for waste is estimated at 50–80 Eastern Caribbean Dollars (equivalent to USD 18.5 and 30) per tonne. • The average sale price of dismantled e-waste parts is estimated at 300-400 Eastern Caribbean Dollars (equivalent to USD 111 and 148) per tonne, depending on material composition and destination country. • Budget constraints continue to hinder investment in essential infrastructure, including collection vehicles, dismantling facilities, and equipment for the safe handling and removal of hazardous components. • If export routes and processing agreements are secured, Dominica could generate revenues from recovered materials, particularly metals, and electronic component.

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Guyana	• **No formal separate WEEE collection system is in place** in the country. • Two private sector companies, Eternity Investments Inc and Cevons Waste Management collect and accept WEEE at their recycling facilities for processing, with Eternity Investments Inc being EPA authorized for exports. • Eternity Investments Inc, salvages metals and electronic components from WEEE. It was reported that an average of **10% of the incoming WEEE is salvaged because of its value and that the remaining 90% is dumped at the landfill**. • Haags Bosch landfill has a white goods section and an electronic section. • The informal sector consists of predominantly waste pickers at the landfill, mainly active in the **sorting and dismantling of WEEE for metals, electric motors, circuit boards and other parts that are usable.** • Majority of WEEE ends up at the landfills co-mingled with other waste types.	Financial instruments currently in place to finance WEEE management: • Government Funding: Taxes, municipal budgets, and public funds. • Waste Collection Fees: Businesses pay for waste services. • Advanced Disposal Fee.	• It was reported that the Ministry of Local Government and Regional Development and other Environmental Bodies such as the Environmental Protection Agency, are responsible for data management and reporting in **Guyana**. However, **no indication was given on a regular reporting system in place on EEE and e-waste at national level**.	• Guyana's e-waste management system is characterized by the coexistence of formal and informal actors (waste pickers) and involves mainly small-scale manual disassembly, with limited downstream recycling infrastructure. • Formal e-waste collection is led by Eternity Investment Inc., whose operations remain primarily focused on manual dismantling, with valuable materials separated for export and non-marketable residues. • The parts that are dismantled to be exported are: 1. Electronic board. 2. Metals like aluminum and copper. 3. Small transformers. 4. Electric motors for water pumps, refrigerators, washing machines. • Low volumes of high value electrical components such as printed circuit boards (PCBs) causes delays in shipment. • Profitability in the existing system depends almost entirely on the recovery of high-value metals, leaving the majority of material fractions unprocessed and disposed of at landfill.

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Saint Kitts and Nevis	• N**o formal separate WEEE collection system** is in place in the country. Consumers typically **dispose of WEEE along with other waste** (e.g. household waste) or **via the informal sector**. No dismantling or recycling facilities are operating in the country. • In the Saint Kitts Solid Waste Management Authority Conaree Landfill, Persistent Organic Pollutants - Polybrominated diphenyl ethers (POPs-PBDE) and Hexabromocyclododecane (HBCD) in WEEE and other hazardous wastes were identified during an assessment exercise. • No voluntary industry initiatives or measures exist to date to contribute to WEEE management.	Instruments currently in place to finance the waste management in the country include: • Government funding: taxes, municipal budgets and public funds. • Landfill tipping fees: charges for waste disposal at landfills • Private sector contributions: voluntary recycling programs by businesses. • International aid and grants: funding from NGOS or global organizations. However, these resources are **not specifically allocated to WEEE stream**, and there are no economic instruments such as eco-taxes, deposit-refund schemes, or producer fees.	• According to the collected surveys, there is **no regular reporting system on WEEE in place** at country level. Both WEEE collection companies and the Ministry of Environment were indicated as responsible bodies for the collection of WEEE-related data.	• There is no organized public drop-off network, and **no dedicated dismantling or recycling facilities are in place.** • The Solid Waste Management Authority (SWMA) charges a **fee of 5 dollars per item** from anyone who drops off their WEEE. • Moreover, fees applied at the Conaree Landfill in Saint Kitts to industrial, commercial and institutional waste, green waste, steel cables, **E-waste, Tv/ computers etc. amount to approximately 20 USD**. • Fees applied at the Long Point Landfill in Nevis for **WEEE** amount to **5 USD per item**, and **20 USD per item** for **white goods** such as fridges, washing machines, AC, Stove etc. • Overall, WEEE management in the country is primarily financed by government funding and international aid and grants. Consumers are also charged with fees for waste collection and disposal at landfills. • At the landfill in Saint Kitts, informal waste pickers go through security and are given a pass to collect what they need, (e.g. refrigerator parts, washing machine parts, car parts, copper etc.). An average of 10 waste pickers enter the landfill in Saint Kitts, daily. • The landfill in Nevis charges the waste pickers for whatever they are taking out of the landfill. • **No category-specific recovery protocols exist, and there are no reported exports of mixed e-waste fractions beyond the battery** stream.

