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How cities can collect residential food waste on the path to zero waste

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Effective food and organic waste collection is integral to any city's zero-waste roadmap. Food waste accounts for a high percentage of total waste in cities and, when it accumulates in landfill or in open dumping sites, it is a major source of the potent greenhouse gas (GHG) methane. It can also cause fires, destabilise slopes and attract pests, cause a nuisance and pose health hazards. Separating the collection of food and organic waste from the wider waste stream is a critical step in its safe disposal and treatment, which produces valuable resources, including compost and biogas. Yet, most cities are missing out on this opportunity. This article outlines approaches cities can take and things to consider in developing successful segregated food-waste collection.

Cities should also seek to cut food waste to reduce collection and treatment requirements, and connect food-waste recovery and redistribution efforts to food assistance programmes to tackle food insecurity.

Understand the potential for segregated food-waste collection in your city

Begin by assessing current conditions, focusing on:

- **Waste composition and mass flow.** Waste composition and mass flow analysis facilitates the setting and monitoring of diversion goals, allowing the city to track the impact of policies and campaigns and adapt them accordingly. It tracks what people are throwing away, the volume of food waste that requires treatment, the size of bins needed to accommodate expected waste volumes, and who is producing the most food waste. Run recurrent studies to track change over time.

- **Waste-collection logistics.** Review collection routes and requirements, including collection vehicles and their collection capacity; collection frequency; pick-up times; the collection routes of recyclable and residual waste; distances from pick-up to transfer station or treatment, and transfer station to disposal; storage capacity at collection and at treatment sites, including bin types, sizes and how long food waste can be stored; and costs, including whether existing collection fees will cover costs of any new segregated collection services.



Explore the availability of electric waste collection vehicles to reduce emissions and noise pollution.

Also ensure new segregated food-waste collection vehicles are suitable for the size and conditions of the city's roads. *Collection of municipal solid waste in developing countries* provides detailed advice on this.

- **Food-waste treatment capacity and space.** Understand current food-waste treatment capacity and demand, and plan to grow capacity in tandem with segregated food-waste collection.
- **Types of food-waste generator and stakeholder.** Study how waste generation and collection across your city may be influenced by:
 - **Building typology:** food-waste storage and collection logistics will differ between neighbourhoods dominated by single-family homes and multi-home units, for instance.
 - **Demographics and environmental interest of waste generators:** information such as income level or interest in environmental issues can influence waste generation patterns across households and neighbourhoods.
 - **Other stakeholders:** understand perspectives and seek the cooperation of community groups, community gardens, hauliers (especially if the city doesn't provide a direct collection service) and other relevant stakeholders. *Municipal curbside compostables collection: What works and why?* provides more advice on working with hauliers, as well as examples and analysis from 15 cities in North America.

Composting and anaerobic digestion are the most common treatments for food waste

Composting requires a balance of 'green' (food scraps and fresh garden waste such as grass clippings) and 'brown' content (garden waste such as dry leaves or wood chips) to ensure the correct balance of nitrogen and carbon for aerobic (in the presence of air) decomposition. Cities using composting can direct both food waste and green and brown garden waste streams to the same treatment facilities. Read more about how to implement composting and anaerobic digestion in our [articles for Global South cities](#) and [cities with relatively advanced waste systems](#).



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Identify appropriate segregated food-waste collection approaches for different types of generator

The variety of approaches incorporated in the food-waste collection system should be informed by waste composition and flow, waste generators' experience of waste segregation, existing regulations and infrastructure, available resources, and current and planned treatment capacity. The main collection approaches are:

Door-to-door and kerbside collection are the systems of choice of most municipalities for mixed or segregated collection – either directly by city departments or through contracting – in which waste-collection vehicles follow a planned route that ends at the treatment site.

- **Door-to-door residential food-waste collection is a system** in which waste is collected directly from household bins. It is best suited to mid- to low-density neighbourhoods with primarily single-family homes, as the street network usually provides enough space for collection vehicles to operate, with residents placing their food-waste bins or bags outside their homes.

In Los Angeles, the OrganicsLA organics recycling programme provides door-to-door food-waste collection on the same collection day as other household waste. The organic waste collected is processed into compost to be used by farmers.

