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How cities can boost recycling rates

Waste

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Author(s): **C40 Cities Climate Leadership Group, C40 Knowledge Hub**

High recycling rates are essential for cities to minimise waste disposal costs and impacts, and to work towards zero waste. Many Global North cities have decades of recycling experience, and cities can learn from successes in ambitious cities like Seoul and San Francisco, which already achieve diversion rates above 75%.[1, 2] Global South cities have an opportunity to boost recycling rates with relatively low operational costs, and can replicate the innovative, inclusive schemes being implemented in cities such as Surabaya to increase recycling alongside addressing other societal challenges.

This article explains how cities can boost participation in recycling and promote the development of a local market for recycling, supported by revenues from recovered materials, avoided landfill fees and reduced transport costs.[3]

> Recycling recovers material from cities' waste streams to keep it in use for as long as possible, reducing unnecessary resource extraction and waste disposal. Cities should also take steps to minimise the volume of material that enters the waste stream, prioritising municipal food waste, single-use plastics, building construction and demolition waste, and the of growth of the reuse and repair economy.

Collect and analyse waste data to set recycling priorities

Start by undertaking a waste characterisation study to understand the waste produced in your city. The study will identify what and how much waste is being disposed, help you to understand the success of diversion programmes and to understand recyclables contamination, among other issues. This analysis

should inform your recycling priorities. For instance, a high presence of scrap wood or metal points to a need for a dedicated effort targeting wood and metal collection.

As a starting point, assess data already available in your city, or find how much solid waste is generated in your city, its composition, the disposal and treatment approaches used, and the diversion rate from landfill and incineration from our Waste Data Explorer. This explorer uses a mix of World Bank and Carbon Disclosure Project (CDP) data; if your city is not included, look for data from a similar-sized city in your region for indicative results.

Cities should look for data that includes different waste streams – such as plastics, paper, or packaging material – for analysis that supports the design of collection and treatment processes for each stream. Cities should start by determining which waste streams are the biggest, and then review the characteristics of these significant waste streams. Understanding which materials are most commonly recycled can help local authorities identify areas where education and outreach efforts could be focused to improve recycling rates.

For guidance on how to conduct a full waste characterisation study, the data you should obtain, and how to use it to make solid waste policy decisions, watch the Climate and Clean Air Coalition's Webinar on *Best Practices for Waste Characterisation*.

Cities that are unable to undertake their own waste characterisation study due to time or resource constraints can seek data from similar-sized cities. Municipal waste system operators often make this information available via annual reports or online, and usually willingly respond to requests for data.

Make recycling services accessible and easy to use for residential, commercial and industrial waste generators

Determine the collection approach best suited to local conditions

The two most common collection systems are door-to-door collection schemes, and waste drop-off systems.

- **Door-to-door collection** schemes typically have higher recovery rates and reduce contamination. However, they are more costly to operate as they are more labour intensive and require bins and bag identification systems for each material category.[4]
- **Drop-off or 'bring' schemes** rely on waste generators to deposit waste at centralised locations, and recovery rates can be low. However, they are cheaper and easier to operate, and can be a better option in cities with high housing density, which face challenges with bin storage and day-of-collection bin placement.

Cities can use a combination of these strategies, for example providing door-to-door collection for major generators and drop-off schemes for residential generators in high-density areas. Many European cities have combined residential door-to-door collection and drop-off schemes, where collection points are positioned at strategic points within neighbourhoods.[5]

Use convenient, single-stream bins in graduated sizes to maximise waste separation

Select waste bins or bags that are easy to move and identify, both for residents and collection workers. Use single-stream bins (or 'carts') with wheels and lids, in graduated sizes (with the landfill bin being the smallest) to maximise waste separation. Single-stream bins mean that all dry recyclables are collected in one container and are later sorted by material type, removing the need for waste generators to sort metals, plastics and other recyclables separately at home. For example, San Francisco uses blue bins for recyclables, green bins for organics, and black bins for landfill (see box). For drop-off schemes, cities can also use underground containers to minimise visual and noise impacts on neighbours. This approach requires strong communication programmes to educate citizens on what is and is not recyclable to reduce contamination.