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Saint Lucia	• The **e-waste management** system in Saint Lucia falls under the **responsibility of the Saint Lucia Solid Waste Management Authority** (SLSWMA), established by the Waste Management Act as the statutory body in charge of solid waste management. • **Saint Lucia has no formal national collection system dedicated to e-waste**. Obsolete electronics are typically disposed of with household waste or collected on an ad hoc basis by private firms that also handle other waste streams. **Some informal collectors and landfill pickers recover valuable e-waste components for resale.** • There are no Extended Producer Responsibility (EPR) mechanisms, eco-fees, or structured cost-recovery systems.	• WEEE management is **primarily financed by government funding** (e.g. taxes, municipal budget) • Waste collection fees and landfill tipping fees are applied. The sector also benefits from private sector contributions, establishing voluntary recycling programs, and funding also comes from NGOs or global organization through international aid and grants.	• The following bodies collect data on WEEE: Central Statistical Office of Saint Lucia; Ministry of Sustainable Development, Energy, Science and Technology; WEEE export companies. • Data collection is **not part of a standardized national framework**.	• Most of the interviewed stakeholders agreed that there are no formally recognized e-waste dismantling or recycling facilities in the country. Limited manual dismantling may occur informally, but most discarded electronics are disposed of at the Deglos Sanitary Landfill and the Vieux Fort Transfer Station, where e-waste is mixed with municipal waste. • The **informal sector continues to play a central role in collection, sorting, and dismantling**. Informal workers, including landfill pickers, recover components such as copper wiring and small electronic parts for resale to scrap dealers. • The economic potential of e-waste recovery remains low under the current conditions.
Suriname	• There is no official WEEE collection system in place in Suriname. • WEEE and metal recyclers (from both the formal and informal sector) collect WEEE at a household and company level and allow for drop-off as well. • **There are, six (6) WEEE collection, dismantling and recycling private companies in Suriname**: BAP Waste Management Company, Green Circle Recycling NV, Makandra Community-based Circular Waste Management Solutions, Kairos Solution NV, Bux Engineering, and Nicole 'Aannemings en Constructie Bedrijf (NAB). • These facilities primarily dismantle WEEE to recover metals and circuit boards. The metals and plastics are typically sold to local recyclers, while the more valuable circuit boards are exported. • The **informal sector** is mainly active in the **collection, sorting and dismantling of WEEE for metals, circuit boards and other parts that are usable**, which are sold back to metal recyclers.	Instruments currently in place to finance the waste management in the country include: • Government funding: taxes, municipal budgets and public funds. • Landfill Tipping Fees. • Charges for waste disposal at landfills. • Waste Collection Fees. • Businesses pay for waste services. • Private Sector Contributions • Voluntary recycling programs by businesses. • International aid and grants. • Funding from NGOs and or global organizations.	• There is **no reporting system on WEEE in place** at country level. • Data on WEEE collected and processed can be obtained from the recycling companies.	• Consumers dispose of e-waste in multiple ways: dropping it off at designated points or recycling facilities, handing it to informal collectors, or discarding it with general household waste. • The focus is especially on category 3 WEEE (IT and telecommunications equipment) with **Printed Circuit Boards (PCB) as the main separated output fraction, as this is feasible and there is a market**. Process at these facilities involves **manual separation and dismantling**. • Due to the absence of complete quantitative data, it is not possible to determine the overall operational costs, revenue streams, or profitability of Suriname's WEEE management activities.

	Collection and Disposal	Financial mechanisms	Data management and reporting systems	Treatment and Economic impact
Trinidad and Tobago	• Trinidad and Tobago's e-waste management system continues to be characterized by the **coexistence of formal and informal actors** engaged primarily in preliminary waste handling and dismantling activities. • The **private sector leads the e-waste management operations** in the absence of dedicated national policy or legislation. • **There are six (6) WEEE collection, dismantling and recycling private companies in Trinidad and Tobago:** Piranha International Limited, Recyclage E-Waste Management (Recyclage TT), Green Chip Recycling Limited, The eWaste Company Limited, GreenVoltt Ltd., and the Secure Group. • As of 2025, stakeholder interviews confirm that e-waste continues to be collected primarily by private sector initiatives, with collection points managed by recyclers. • The informal sector in Trinidad and Tobago is involved in the collection, sorting and dismantling of WEEE.	• **Financially, the system remains market based.** There are no producer responsibility schemes, eco-fees, or formal cost-recovery systems. Recyclers finance their operations through resale of valuable components recovered from collected e-waste.	• No indication was given on the responsible bodies for collecting data on e-waste in Trinidad and Tobago. And no annual or regular reporting system in place on EEE and e-waste at national level was reported.	• Six main operators involved in the handling of e-waste in the country, but only one (Piranha International) has formal permits duly registered • The main activities of these companies still focus on the **aggregation, manual dismantling, and export of valuable fractions such as printed circuit boards (PCBs) and metals**. No domestic end-processing facilities have yet been established • Volumes processed remain modest and are not systematically reported to government authorities. • Profitability remains limited, and collection activities are often sustained by the recyclers' broader scrap metal operations. Stakeholders from the MPEAD acknowledged that the system's economic sustainability is constrained by the absence of EPR or import-based financing mechanisms.



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