

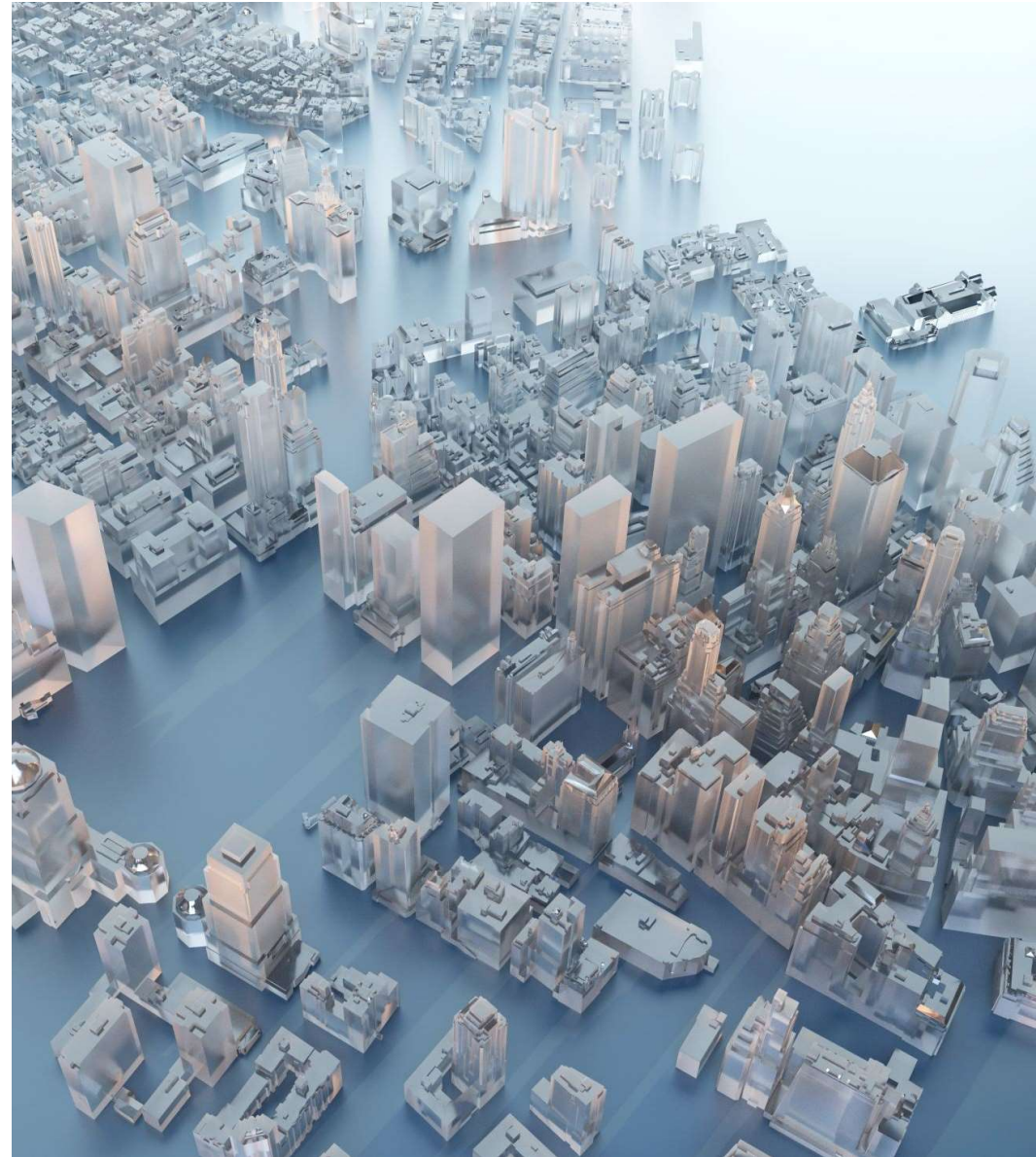
CRIC Training on Integrated Waste Management (IWM)

Module 4 The role of local and regional authorities



Cities as Systems: Circular Metabolisms

- Cities cover are just 2% of the earth's land surface but contribute **80% of global GDP**
- Cities consume lot of resources to meet demand for energy, water, food, as well as produce wastes and emissions,
- Urban areas currently account for 60-80% of global energy consumption, 75% of carbon emissions, and more than 75% of the world's natural resource consumption
- An **70-80% rise in the global population residing in urban areas** is expected **by 2050**
- Cities must therefore be seen as the building blocks of sustainable development.