Boost recovery by maximising the number of accepted materials

Cities should maximise the number of accepted materials in their collection schemes to achieve maximum diversion, and incorporate new accepted materials over time. To achieve this, cities should focus first on a few easily recycled materials (aluminium, polyethylene terephthalate plastics (PET), cardboard) and progressively advance to incorporate other materials as the market for them develops.

San Francisco has achieved 80% waste diversion

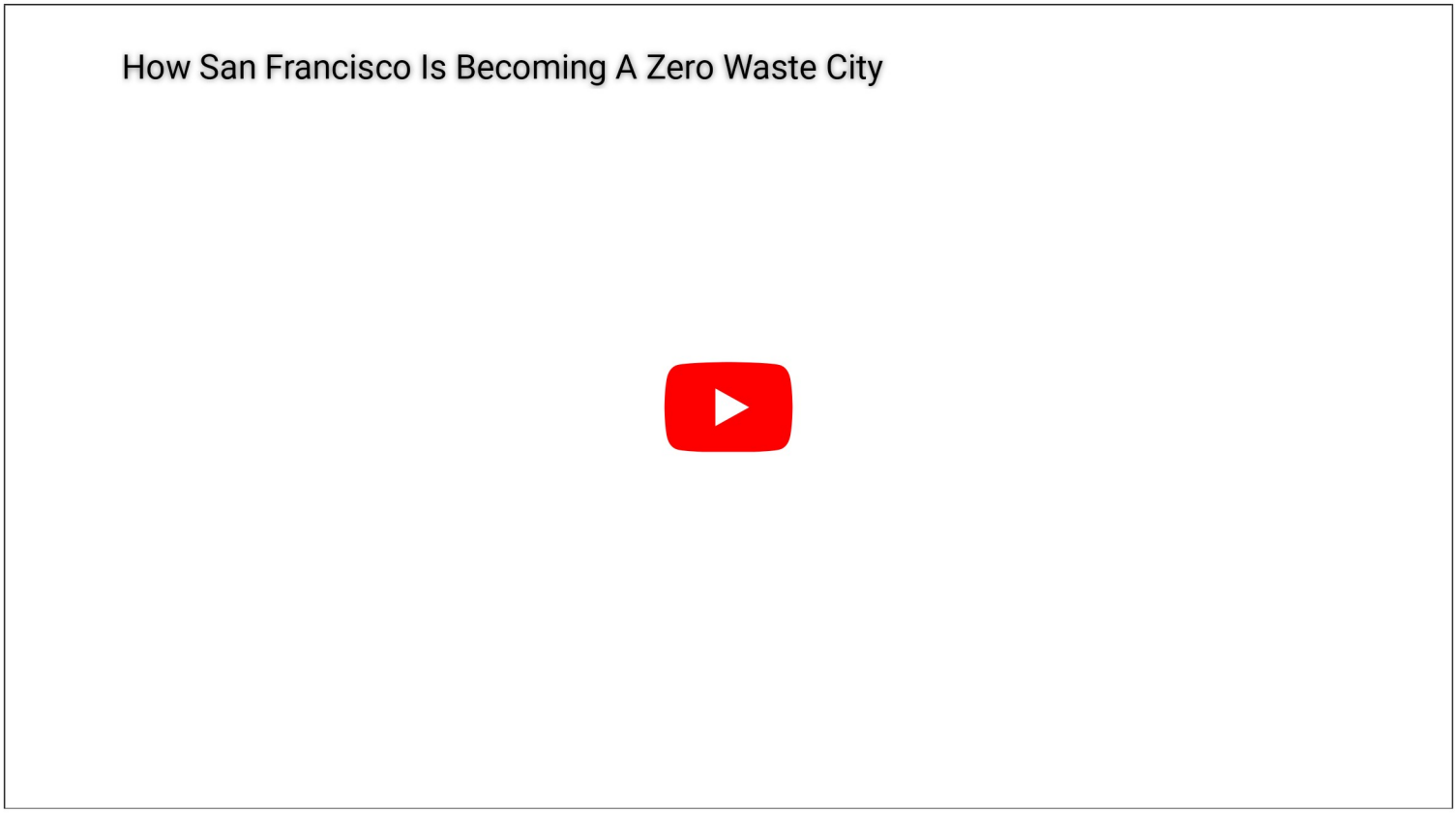
In 2002, San Francisco made a commitment to divert 75% of all waste generated. In 2009 the city introduced legislation requiring the recycling and composting of food and yard wastes, and banned items like Styrofoam and plastic grocery bags. Today the city sends less trash to landfill than any other major city in the United States, diverting about 80% of its waste.[6] It aims to become the first city in the country to reach zero waste, by 2020.