- **Kerbside residential food-waste collection** is the system in which a single multi-unit building or several single-family homes bring their waste to a shared collection spot on the kerb outside their homes. Kerbside collection is more easily implemented in low- to mid-density neighbourhoods, but it can be used in higher-density neighbourhoods with multi-unit buildings. Logistical challenges, such as congestion caused by collection vehicles on narrow streets, or a lack of space in multi-home buildings for consolidating food waste prior to collection, can be overcome with night-time collections, the provision of appropriate shared food-waste bins and strong public communication campaigns.

In Milan, high-rise, multi-unit buildings account for approximately 85% of housing units. Many residential buildings have courtyards or waste rooms located on the ground floor or in basements for segregated waste collection, allowing for efficient kerbside collection.¹

- **Combined kerbside collection of food waste and other green waste.** Cities that are already collecting garden waste can integrate food-waste collection into that service to minimise additional collection, depending on treatment capacity. This is the approach taken in Boulder, Colorado, where residents can also collect free compost or mulch from treatment sites to use in gardens.

Drop-off points are communal food-waste bins or sites serving a larger number of waste generators. This approach reduces the number of collection points required and offers more efficient and cost-effective collection than door-to-door or kerbside collection, as routes feature fewer stops. Drop-off points are often an effective approach for mid- to high-density neighbourhoods that feature multi-unit buildings and lack

space for waste collection, or hard-to-reach areas with narrow or unpaved roads. Drop-off points should be sited at locations that offer convenience for waste generators, as well as access by collection vehicles.

Types include:

- **Neighbourhood drop-off points** serve the residents of a neighbourhood. [Rotterdam's neighbourhood](#) points require an access key card and use chutes to direct food waste into underground storage containers. This ensures the consistency of the volume collected (it does not overflow or exceed treatment capacity volumes) and prevents nuisance, such as smells or pests. In Hackney, London, many large multi-family blocks and estates have communal street-side food-waste bins, which are freely accessible.² [New York City is piloting Smart Compost bin](#) technology as pest-proof sidewalk collection infrastructure, with bins accessed via an app or key card.
- **Food-market drop-off points.** Food markets are large waste generators, making them priority sites for larger-scale food waste collection points. [São Paulo launched a street-market waste compost programme](#) in 2015, which now collects food waste from 900 street markets to be treated at semi-local composting facilities. The compost is used in the city's public spaces and offered to other users for free. In Milan, collection from open markets has delivered a significant increase in food-waste collection. [Zero Waste Europe's case study](#) explains more. Drop-off points located near markets can serve the food-waste collection needs of both the market and other local commercial and residential units.
- **Park or community garden drop-off points.** Parks, community gardens and urban agricultural sites can co-locate drop-off and treatment. Food waste can be composted on site and used in the park or garden, which can reduce transport and treatment costs. Any surplus food waste beyond the sites' composting capacity can then be collected by municipal services. Work in partnership with municipal departments, community or non-profit organisations that run the sites. [Buenos Aires has added food-waste collection \(video in English here\)](#) to waste drop-off points in parks and squares.

Consider enabling other stakeholders to collect organic waste from drop-off points to reduce municipal collection and treatment costs and increase overall capacity. This is the approach taken in the town of Freidstadt, Austria, where a legal framework requiring mandatory training and a contract with the municipality enables local farmers to collect organic waste to be composted on their farms for their own use or for sale.³



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Start with a pilot programme and phase in city-wide collection while building treatment capacity

Test, validate and adapt segregated food-waste collection approaches with a sample of generators before beginning to phase them in city-wide. This will enable lessons to be learnt and incorporated into the next phase of investment. It will also build support, alliances and evidence to counter opposition and demonstrate viability.⁴

Select pilot area(s). Identify pilot neighbourhoods or areas that are likely to have high participation rates or which offer greater collection and operational efficiency, such as:

- Neighbourhoods that already offer some segregated waste collection, such as separate recycling collection. It will be easier to communicate on a pilot with residents already familiar with some form of segregated collection.⁵
- Parks or community gardens that already have some capacity for treatment.
- Neighbourhoods that are more easily accessible.
- Areas or waste generators that produce a high volume of food waste.
- Properties or areas where residential and commercial waste generators have self-identified as likely to participate. Cities can offer surveys or a sign-up mechanism alongside communication campaigns targeting stakeholders such as building managers and neighbourhood associations, as well as waste

generators, for example.⁶



Collect data from pilot programmes to improve the provision of future services. In particular:

- **Track participation** and compare the actual volume of food waste collected with what was expected.
- **Monitor contamination** and determine the educational messaging needed to ensure proper waste segregation. Compare waste-stream composition before and after the pilot to understand any behavioural change arising from the pilot.
- **Conduct surveys** with participants before and after the pilot and incorporate feedback into collection policy and communication campaigns. For instance, a study in Wigan, United Kingdom, discovered a commonly held belief that households didn't produce enough food waste to be worth recycling, which was later addressed in communication materials.