Towards Circular Economy in Cities

- Cities are **an attractive starting point to promote the circular economy** because cities are where products are produced, consumed and discarded in large quantities and – that waste streams can be cost-effectively collected, transported and recycled
- Sustainable cities can therefore form a through promoting eco-innovation, sustainable consumption and public procurement, as well as resource efficient land use, water and waste management
- The basic principle of the circular city is that **all product and material streams can be brought back into the cycle after use, and become resource for new products and services**



Cities as the Front-runners of Circular Economy

1. Cities have a **high concentration of biological and technical nutrients**:

- between incoming and outgoing flows of materials, a process of accumulation takes place at the urban level
- city offers a scale of supply large enough to create valuable collection & recovery opportunities
- waste streams would be captured and valorized

2. Cities provide a **fertile ground for innovation and new technologies**

- offer both a highly skilled workforce and a technology-savvy market

3. Cities offer greater **proximity between stakeholders**, be they citizens, retailers or service providers

- to lead the way on collaborative consumption – of cars, clothes, accommodation, household appliances, tools and more

What can local and regional authorities do?

Behavioural change

(citizens, enterprises)

Awareness campaigns,
Regulations, Local taxes
as Pay-As-You-Throw
System (PAYT), etc.

Public procurement

(public authorities)

GPP, PPI

Supply

Demand



Infrastructures

Incubator, Re-use center,
Selective collection and recycling,
Eco-park, etc.

Business Support Scheme

Testing opportunities, Financial
instruments, Labels

Fiscal framework

Local taxes

Regulation

Permits

What can cities and regions do?



Prevent, minimise unmanaged waste and recycle

through

- Regulation and policy
- Behavioural change
 - Partnerships
- Technology and infrastructure investments



Planning and regulation

- Product bans
- Producers' responsibility schemes
- Laws and incentives for recycling and waste separation
- Integrated Sustainable Waste Management planning (see next section)

Ban of single use plastic bags in Bali

Bali Province has banned single-use plastic bags, plastic straws and plastic polystyrene (styrofoam) since July 1 2019 through Regulation of the Governor of Bali Province Number 97 of 2018 concerning Restrictions on the Generation of Single-Use Plastic Waste.

Overall, study shows that the regulation succeeded in encouraging changes in household behavior in the form of reducing consumption of plastic bags by 57%, straws by up to 70%, and styrofoam by up to 81%. However, you can still find plastic bags in markets and stalls, as well as straws and styrofoam in restaurants and stalls. This indicates that there is public awareness to reduce the use of these goods, but this is not necessarily accompanied by business actors' compliance with regulations.



Producers' responsibility schemes

- **Extended Producer Responsibility (EPR)** is a policy approach under which producers are given a significant responsibility—financial and/or physical—for the treatment or disposal of post-consumer products. Assignment of such responsibility can incentivize producers to incorporate environmental considerations into the design of their products. EPR is crucial for **reducing waste at the source, promoting product design for the environment, and supporting the achievement of public recycling and materials management goals.**
- A voluntary EPR scheme has already been launched by consumer goods companies with support of the Indonesian government.
- EPR is a proven, efficient and transparent way for the private sector to complement public sources (retribution fees) of funding for waste collection in Indonesia.

Optimal EPR design in Indonesia

To realise the benefits of Optimal EPR, its design and implementation in Indonesia must reflect the local circumstances, and solutions must be tailored to fit the Indonesian context, for example:

- 1) **Low-complexity approach** where some of the more complex Optimal EPR Principles are introduced in future phases
- 2) Crucial to effective EPR in Indonesia is the establishment of effective institutions with **robust governance structures**. For example, a trusted Producer Responsibility Organisation (PRO) to manage the EPR system, public-private BLUDs to receive funds on behalf of government-operated waste systems at subnational level and a packaging registry to assess the contributions payable by companies placing packaging on the market Use of **effective data collection and monitoring**
- 3) **Informal waste collectors and informal or private sector companies** should be included in an EPR-funded waste and recycling system
- 4) Agreeing on the waste management objectives and the corresponding funding responsibilities for the private sector, national and sub-national governments
- 5) **Shared governance** with the collaboration of all relevant stakeholders
- 6) **Strict enforcement** by the government to ensure that the targets are met

More info at <https://www.theconsumergoodsforum.com/wp-content/uploads/2023/10/Optimal-EPR-in-Indonesia.pdf>

PACKAGING RECOVERY ORGANISATIONS

- If EPR is operational, producers can collectively assume responsibility for the waste they generate via a PRO. Several PROs can exist under a single coordinating organization ensuring rules are applied consistently.
- The Optimal EPR Principles call for a **single, professionally managed, not-for-profit PRO that covers the whole country and the entire industry. A shared governance and strong enforcement by the government is crucial to reach high collection and recycling performances.**
- The PRO should be allowed to **collect waste from all companies' products.**
- To monitor the effectiveness of the EPR system, a **standardised reporting system needs to be set up that aggregates the information collectors, sorters and recyclers send to the PRO that can be shared with government.**

