

MUNICIPAL SOLID WASTE MANAGEMENT

A Roadmap for Reform for Policy Makers

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Origin, Background and Purpose

- ▶ Developed to respond to growing demand from policy makers
- ▶ Based on analyses of the experiences with waste management in Japan, the European Union and a number of other countries in Europe and Asia
- ▶ Lessons and recommendations are applicable for any country context
- ▶ Intended as a guideline for policy makers on the sequencing of reforms in waste management

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Introduction: the Beginning

- ▶ Guiding policies: Japan - *Sound Material-Cycle Society*; EU - *Waste Hierarchy/Circular Economy*
- ▶ Initially, market conditions did not support such policies per se. New market conditions had to be 'created' to make the policies implementable
- ▶ The new sector environment was created through legislation, economic instruments, and regulation. Taken together, **these measures made disposal of untreated waste expensive or impossible in practice**
- ▶ The result (1): decrease in landfilling, increase in recycling and recovery
- ▶ The result (2): spike in research and development, investments in new and more efficient waste treatment technologies

Introduction: the Beginning

- ▶ The above is often underestimated in countries at the beginning of the transformation of their waste sectors. The tendency is to adopt or copy approaches that are working in high-income countries with the expectation that they would work everywhere.
- ▶ But actors in the waste sector follow market rules and chose the lowest cost option. This means that if waste treatment were costlier, it would not be chosen by the waste actors, unless they were required to do so **by regulation** or if treatment was made **financially attractive** due to, for example, landfill taxes.

Introduction: the Beginning

- ▶ The shift from disposal to reduction, treatment, and recycling results in higher costs. As such, introducing the *waste hierarchy* principle bring important economic and environmental benefits. At the same time, they increase the financial cost of the sector.
- ▶ The population in Japan, the EU, many OECD countries have developed appreciation for resource conservation and have accepted the cost of treatment. Progress was achieved over decades of efforts engaging the public and securing citizens' participation.
- ▶ It is therefore questionable if individual solutions and technologies can simply be copied successfully from high-income countries.
- ▶ The “building blocks” of a well-functioning waste management system include reliable data, legislation, institutional frameworks, financing, public communication and participation, management capacity, and operations. These elements are closely integrated. It is therefore essential that intended sector reforms and changes are assessed *holistically*, and to the extent possible, with the involvement of all stakeholders.

Key Considerations and Guiding Principles to this Roadmap

1. Enhancing any waste management system requires a gradual approach, changes should be introduced incrementally, and the sector should be allowed to improve and grow naturally without outsized interventions.

Key Considerations and Guiding Principles to this Roadmap

2. The very first and basic objective of any waste management system is to provide professional collection and disposal services to its constituencies. As a general rule, investing in more sophisticated infrastructure and technologies should be considered only after the basic level of service provision for the population is available

Key Considerations and Guiding Principles to this Roadmap

3. Landfilling of waste is a well-established and acceptable environmental option, assuming it is done properly and especially when financial circumstances do not allow for costlier alternatives.

Key Considerations and Guiding Principles to this Roadmap

4. Once full collection coverage and environmentally sound disposal practices are in place, and when affordability allows it, waste separation and recycling should be considered. Waste re-use, recycling, and recovery are *policy choices* that bring essential environmental benefits, but in financial terms make the waste management system more expensive. Therefore, moving up the 'waste hierarchy' should be done only when sufficient resources are available to finance the increased costs that come with such improvements.

Key Considerations and Guiding Principles to this Roadmap

5. Recycling of household segregated waste is almost never a profitable activity and is at best cost-neutral. Compared to recovering recyclables from households, recovering recyclables from the commercial/institutional/industrial (CII) sector is easier to operate and less costly. Placing the burden to recover materials on the producers and importers of such materials should be considered by governments in order to reduce the financial burden on the public sector.

Key Considerations and Guiding Principles to this Roadmap

6. Introducing Extended Producer Responsibility (EPR) to capture recyclables such as packaging waste, electric/electronic waste, end-of-life vehicles, and batteries is an effective instrument meeting the principle of 'polluter pays.' It takes time (often more than five years) to develop comprehensive schemes in cooperation with key parties such as manufacturers of consumer products and packaging materials.

Key Considerations and Guiding Principles to this Roadmap

7. Treatment technologies such as mechanical and biological treatment (MBT) and waste to energy (WtE) schemes will further increase the financial cost of the sector and should be considered only when a society is ready to pay the higher cost for waste services; is technically feasible (given waste composition and volume) and sufficient technical capacity exists.

Key Considerations and Guiding Principles to this Roadmap

8. **Financing is the backbone of waste management.** Waste management is not an economic activity for generating income but a public service requiring financing for cost recovery. Sufficient financing is essential to run the waste management system in place.

Key Considerations and Guiding Principles to this Roadmap

9. Private sector involvement is desirable if there is sufficient and reliable financing available to the sector, and if the public sector has the capacity to provide meticulous contract enforcement and supervision of private activities. The private sector may improve efficiency and bring in private capital, but will rarely be able to solve larger sector issues at hand.

Key Considerations and Guiding Principles to this Roadmap

10. The waste management system should be guided by appropriate legislation and controlled at national, regional, and local levels, while local authorities should be left with the responsibility of actual service delivery and implementation. This requires adequate staffing capacity at all levels.

The Sequencing of Reforms

The steps below provide general guidance for the steps and sequencing for upgrading the waste management sector in a country. Since the different technical, financial, environmental and institutional aspects are closely inter-related, these steps should not be seen as strictly sequential and should be viewed only as providing general direction for reforms.