New York City's three-month pilot in one borough laid the foundations for expansion

Around a third of the waste collected from New York City residences is organic and, until recently, almost all of it was sent to landfill. In 2022, New York City began a borough-wide pilot of combined food and garden waste collection in Queens, automatically enrolling all households. Queens is a large, lower-density borough characterised by single-family homes and a wider street network, providing relatively easy access and less complex, cheaper logistics. This area also has the highest number of gardens in the city, which produce a high quantity of organic garden waste, and is home to a group of residents who had campaigned for an organic waste-collection programme.⁷ The auto-enrolment pilot was a huge success, wildly outperforming legacy opt-in programmes, and is set to expand across the rest of the city, borough by borough, in 2023 and 2024. Organic waste is collected on the same day as recycling and treated to produce compost for city parks and biogas through a treatment programme launched alongside the pilot.⁸

Make participation in segregated food-waste collection easy and attractive

To support city-wide segregated food-waste collection and maximise participation, cities can:

- **Enable multi-unit kerbside collection through building design.** Integrate segregated waste-collection requirements into planning and building codes to encourage and enable food-waste collection in higher-density areas. For example, Milan requires all new apartment buildings to include a waste room large enough to accommodate segregated waste collection (including recycling and food waste) for all residents.⁹
- **Provide free kitchen bins or 'caddies' for in-home food-waste collection to all residents in neighbourhoods with food-waste collection services.** Providing bins to all, rather than requiring



English

residents to request them, leads to a higher overall food-waste recovery rate, including in multi-unit buildings. Sydney has found success with this approach; watch the webinar below to hear more:



[C40 Food Waste Action Lab] Getting started on: segregate collection - High rise buildings - Session 1

1:10:32

- **Provide more frequent organic collection than regular waste collection.** This has proven effective where fees are not an option, but can also be used alongside a fee-charging scheme.
- **Deliver ongoing communication campaigns to ensure continued, correct food-waste separation.** Conduct campaigns through multiple media streams, including websites, letters, or direct contact (such as door-to-door education). Clearly explain the differences in collection bins and the accepted types of waste, and install signage that is informational, bilingual and locally relevant. For example, Milan's food-waste educational campaign includes direct marketing to residents (letters, posters, leaflets) and direct contact with building managers.
- **Use financial incentives to reward participation.** ‘Pay-as-you-throw’ policies are an effective financial incentive for waste segregation and reduction by waste generators. These schemes incentivise composting and food-waste reduction at source through differentiated collection fees, with lower or no fees for segregated and organic waste or recyclables and higher fees for waste destined for landfill, paid based on services consumed. Consider requiring priority building types to collect and treat their own waste, enforced with a financial penalty for non-compliance, as Mumbai has done – large (over 5,000 m²) gated residential complexes, hotels and commercial properties are required to collect and treat their organic waste on their own premises, supported by an upfront investment and training from the municipality. If your city is limited by the types of collection that

fall within your jurisdiction, other financial incentives, such as rebates or subsidies, encourage those outside your jurisdiction to seek out segregated waste-collection or drop-off points.

- **Form strategic partnerships with community organisations or local leaders to raise awareness and encourage participation.** São Paulo's municipal solid-waste department, for instance, partnered with local municipal administration offices, street-market cleaning companies and street-market sellers to implement food-waste collection points at street markets, which service local residential and commercial collection.¹⁰

Identify and address any existing policy constraints that could hinder food-waste collection

Some cities have policies in place that prevent or hinder segregated food-waste collection. These might include food hygiene rules that prevent composting at markets, policies that prevent private-sector food-waste collection, or restrictive land-use or zoning polices that prevent the creation of local community gardens or their use for composting, for example.



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