EPR with a PRO

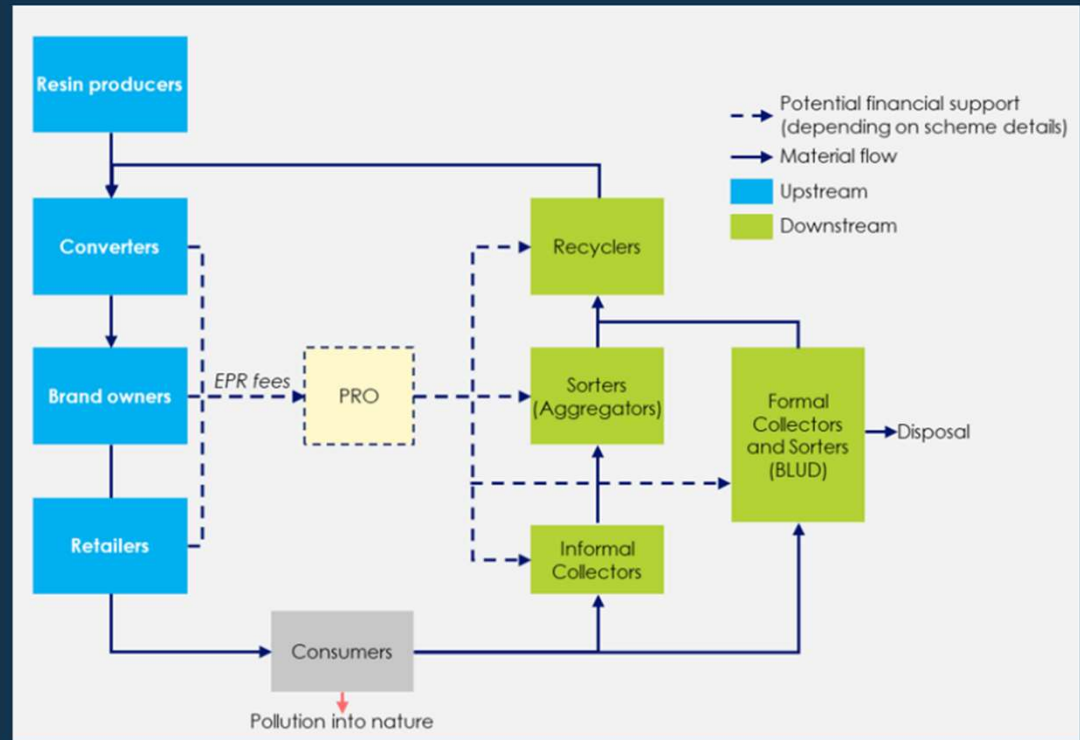


Figure 1: Simplified overview of a waste system with a PRO



BLUD (badan layanan umum daerah)

- A **local government public service body that can provide waste management services**. They are the preferred form of waste governance structure as they can:
 1. Provide services for the whole regency/city and allow waste systems to be coordinated centrally at the regency/city level
 2. Legally accept multiple revenue sources and independently manage and fully utilise these revenues for waste management, so are financially more sustainable
 3. Remain independent, professional, and detached from political change Separate the roles between BLUD as the waste management operator and the environmental agency (Dinas Lingkungan Hidup, DLH) as the regulator for better delivery accountability
 4. Manage integrated waste management services from collection, sorting and transport to disposal
 5. Function as a central waste bank and an off-taker for recycled waste, enabling low value plastics to be sold off in large volumes and bring greater revenue
- BLUD have **solid legal basis** but not yet a mainstream practice due to lack of practical guidelines on how to implement this model

Case study: BLUD Malang regency

Key Figures:

