

Mechanisms to support the implementation of efficient municipal waste management systems adapted to national and local conditions, guaranteeing high collection and recycling rates, while minimising the dumping, landfilling or incineration of plastics.

The waste treatment hierarchy establishes three priorities as listed below, which are also needed to achieve the 2030 Sustainable Development Goal agenda:

-**Priority 1** is given to **prevention**, i.e. initiatives that avoid waste generation, reducing the volumes of waste.

-**Priority 2** is to enable the **recovery of waste** with a view to maximising re-use, recycling or energy recovery, where this can be done safely.

-**Priority 3** is **disposal or storage**, reserved for residual waste that cannot be recovered. It must be controlled to reduce its impact on health and the environment.

This **document focuses on mechanisms to support the implementation of effective municipal waste management systems adapted to national and local conditions**. Local authorities are often mandated to manage waste that cannot be prevented. These goods or residues end up in the municipal waste management system, which has the responsibility to minimize their impact on human health and the environment. Local authorities can only take limited action on prevention, as they generally have no leverage over producers, nor do they have sufficient capacity to run education and awareness campaigns on reducing waste generation. They are dependent on national policies on prevention (priority 1) and recovery (priority 2), and work with local recyclers who recover waste when a market exists (e.g. PET bottles). They are then responsible for all residual waste of lesser value.

In places where the waste management system is underdeveloped, the treatment hierarchy needs to be approached both top-down and bottom-up. The first step is to set up a waste collection and management system that can control its impact on human health and the environment. Once this essential service is in place, the skills and data acquired can be used to progressively improve waste prevention, sorting and treatment in order to both reduce waste volumes and to recover materials and energy. It is then generally necessary to increase financial and human resources to meet the ever-increasing needs in terms of investment costs and skills required for industrial sorting, recycling and energy recovery facilities.

Support mechanisms for municipal waste management: The keys to success!

A. Public policy

Public policies are the result of a strong **political vision**. They define a **national strategy** and the associated **regulatory frameworks** to:

- Allocate roles and responsibilities for waste prevention, recycling and disposal (i.e. governance) and provide a framework for public/private partnerships to avoid collectivising costs and privatising profits;
- Assign the administrative and financial resources corresponding to each of the responsibilities assigned, and introduce the financial incentives needed to support change;
- Define minimum environmental and health protection standards and requirements, as well as technical guides for their implementation, monitoring and evaluation. All of this should be accompanied by the establishment of an independent regulator to enforce compliance with the established standards.

On the latter point, enforcement requires a solid legal framework and mechanisms to address the cause of the violation. For example, penalties for illegal dumping or open burning need to be adapted depending on whether the offences are the result of a lack of safe outlets due to a failing service, or a refusal to pay the fee for a quality service. Improving the regulatory framework is complex because it requires coordination between the institutions in charge, the involvement of citizens and the commitment of industry players to ensure its adoption and implementation.

B. Financing mechanisms

Financing mechanisms provide long-term funding for the service as a whole, including human resources, infrastructure requirements, operating costs and the organisational system needed for stakeholders to play their respective roles. These funding mechanisms (i.e.: sources and instruments) are based on the public policies mentioned above. They may use public, private or mixed funding. In addition:

- Waste management funding mechanisms need to be based on a **cost recovery approach** if they are to be viable in the long term. This approach can be based on a combination of economic models: the rarely viable model based on the recovery of materials or energy, which can motivate private investment; the model based on service charges billed to users; or the model based on a tax system. A combination of these models must make it possible to cover operational costs, including those that are economically unviable, in order to ensure the sustainable operation of a waste management system that meets the requirements of public policy. Financing systems must ensure that, in the local context, users are prevented from turning to uncontrolled dumping or open burning.
- Financing mechanisms can be used **to incentivise changes** throughout the industrial chain (e.g. Extended Producer Responsibility (EPR)) or among consumers (e.g. the introduction of incentive-based pricing for waste) with the aim of improving prevention, reduction, collection, recycling, recovery and safe final disposal. For example, EPR systems can be used to involve the industry in preventing waste production, increasing recyclability and financing the collection, sorting, recycling and final disposal of the remaining waste. Each of these objectives must be integrated into the design of the EPR system and its operation evaluated in relation to each of them.
- Financing mechanisms based on the "polluter pays" principle (e.g. EPR) are a way of **making environmental and social impacts visible** to producers and consumers, by reflecting the cost of reducing them in the price (e.g. eco-modulations). This mechanism can only be set up by governments at national or supranational level. The funds collected must be strictly allocated to finance actions aimed at reducing the environmental and social impacts identified, and the funds usage controlled by a body independent of marketers. This body must also check the data and balance sheets supplied by the Producers Responsibility Organisations (PROs).
- **International funding** (e.g. investment funds, solidarity or cooperation), can help **to bridge the investment gap**, but local capacity to cover operational costs must be developed in parallel to guarantee the sustainability of these investments.

