French Solid Waste Partnership Position Paper on Waste-to-Energy

Position paper

20 November 2025

The role of WtE facilities* in the waste and resource management system: the final step in the circular economy hierarchy of actions.

The purpose of this note is to inform policy directions on future investments.

The primary mission of the public waste management service is to capture existing waste streams in order to control and minimise the pollution they cause and their harmful impacts on the environment and health (Article 2 of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Other Wastes). The most direct way to meet this requirement is to collect all waste and dispose of it in technical landfill sites that comply with Environmentally Sound Management (ESM) practices.

However, the broader ambition is to reduce the quantities of waste sent to landfills. This requires implementing the waste treatment hierarchy, which prioritises actions in the following order:

1. Reducing waste generation, which relies on long-term, cross-sectoral actions requiring territorial planning and regulations setting targets;
2. Recovering the material contained in waste;
3. Recovering the energy contained in waste.

The aim is therefore to shift from an approach focused on controlling waste flows to one focused on recovery wherever possible, while upholding the primary objective of minimising the impact on health, the environment (water, air and soil pollution) and biodiversity, as well as on climate change at every stage. This requires investing in the development of technical capacities and infrastructure to manage waste as a resource while ensuring the controlled management of non-recoverable waste. For this transition to be successful, technical solutions must be adapted to each local context.

Figure 1 (from the FSWP Atlas publication) presents waste management archetypes corresponding to different situations in different countries. It shows that at an early stage of development, landfilling is the most common method for controlling waste flows and their impacts, as long as land availability permits opening new landfill cells. When a country reaches a more advanced level of development, with an economy in transition towards circularity, Waste-to-Energy (WtE) facilities become a preferable final sink for non-recyclable waste to reduce environmental and climate impacts. Thus, WtE facilities belong to an economy that is sufficiently developed to have functional waste management systems, with a good understanding of waste flows and the political will to recover energy that would otherwise be lost, when it could be used as a substitute for fossil fuels. In Europe, WtE facilities are subject to Best Available Technique (BAT) regulations and therefore meet high, regulated standards of energy and environmental performance.

* This document focuses on Waste-to-Energy (WtE) facilities that treat household and similar waste by incineration with energy recovery.

FIGURE 1

Waste management archetype and developments to reduce emissions

Build the Basics (BtB)

- No or limited actions taken to reduce waste generation
- Low to medium waste collection rates
- Limited or no source-separated organics or recycling
- Limited or no waste treatment
- Waste is disposed of at dumpsites
- Illegal dumping and open burning of waste are common

Build the Basics Plus (BtB+)

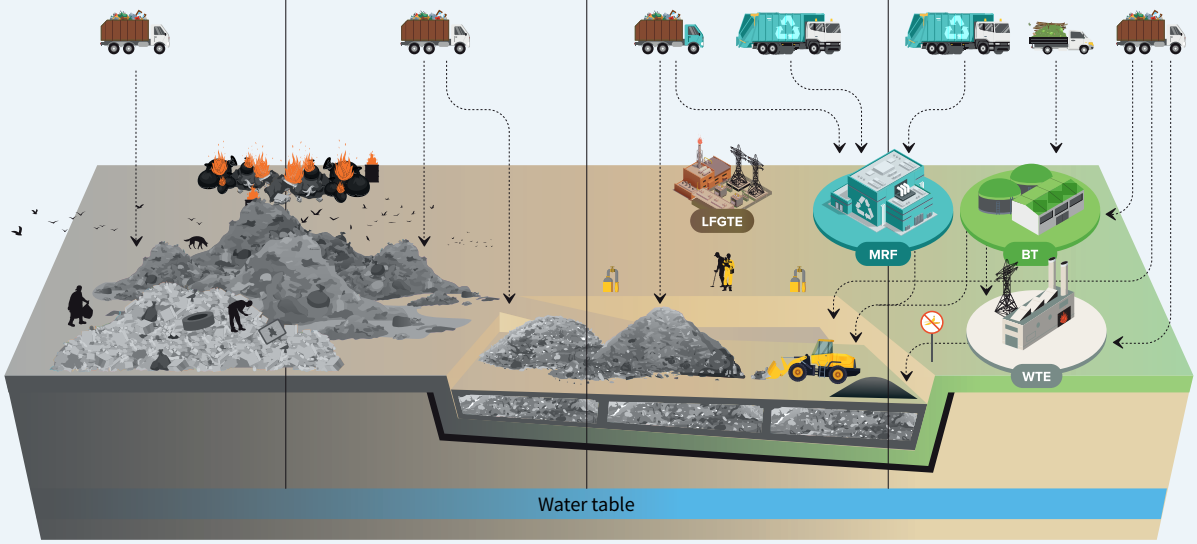
- Some actions taken to reduce waste generation
- Higher waste collection rate than BtB
- Limited or no source-separated organics or recycling
- Limited waste treatment
- Transitioning from dumpsites to sanitary landfills
- Illegal dumping and open burning of waste may occur