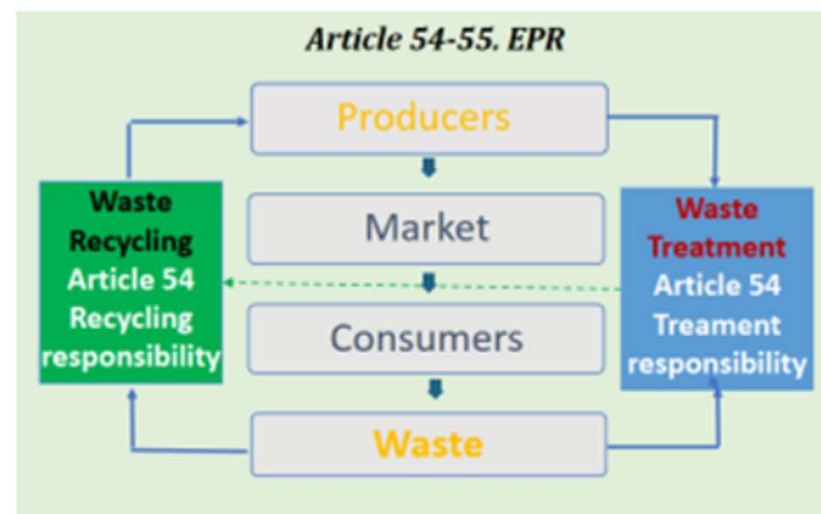
- Budget around Rp 460 billion.
- Grant from the Alliance to End Plastic Waste (AEPW).
- For the construction of 3 Material Recovery Facility (MRF) or Integrated Waste Processing Site (TPST) at the Poncokusumo.
- Currently establishing 3 BLUD that will be the waste collector and operator of the facilities (end-to-end).
- Currently processing the Environmental Management Efforts (UKL) and Environmental Monitoring Efforts (UPL) at the East Java Provincial Government. Next, proceed with processing the Building Construction Permit (PBG).
- Designed since January 2024. Target to begin implementation in late 2024 or early 2025.
- After operational, projected to employ up to 1.000 workers, recruited gradually. Initial phase will recruit 100 workers.
- Worker roles include drivers, waste sorting personnel, collectors, and collection supervisors.

Mandatory EPR Legislation in Vietnam

- Revised Law on Environmental Protection 2020 will be enforced from January 2024
- 2-year implementation period, placing the responsibility of collecting and recycling of packaging to meet minimum recycling targets on producers and importers.
- To comply with the law, producers and importers have two options:

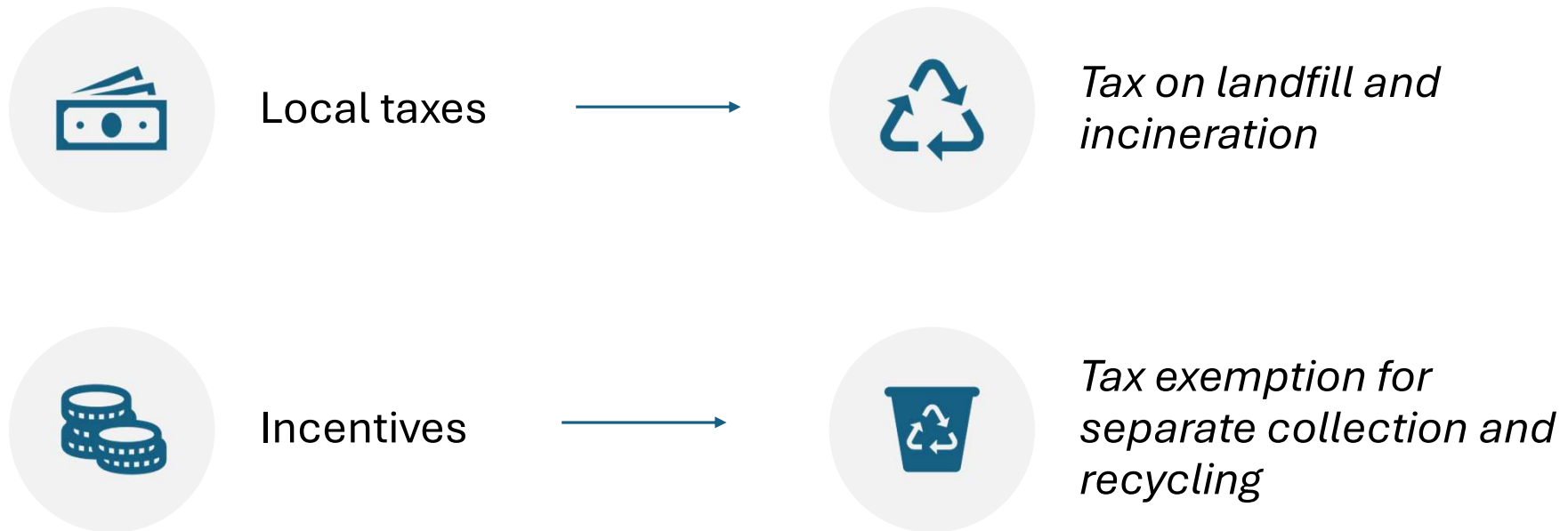
1. Organise recycling activities themselves to meet the minimum recycling rates and specifications (either individually, or through a collective PRO); or

2. Contribute financially to the Vietnam Environmental Protection Fund, which is ring-fenced for the support of collection and recycling in Vietnam (not an excise).