One of the key reasons for the high recovery levels is the number of materials accepted for collection. The city uses blue recycling bins, green composting bins and black landfill bins in graduated sizes (64, 32 and 16 gallon respectively), using the small size of the landfill bin as a behavioural nudge. The city accepts eight categories of waste in their blue bin alone, including: paper, cardboard, metals, plastics, glass, cartons, fabrics and other miscellaneous wastes. Visit the city's website for a full list of the materials accepted in these bins.

The system's annual $300 million cost is entirely user-fee funded, with fees comparable to those of other, less successful systems in the area. Waste collection fees are similar across the bins, but businesses receive discounts for blue and green bin use. San Francisco partnered with a single private firm, Recology, to

implement the scheme, which has reduced the administrative burden and made it easier to collaborate on long-term goals. By contrast, New York's private system comprises hundreds of competing waste collection companies, making collaboration on citywide initiatives more challenging.[7]

Watch the five-minute film below to learn more about San Francisco's efforts:



Minimise contamination of waste streams

It is essential to minimise contamination for each waste stream, as this influences the quality of the recycled material as a recycled / secondary resource and its market value considerably. For example, paper or cardboard that gets wet or otherwise contaminated loses quality considerably and might even become unrecyclable.

To maintain quality high, campaigns can be used to increase awareness. For example in Washington D.C., the city inspected bins of households and issued warnings to those that exceeded a certain level of contamination. Some cities also refuse to collect waste in such cases or add financial fines. Educational outreach and partnerships with local and community organizations, as was done in Auckland, can also help to increase the quality of waste streams.

Incentivise participation with pay-as-you-throw policies, bans of non-recyclable items and more

One of the most impactful supportive policies cities can introduce is volume-based fees or **'pay-as-you-**

throw' schemes. This is an effective financial incentive that immediately encourages waste segregation and reduction at source by waste generators. These cost structure systems are more impactful than schemes that focus only on increasing recycling rates, as they also incentivise composting, source reduction and reuse. It uses differentiated collection fees, with lower or no fees for segregated recyclables and organic waste, and higher fees for wastes destined for landfilling, paid based on services consumed. Over 7000 cities in North America, and many other cities around the world, are implementing pay-as-you-throw systems.

Other effective supportive policies that cities can implement, which are increasingly common in cities around the world, are:

- **Legislation and enforcement for segregation of waste material** at source for commercial, industrial and/or residential waste generators.
- **Deposit schemes,** which provide a small financial reward for the deposit of packaging like glass and bottles returned to a collection point. These can be designed to promote other sustainable behaviours in the city like public transport use, and support and formalise existing informal collection systems. For example, in Surabaya in Indonesia bus travellers can pay for their fare using plastic bottles collected in the city, incentivising citizens to clean up the streets, boosting recycling, and supporting bus ridership.[8] Sydney has a system of Reverse Vending Machines that provide a small reward for deposited recyclable materials.
- **Bans or taxes on single-use and non-recyclable items** like plastic bags, low-density plastic or Styrofoam food containers, plastic straws and other items. Reusable options are already well developed and widely available in the food sector, offering cities a starting point for tackling plastic demand and single-use waste. For example, San Francisco and Montreal have banned plastic bags, Seattle has banned plastic straws and utensils, while New Delhi and Mumbai have banned almost all single-use plastic.[9] To build popular support for a ban, cities can run trials and campaigns as Seattle did in September 2017 with the 'Strawless in Seattle' campaign. *How to reduce single-use plastics in the food sector* explains more.
- **Extended Producer Responsibility policies,** which can improve the recyclability of consumer goods as producers are forced to take them back after their useful life has ended. These policies need to be set at the national level.