Move up the Hierarchy (MuH)

- More actions taken to reduce waste generation than BtB and BtB+
- Universal or near-universal waste collection
- Higher source-separated organics and recycling rates than BtB and BtB+; source-separated organics is still relatively limited compared to CtC
- Waste treatment and material recovery facilities are common
- Waste is disposed of in sanitary landfills
- Methane emissions monitoring and capture may occur

Close the Circle (CtC)

- Extensive actions taken to reduce waste generation
- Universal or near-universal waste collection
- In most CtC countries, source-separated organics and recycling rates are higher than in BtB and BtB+ countries and source-separated organics is mandated by law
- Most CtC countries have banned biodegradable waste from landfills
- Biological treatment and incineration of waste are common
- Least reliant on landfills



Waste collection, treatment, and disposal activities occur at different sites. Note that the primary outputs from the materials recovery facility and the biological treatment plant (e.g., plastics and biogas) are not depicted. The graphic has been simplified for illustrative purposes.

LEGEND

WTE : Waste To Energy
BT : Biological Treatment
MRF : Materials Recovery Facility
LFGtE : Landfill Gas to Energy Process Works

Source: Adapted from «A Playbook for Municipal Solid Waste Methane Mitigation, Recommendations Based on Global Waste Management Archetypes,» RMI (2024). In. PFD (2025). Atlas on waste management and climate crisis mitigation. Focus on integrating waste actions into NDCs. French Partnership for Waste, p. 31.

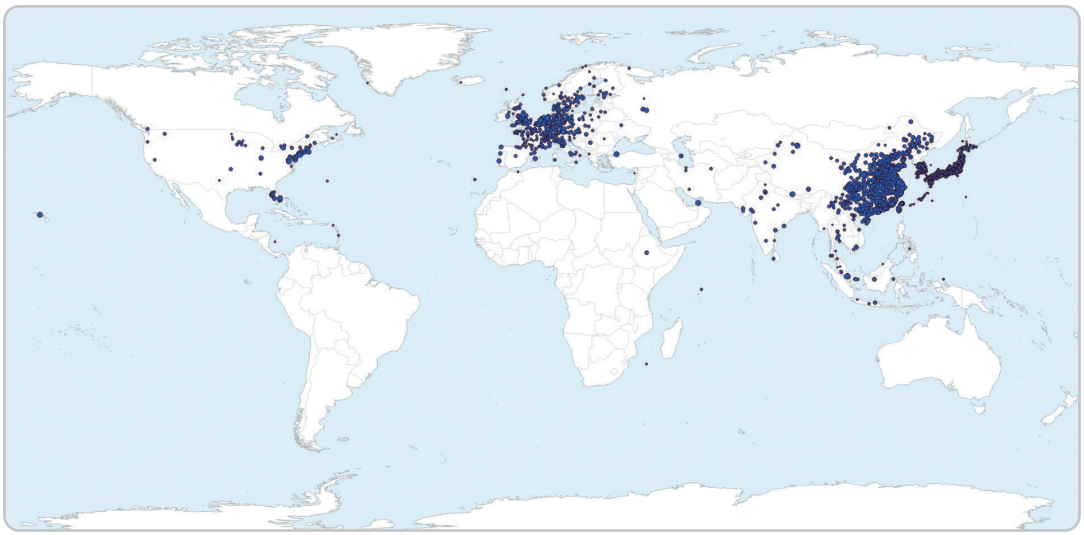
Circularity implemented to its ultimate level will result in a significant decrease in waste, volumes suitable for energy recovery, but some waste will still continue to exist. This reduction in waste streams is the result of public policies implementing the upstream steps* in the hierarchy of action of the circular economy. It is the result the implementation of multiple actions, the success of which depends on complex mechanisms with social, technical and economic components. The initial sizing of the WtE facility must take into account the ambitions for transitioning to circularity, and therefore the long term waste generation reduction goals. However, anticipating the reduction of these streams prematurely during territorial infrastructure planning may lead to a risk of insufficient capacity to treat the waste generated by the local economy.