Source: <https://sustainability.chemlinked.com/greenpedia/vietnam-extended-producer-responsibility-epr-regulations>

Local and regional taxes, PAYT



Waste retribution fee

- **Advantages:**

1. Increasing incomes of waste operators
2. The citizen will receive better waste transportation and services
3. Raising public awareness to reduce waste and manage it responsibly.

- However, today **the amount paid to the TPS is often still voluntary** due to lack of training on standard nominal waste retribution that should be paid.

- **An ideal waste retribution system should:**

1. Encompass all aspects (collection, transport to intermediary locations and final location, destruction of rubbish)
2. Monitor compliance and enforce strict sanctions
3. Involve training on Waste Retribution at the neighborhood and hamlet office (RT and RW offices) levels.
4. Set the amount to be paid based on waste produced

- **Legal basis:** Minister of Home Affairs Regulation 7/2021 concerning Procedures for Calculating Retribution Tariffs in the Implementation of Waste Management

- **Kalkulator Digital Perhitungan Penyelenggaraan Penanganan Sampah:** <https://pprk.bappenas.go.id/aksara/kalkulator-sampah/>

Examples of incentives and taxes for recycling and waste separation

Pay-As-You-Throw (PAYT) Programs in South Korea: Residents pay by non-recyclable waste, incentivizing free separation of recyclables and food waste.

Malaysia's MYHIJAU Program: Malaysia's government promotes green technology through the MYHIJAU program. It includes incentives for businesses that produce environmentally friendly products. This program helps foster a market for recycled materials and products designed for easier disassembly and recycling

Aarhus' open deposit return scheme for takeaway-packaging

To learn more about DRS: <https://www.acrplus.org/en/news/deposit-refund-systems-in-the-eu-2023-update-4174>

To learn more about Aarhus DRS for takeaway packaging: https://zerowasteurope.eu/wp-content/uploads/2024/01/ZWE_ZWLiveMar24_SimonRossau_Aarhus_presentation.pdf



Green public procurement

A process by which “public authorities purchase works, goods or services that seek to contribute to closed cycles of energy and materials in supply chains, while minimising, and at best avoiding, negative environmental impacts and the creation of waste throughout the life cycle of such works, goods or services.” EU’s Communication (COM -2008- 400)

- Eco-Friendly Products: Hotels and resorts sourcing biodegradable or reusable products instead of single-use plastics.
- Sustainable Suppliers: Partnering with suppliers that follow sustainable practices, such as using recycled materials and reducing packaging.

Example of a checklist to provide to suppliers depending on the service they provide describing the minimum requirements in terms of packaging and single use plastics, and what options are accepted by the buyer



Ideal option:

- Eliminate packaging
- Reusable and returnable packaging and containers



Intermediate option:

- As little packaging as possible
- Large quantities in a single packaging system
- Lower-impact materials: cardboard, glass, metal, fabric, natural fibres



Not accepted:

- Large quantities of plastic packaging or biodegradable/compostable plastics
- Individually packaged products in plastic or other materials



CATERING AND FOOD SUPPLIERS

Ideal option:

- Reusable and returnable packaging and containers
- Bulk products served in returnable packaging or cartons



Intermediate option:

- As little packaging as possible
- Large quantities in a single packaging system
- Lower impact materials: cardboard, glass, metal, fabric, natural fibres



Not accepted:

- Large quantities of plastic packaging
- Individually packaged products in plastic or other materials
- Individual drinks in plastic or other plastic-containing materials, such as cartons

Case study: GPP criteria for eliminating single-use plastic cups and bottles in medical centres in Spain

- Mutualia is a provider of social services and medical care, which operates 17 social and medical service centres in the Basque country, Spain.
- Mutualia is a participant of the Basque GPP Programme⁷ and is committed to green their procurement practices. So far, **70% of Mutualia's tenders include environmental criteria** and the organisation aims to increase this number and introduce environmental criteria in future tenders

[See award criteria in the tender and environmental impacts: file_1614693018.pdf](#)

Behavioural change

1. Information
2. Convenience
3. Quality of waste service
4. Incentives

1) Get people used to use waste services

- Increase willingness to pay for services (also by promoting transparency in how such money is used)
- Empower people to improve accountability

2) Get people to be more sustainable with their waste disposal

- Decrease littering
- Increase reuse and recycling
- Increase segregation of organic and other waste

3) Get people to generate less waste

- Change production and consumption behaviour



Partnerships

Cooperative agreements between the public and private sector can help shift some financial burden and risk from the municipality to a private company.