C. Integrated spatial strategic planning

Land-use planning, i.e. spatial and strategic planning that gradually integrates the various sectors and territorial scales, makes it possible to prevent and manage waste as effectively as possible at local level: reducing the use of what becomes waste (e.g. access to drinking water avoids using disposable bottles), making available a sorting at source system with as many waste streams as possible, repair and re-use businesses organised on a scale that makes them economically viable, waste sorting centres, recycling businesses by stream of sorted materials, energy recovery plants where appropriate, and final disposal facilities for waste that cannot be recovered. The key points of this territorial approach are as follows:

- Sound waste management systems rely on **integrated planning, driven at the local and/or provincial government level**, coordinating the following components in a stepwise approach:
 - Spatial planning for local waste management facilities, integrated with city and provincial spatial planning, including voluntary drop-off points in public spaces, to reserve the land needed to provide a service to the entire area.
 - Planning how to access waste facilities, and how to transport waste and resources (need for a territorial coverage that is consistent with population density and its movements)
 - Employment and human resources planning, including the integration of existing informal sector workers and market-oriented recycling activities.
 - Strategic planning of all economic activities and of the budget associated to waste prevention and management acknowledging the synergies between waste management and economic sectors (e.g.: tourism, industrial production).
 - Planning connections with energy systems.
- **Waste characterisation data** is needed both to carry out targeted prevention actions and to plan and design industrial investments such as sorting and recycling centres or waste-to-energy plants. In places where waste management is underdeveloped, a first step is at least to set up a system for collecting quantified data through the development of weighing systems or a correct assessment of the volumes collected and/or treated. These data serve as a basis for future investment, capacity building and preventive action.
- **By pooling investment in infrastructure, training and prevention, costs can be optimised.** In some cases, recycling plants (plastic polymers, electronic waste) or waste treatment plants would not be economically viable at local level. In some cases, pooling infrastructures is a way of collecting, recycling and treating waste at a lower cost. When integrated into a broader regional plan, sufficient volumes can be generated to ensure the economic viability of industrial facilities. This may require partnerships between towns or countries, or between public and private players. The planning of these shared facilities includes the question of transport infrastructures and costs.

D. Training and research

The involvement of training institutions and professional associations in the local waste management strategy is essential. It contributes to a **just transition**, in particular for workers in the informal sector, and **strengthens the skills** of national and local staff in charge of the various aspects of waste management (strategic planning, monitoring, data collection, waste management operations, budgeting, etc.). Private players can also contribute to the implementation of innovative solutions adapted to the local context and to skills development. Research organisations involved in waste prevention, reduction and management contribute to the development of **integrated, innovative, science-based solutions** that improve the entire waste value chain.

E. Prevention

Prevention has three complementary components: raising awareness, transitioning production systems and transitioning economic models.

- **Raising public awareness** involves **education** from an early age, to help improve consumer behaviour to put an end to illegal dumping and open burning, reduce the volume of waste and improve sorting at source. Undertaking **large-scale communication campaigns allow to raise public awareness on expected behavioural changes** and are also crucial to support **local authorities' actions**. Communication campaigns **inspire citizens with opportunities** to take part in the transition towards reducing, reusing, repairing and sorting remaining waste. These communication campaigns must be backed up by **factual and transparent information** for citizens and businesses on waste management and its impacts, building trust. Therefore, education systems, community initiatives and large-scale campaigns (TV ads, influencers on social networks, etc.) complement each other.