The Sequencing of Reforms

Step 1: Designate and empower a professional institutional leader for sector development and reforms.

A line ministry such as a ministry of environment or a ministry of regional development is typically assigned with the responsibility to develop policies, draft legislation, and oversee waste management in a country. A **waste management section** within the line ministry should be established, staffed with professionals and empowered to initiate and carry out the intended reforms. The waste management section could be dedicated exclusively to the waste sector and become the nucleus and driver of reforms

The Sequencing of Reforms

Step 2: Introduce adequate incentives and regulatory oversight.

The central government should use a 'carrot and stick' approach to establish a set of incentives and enforcement mechanisms for local governments responsible for service delivery in order to advance the sector in the desired direction.

The Sequencing of Reforms

Step 3: Establish a permanent platform for dialogue on the sector with key stakeholders.

Establish a consultative group to review key aspects of intended reforms. Such a consultative group should be broad based and comprise representatives of essential stakeholders, including associations of municipalities, associations of utility companies, the Ministry of Finance, the central Statistical Office, the Environmental Protection Agency, EPR organization(s), and one or two key citizen organizations/NGOs. Such a consultative group should be viewed as a permanent establishment and provide an ongoing platform for sector consultations.

The Sequencing of Reforms

Step 4: Develop a national waste management strategy and/or implementation plan to ensure access to waste management services and environmental protection.

Step 5: Advance institutional improvements at regional and municipal levels

Step 6: Once a basic level of services is functioning adequately, examine what the sector can realistically afford in order to move up in the waste hierarchy and the timeframe required to achieve the move.

The Sequencing of Reforms

Step 7: Advance cost assessment and fee setting practices.

A national authority should prepare regulations for fee setting procedures, including a methodology and guidelines for cost calculation. The guidelines should define all cost factors to be included in the fee calculation. However, the actual fee setting using local unit rates should be left to the municipal administrations.

The Sequencing of Reforms

Step 8: Consider introducing a system of separation at source for dry recyclables (paper/cardboard, plastics, metals/cans, glass) and possibly other priority waste streams like electrical/electronic waste.

Step 9: Consider treatment of residual waste and/or the introduction of separation at source for organic waste.

The Sequencing of Reforms

Step 10: Other treatment: incineration with electricity/heat production

In many developing countries incineration is contemplated as a business transaction to generate revenue. The general lesson is that the cost per ton of incinerated waste is significantly higher than the cost per ton of alternative waste handling and especially disposal, which often remains a widely available option in these countries. Waste incineration and other waste treatment options should therefore not be looked at in an isolated, transactional manner, but should be reviewed against all other available treatment and disposal options in the given country. Although the cost of waste incineration has dropped in recent years, it remains an expensive treatment option compared to alternatives.

The Sequencing of Reforms

Step 11: Continuous monitoring, regulatory frameworks, and economic incentives are needed to steer the sector in the desired direction.

Countries should adopt flexible approaches and continuously adapt their regulatory frameworks to respond to market conditions in order to have their waste sector react and perform in the desired manner.

Waste Management Costs

TYPICAL WASTE MANAGEMENT COSTS BY DISPOSAL TYPE (US\$/TONNE)

	Low-income countries	Lower-middle- income countries	Upper-middle- income countries	High-income countries
Collection and transfer	20–50	30–75	50–100	90–200
Controlled landfill to sanitary landfill	10–20	15–40	20–65	40–100
Open dumping	2–8	3–10	—	—
Recycling	0–25	5–30	5–50	30–80
Composting	5–30	10–40	20–75	35–90

Waste Management Costs

	Incineration		Anaerobic digestion	
	Capital expenditures(1) (US\$/annual tonne)	Operational expenditures (US\$/tonne)(2) (3)	Capital expenditures (US\$/annual tonne)	Operational expenditures (US\$/tonne)
Europe	\$600-1000	\$25-30	\$345-600	\$31-57
United States	\$600-830	\$44-55	\$220-660	\$22-55
China	\$190-400	\$12-22	\$325	\$25

Notes:

- (1) In Europe and US, predominantly mass-burn/moving grate technology is used for waste incinerator with energy recovery (waste-to-energy). In China many incinerators use circulating fluidized bed (CFB) technology which reflects the lower end of investment cost although moving grate incinerators are also becoming more common.
- (2) Operating costs without accounting for revenues range between \$100-200/tonne. The figures presented in the table are typical operating costs (net gate fees) taking into account revenues for electricity and/or heat sales and other revenues. In EU, also including subsidies to energy from waste in some countries, these revenues are typically in the \$100/tonne range, hence the resulting operating costs. In US feed-in tariffs for electricity are typically lower, below \$50/MWh.
- (3) Mixed waste in US/EU is relatively low in organics and water content and hence high in calorific value. As a consequence, operating costs for waste with high organics often seen in lower income countries could substantially increase operating costs due to lower revenues.

Waste Management Financing

AVERAGE FEE PER HOUSEHOLD IN SELECTED COUNTRIES

	Average household fee/year (Euro)	Average household income/year (Euro)*	Percentage of spendable income
EU			
South	225	22,540	1
North	350	37,095	0.95
East	70	8,620	0.8
Japan	353	24,830	1.42
Bulgaria	58	6,476	0.9
Romania	55	6,120	0.9
Bosnia	55	10,000	0.55
Belarus	14	8,160	0.2

* Eurostat: one earner/household with two children.

Thank you