Using these formalized contracts, **private companies can construct, operate, and maintain waste facilities**. This agreement can be an advantage when technical expertise may be limited. To be successful, such partnerships should be **flexible, provide secure and proven products, ensure value for money and meet environmental requirements**. PPPs in the municipal waste sector are usually funded by collection fees, tipping fees, or other direct user charges or even by revenues from the sale of waste treatment byproducts, including biogas and compost. (source med4waste policy toolkit)

Public private partnership to improve logistics and build efficiencies in the recycling system by bringing recycling facilities closer to the source of the aggregated waste.

Public-Private Partnerships

Kerjasama Pemerintah dengan Badan Usaha (KPBU):

cooperation between the government and private entities in the provision of infrastructure, using some or all of the resources from the private entities

- 20 years partnership between Surabaya city government and PT Sumber Organik to build a waste to energy plant in Benowo landfill
- PT Sumber Organik invests the CAPEX costs to build the infrastructures and provide the equipment, while also operating the plant, while Surabaya City government supplies waste and pays for the tipping fees

ONG/supplier partnership

The Philippines' Plastic Credit Exchange is a non-profit organization that partners with businesses to reduce plastic pollution. They operate a plastic offset program where plastic waste is collected, processed, and recycled to create new products, ensuring that plastics are circulated within the economy and don't end up in oceans or landfills



Efficient selective collection and recycling

1. Infrastructure Development: Adequate facilities for waste aggregation and collection must be available.

2. Regular Collection Schedules: Waste must be collected regularly to prevent overflow and littering

3. Adapt collection systems to typologies of housing (e.g. high frequency of collection for small apartments where households have less space to store their waste).

4. Specialized Waste Collection Vehicles: These vehicles should be designed to navigate the often crowded and narrow streets of tourist areas.

5. Collaboration with Local Businesses: Hotels, restaurants, and other businesses should be involved in waste management practices.

Opportunities in Indonesia: Waste banks

Waste banks play an important role in diverting waste from landfills and their management should thus be improved through formalization.

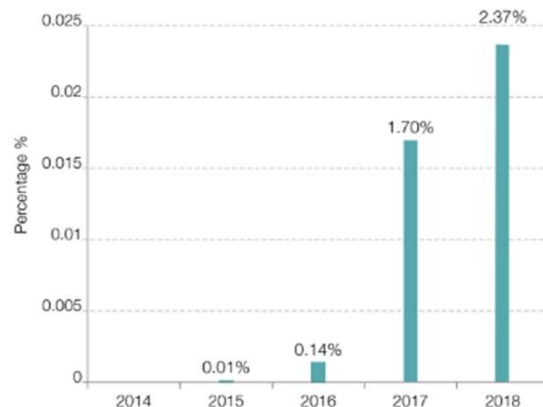


Fig. 11 Waste Bank contribution to national waste reduction



Fig. 12 Economic benefit of Waste Banks

- **Further regulations to protect** managers and customers of waste banks
- **Mentoring** can also be provided by local governments through the Environmental Services to enhance the capacity of waste banks.
- **Larger waste banks** to collect more materials

Opportunities in Indonesia: informal workers

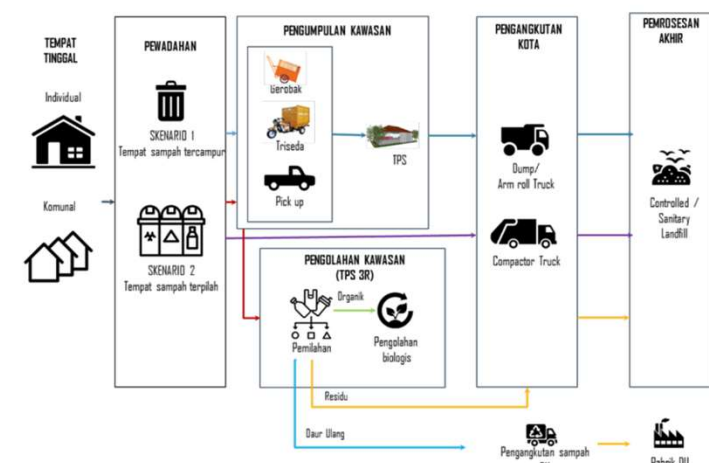
- Informal workers in transfer stations perform **segregation and recycling activities**, significantly contributing to the reduction of solid waste going to the final disposal
- **Provide training and formalize the role of informal workers**
- Cities can **benefit from incorporating these workers in the waste system**:
 1. Technological advantage
 2. Economic advantages (waste turned into tradeable commodities)
 3. Environmental (high recovery rates)
 4. Social (local employment figures, improving workplace safety)