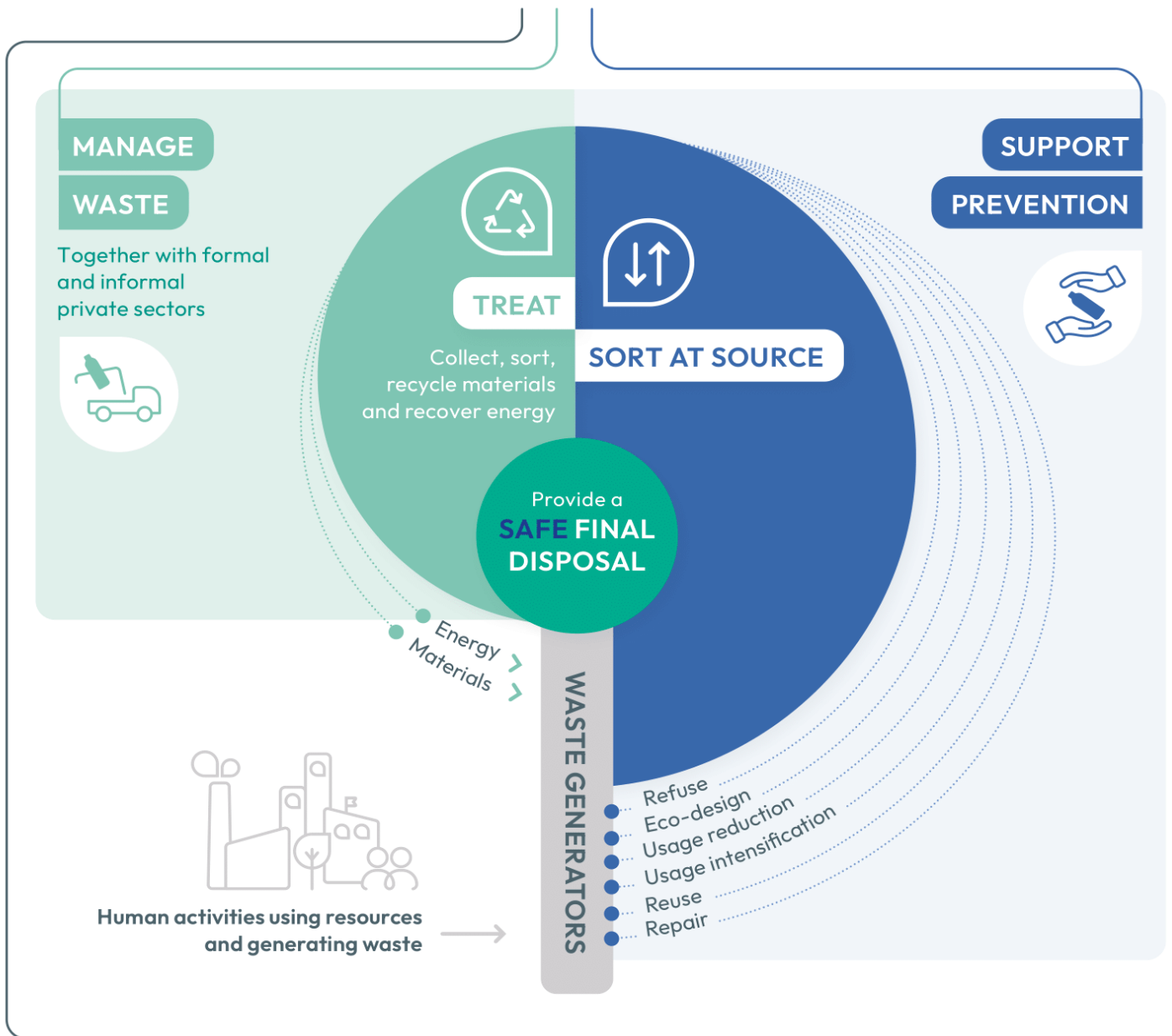
- **Transitioning the production systems is necessary.** Producers must implement eco-design in order to market products of which all or part can be recycled and which can be repaired to extend their useful life. In addition, product by product legislation can impose a percentage for the incorporation of recycled materials in the manufacturing process. Beyond product design, this means supporting the development of the economic actors in charge of repair, reuse, remanufacturing and recycled raw materials production channels.
- **Transitioning the economic models** towards ones that align the global materials footprint with the planet's available resources. The aim is to decouple Gross Domestic Product (GDP) growth from the consumption of raw materials and waste generation.

While local authorities can be involved in raising public awareness, changes in production methods and economic models are the responsibility of governments.