Some countries have made a political choice not to invest in this energy recovery process through incineration, despite a high level of development of their waste management systems.

* See the first 8Rs of the 10R hierarchy of action, as well as the circular economy hierarchy of action, as defined by ISO 59004.

The global distribution of WtE facilities shown in **Map 1** illustrates this situation. In these countries, the volumes of landfilled waste are proportionally higher. These decisions are rooted in a specific local context, based on local assessments. Beyond the reasons related to the maturity of the waste management system, already mentioned above, the key decision-making factors include the following: land availability (landfilling requires large areas with significant restrictions on use in the very long term), the legacy left to future generations in the event of landfilling, the reduction of methane emissions from the storage of waste containing organic residues, and the air quality resulting from poorly equipped WtE facilities. On this last point, WtE facilities as designed and operated in Europe are subject to stricter standards than the requirements based on scientific health studies on which the European Parliament and Council Directive of 4 December 2000 on the incineration of waste (2000/76/EC) was based before evolving, following a precautionary approach, towards BAT (see Directive 2010/75/EU of 24 November 2010)*. Questions are currently being raised about new molecules for which no thresholds have been set. These molecules also need to be assessed and controlled in all industrial processes, which are often subject to much less stringent standards than those set for atmospheric emissions from WtE facilities. Questions about these new molecules also concern all waste treatment methods, including recycling.

MAP 1 **WtE facilities distribution worldwide**



Source: Ecoprog (2022). In. PFD (2025). Atlas on waste management and climate crisis mitigation. Focus on the integration of waste actions into NDCs. French Partnership for Waste, p. 41.

We call for ...

... All international institutions to support the waste treatment hierarchy, as established, without taking sides for or against any specific technological solution, which is the responsibility of local decision-makers. Local decision-makers have a duty to implement the treatment hierarchy in their territory, taking into account existing regulations and local constraints, and prioritising compliance with Environmentally Sound Management of waste.**

* Thanks to stricter regulations (law of December 2002) on emissions, the quantities of pollutants emitted by household waste incinerators have fallen considerably. Between 1995 and 2006, these dioxin emissions were reduced by a factor of more than 100, from 1,090 grams per year in 1995 to 8.5 grams per year in 2006, even though the amount of waste incinerated increased over the same period (ADEME, 2010). Excerpt from https://www.cancer-environnement.fr/fiches/expositions-environnementales/dioxines/

** The waste treatment hierarchy is mentioned in UNEP/EA.2/Res.9. It is also developed in the GWMO 2015 (UNEP (2015). Global Waste Management Outlook). It is defined by the EU Waste Framework Directive (Directive 2008/98/EC). The Basel Convention refers to it in its non-binding document UNEP/CHW.11/3/Add.1/Rev.1.