Optimization of collection and transportation

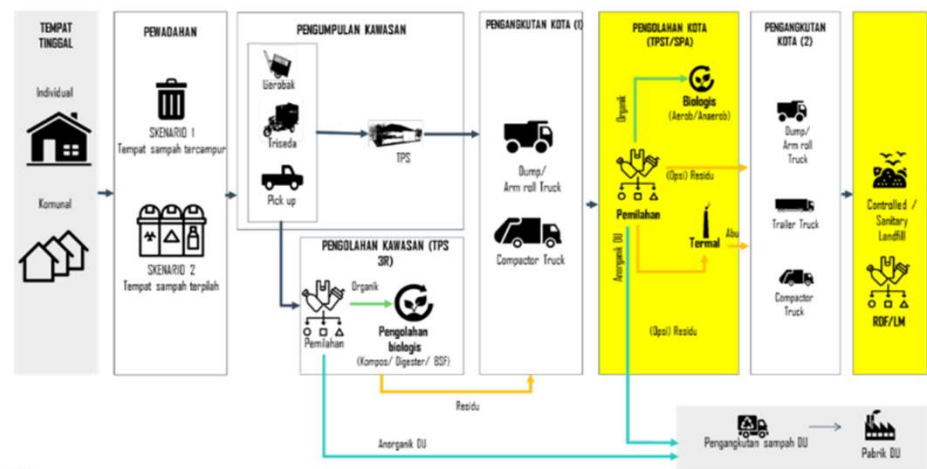
- **Increase efficiency** (vehicles,, existing sorting facilities i;e waste banks see next slide)
- **Route Optimization:** Use real-time data to adjust collection routes, minimizing fuel consumption and travel time.
- **Dynamic Routing:** Adapt routes based on current conditions, such as traffic or weather, to enhance efficiency.
- **Workload Balancing:** Ensure even distribution of tasks among collection teams to improve productivity.

Appropriate technologies for recycling and energy recovery of residual waste

Residual waste processing technologies :RDF, landfill mining and waste to energy



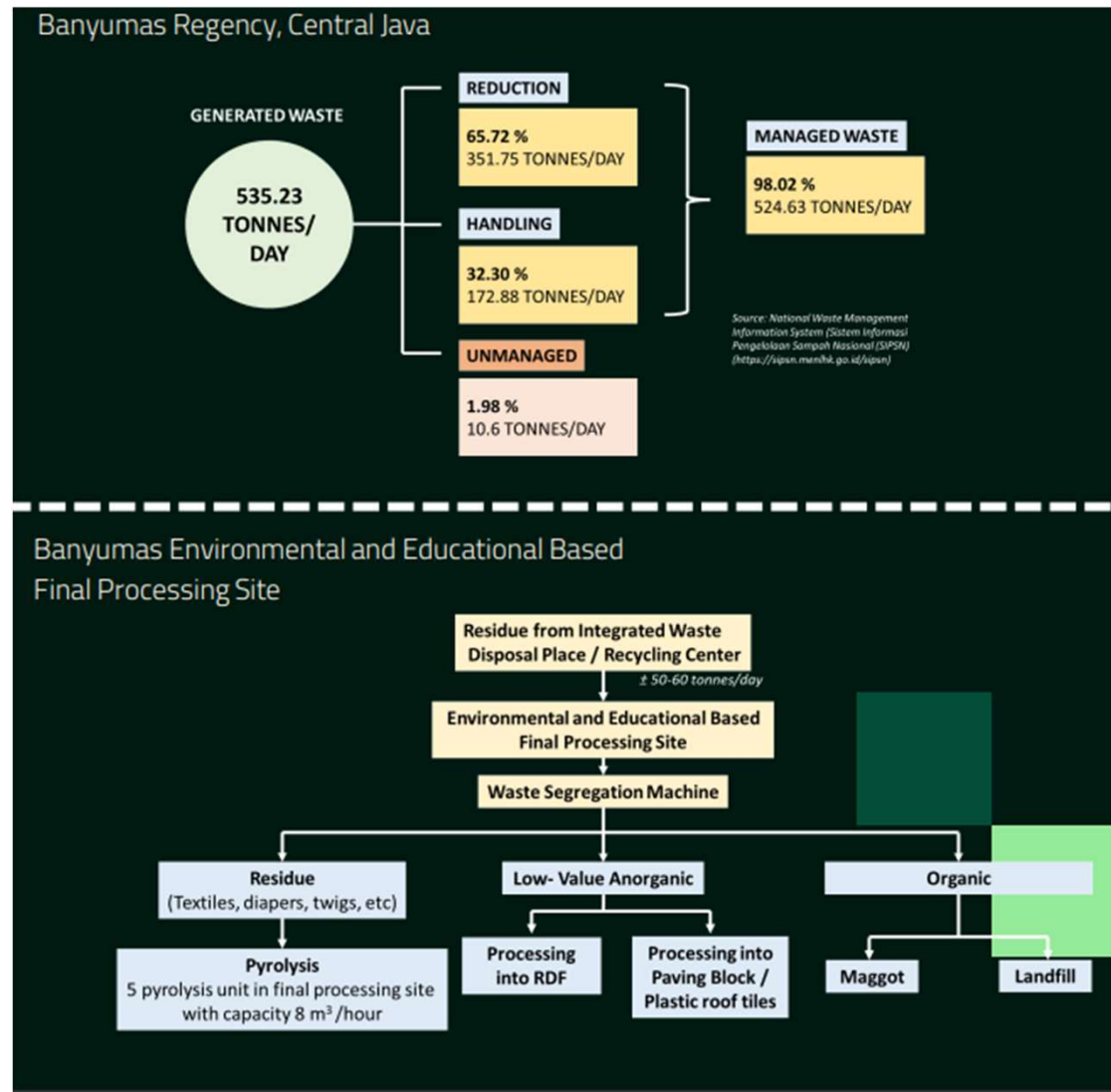
Gambar 2-2
Pengolahan sampah konvensional