Conclusion:

The local authorities in charge of waste management are the best positioned to tailor waste management solutions to their local context. **Adequate support mechanisms need to be provided to them along with the necessary leeway to experiment with local solutions, in order for them to best implement this task.** The implementation of waste management by these local authorities depends first and foremost on **a strong local political vision**, but also on the 5 mechanisms presented in this document: national public policies, financing, integrated planning, training and innovation, and prevention. These support mechanisms are needed to 1/ facilitate the robust planning of waste management systems, 2/ support capacity building and training for decision makers, local staff performing the services, and all stakeholders in general, 3/ provide the framework to recover operational costs and initiate the infrastructure investment, 4/ ensure the control of the services provided locally, in terms of environmental performance, health protection, and transparency of the local funding schemes, 5/ adapt solutions observed in other places to the local context.

ENVIRONMENTALLY SOUND MANAGEMENT OF WASTE IMPLEMENTED BY LOCAL AUTHORITIES



Local governments are supported by many stakeholders on 5 mechanisms

Public Policies and enforcement

- Strategies
- Clear roles and responsibilities
- Organisational and regulatory frameworks
- Standards

Funding mechanisms

- Cost recovery
- Taxation and incentives
- International investments
- Solidarity

Integrated spatial strategic planning

- Current situation
- Cross-sector planning
- Mutualisation between territories

Training and research

- Knowledge and skills
- Just transition
- Innovation

Prevention

- Education and awareness
- Transitioning production systems
- Transitioning economic models

TABLE 2

Stakeholders' roles in the implementation and operation of waste management systems



MECHANISMS/ LEVELS OF ACTION	Public Policies and enforcement	Funding mechanisms	Integrated spatial strategic planning	Training and research	Prevention-specific actions	
					Education, communication, awareness	Evolution in the modes of production Evolution of the economic models
International institutions (UN, ISO,...)	Set legally-binding obligations, common standards and requirements; Set agreements and enforce them; Promote international cooperation; Assign roles and responsibilities.	Set financial mechanisms, frameworks, and obligations for international cooperation; Support the development of solidarity funds.	Incentivise through their Terms of Reference.	Establish training, technical assistance, technology transfer and knowledge exchange centres (e.g. Basel and Stockholm Conventions) for a just transition.	Introduce a "Zero Waste" Day; Introduce and implement the SDG framework.	Set agreements and enforce them.
International Financial Institutions (IFIs)		Fund projects.	Incentivise through their Terms of Reference.	Incentivise through their Terms of Reference.	Incentivise through their Terms of Reference.	
International NGOs	Advocacy.	Channel solidarity; Fund projects.		Develop training programmes.	Develop public awareness programmes.	Advocacy; Encourage and enable social entrepreneurship.
National NGOs						Advocacy.
National or supra-national governments and legislative bodies (incl. EU)	Define national strategies, legislation and enforcement; Set minimum standards; Enforce compliance; Assign roles and responsibilities.	Set the fiscal system to support cost recovery; Implement appropriate taxation systems and incentives; Assign budgets; Assign solidarity funds.	Regulate baseline data acquisition to support national strategic planning; Frame and regulate cross-sector planning.	Identify needs; Define a strategy for a just transition; Fund training and research; Support innovation.	Organise national communication campaigns.	Set agreements and enforce them.
Companies (producers, retailers)		Implement EPR schemes.		Develop eco-design knowledge and skills.	Develop public awareness programmes.	Advocacy; Implement innovations.
Local authorities	Establish the political vision, local strategy and goals; Make organisational choices; Set the terms of the public-private partnerships.	Define service fees and investment budget allocations.	Collect baseline and monitoring data; Coordinate across sectors and between adjacent jurisdictions; Enable mutualisation between territories.	Coordinate with local research institutes to adapt innovations to the local context; Develop knowledge and skills of the workforce.	Implement local communication campaigns.	Support local innovations.
Private operators		Implement sustainable business models.	Facilitate mutualisation between territories.	Innovate.	Develop programmes and amplify.	
Users	Vote.	Pay taxes.	Participate.	Learn and embrace improved behaviours.	Amplify the reach of the campaigns to raise awareness.	Choose to pay for the environmental and social impacts of products.

Note: All the actors listed above are interdependent in fulfilling their respective roles and functions to implement a fully operating waste management system. They influence and interact with each other within and between the different levels of action (international, national and local) and within each of the 5 mechanisms supporting local waste management systems (public policies and enforcement, funding mechanisms, integrated spatial strategic planning, training and research, prevention-specific actions).