Gambar 2-13
Posisi pengolahan sampah PSEL, RDF, dan LM

Source: Comparative Study of Final Waste Processing using Cost and Benefit Analysis , GIZ 2023

Good practice of waste diversion from landfill in Indonesia



Source: <https://unece.org/sites/default/files/2024-04/4-RATN~1.PDF>

Planning aspects of Municipal Solid Waste Management (MSWM)



Defining IWM

Integrated solid waste management (IWM) refers to the strategic approach to sustainable management of solid wastes covering all sources and all aspects, covering generation, segregation, transfer, sorting, treatment, recovery and disposal in an integrated manner, with an emphasis on maximizing resource use efficiency.

Benefits of ISWM



Cleaner and safe neighborhoods



Higher resource use efficiency



Resource augmentation



Savings in waste management costs due to reduced levels of final waste for disposal



Better business opportunities and economic growth Local ownership & responsibilities / participation



Figure 1. The Integrated Solid Waste Management Planning process

Create a ISWM plan



Understand gaps and opportunities in the current SWM system in your city

The CRIC assessment tool

The sustainable resource management tool is designed to comprehensively monitor material resource use, waste management practices, and associated GHG emissions in Indonesian cities. Its structure and content reflect the input gathered through collaborative efforts, expert consultations, and ongoing feedback loops.

	A	B	C	D	E	F	G	H	I	J
1		Waste assessment tool	prepared by ACR+							
2			Version 0.1							
3	Select shortlisted City	Kota Cirebon	Jawa Barat							
4	OR									
5										
6	Select Province									
7	Select Regency/City									
8	OR									
9	Directly select Regency/city									
10	Province	Jawa Barat								
11		Kota Cirebon								
12	Map	Google maps								
13										
14										
15	General data									
16	Population	345,578								
17	HDI (Human Development Index)	77,5								
18	HDI: Percentile Rank in Indonesian cities/regencies	84%								

To download the tool and use guidelines: See dedicated section on [CRIC website](#)

Rapid Appraisal Facility Tool (RAFT)

The Rapid Appraisal Facility Tool (RAFT) is a form-based tool that provides solid waste management staff and planners a quick and efficient way to collect key data about a city's current solid waste and recycling systems, including its individual disposal and processing facilities, to inform solid waste management planning and system enhancements.

Understand gaps and opportunities in the current SWM system in your city

Solid Waste Capacity index for local governments

Determine which aspects of the current solid waste system (planning, legal and policy framework, financial management, service delivery, human resources or community engagement) need improving and could benefit from capacity-building resources. The actions recommended out of this process can then be included as part of the ISWMP.

**Understand gaps and
opportunities in the current
SWM system in your city**

Examples of ISWM plans in Indonesia

Action Plan on Integrated Solid Waste Management in Padang City, Indonesia

RENCANA AKSI PENGELOLAAN SAMPAH PLASTIK PERAIRAN DI KOTA SURABAYA

Waste Management Action Plan in Tritih Wetan Village, Cilacap Regency



CLIMATE
RESILIENT
AND INCLUSIVE
CITIES