Develop clear, positive and targeted communications campaigns

There are two audiences for communications campaigns: those who are already recycling, and non-recyclers. For both groups, a lack of information about what can and cannot be recycled is the most commonly cited reason for low participation rates. To address this, cities should:

- Make sure that drop-off centres and bins are clearly marked, and that instructions are clear and visual

(using photographs or drawings).

- Ensure information is easy to find on the city's website. Highlight answers to basic questions, particularly: What can I recycle? When is my collection day? How can I recycle special wastes? Milan's website, for example, offers a guide in 10 languages for wider accessibility.
- Use the advertising space on the side of collection trucks, direct outreach via collection staff, and flyers attached to bins, for awareness campaigns.
- Ensure messaging is coordinated and consistent (for example instructions on container placing), especially if there are multiple actors involved. Municipal governments should meet regularly with waste authorities, haulers and processors to identify common communication messaging. Consistent messaging across jurisdictions is also important if several cities share a central processing facility.

To encourage recycling among non-recyclers, information about the basic operation of recycling schemes needs to be supplemented with persuasive messages. Base communications campaigns on positive, engaging messages that will resonate with citizens, such as civic pride, cost savings, sustainability and job creation, and highlight top recyclers. Positive messages are typically more successful at encouraging participation than campaigns aiming to 'guilt' citizens into taking part.[10] Read *Why cities need to advance towards zero waste* for more information about the benefits that can be highlighted in communications campaigns.

The example below, designed by Brazilian agency Propeg for the city of Salvador, uses sustainability messaging[11]. It shows the 'use by' date for a jar of olives – the jar itself won't 'expire' for over 4000 years. The Don't Mess with Texas and Leithers Don't Litter campaigns, both based on civic pride, are also good examples that target littering and the dumping of waste, as well as recycling.

Cities can begin by targeting groups which are more likely to engage – for example students/schools, retirees, businesses, health officials and large institutions. Cities can also offer direct assistance to large generators such as businesses or institutional facilities to support them in increasing their participation in recycling schemes. When rolling out a scheme for segregate collection an opt-in scheme can be used, allowing people who are interested in participating – and therefore more likely to generate high-quality waste streams – to sign up for initial phases. This allows for testing and time for the city to adjust schemes to make them more effective before wider rollout.

Keep America Beautiful's 'I want to be' campaign

'I want to be' is an example of positive campaigning that promotes the benefits of recycling, using emotive and innovative messaging and imagery. It also provides clear, accessible information on recycling across the United States, and corrects common myths. Visit their website, and watch the short, sharable video clips.

Secure the buy-in of collection workers and waste management operators

The effective participation of collection workers and waste management operators is vital for successful recycling schemes. To secure their motivation and buy-in, cities need to ensure that separate collection of recyclables is convenient for the collectors as well as the waste generators. District-based contracts or concessions that prevent multiple haulers from providing similar services to neighbouring users are useful tools for cities to support haulers. Cities can also build incentives into contracts with hauling companies to drive action to boost recovery – revenue-sharing mechanisms that kick-in beyond a certain threshold of recyclable waste collected are commonly-used incentives. In cities where waste collection is staffed by municipal workers, cities can award bonuses to teams that successfully drive up participation.

Cities should also minimise waste management operators' costs – and minimise emissions from transporting recyclables – by optimising logistics. Material processing and recovery facilities should be located close to the city to minimise distances travelled and reduce the number of trucks on the road. As well as reducing transport emissions, locating processing close to urban centres helps recycling to become more cost competitive with landfilling, as it requires less fuel and drive time to take waste to the recovery facility (especially when landfills are also located close to cities).

Maximise revenues from recyclables by establishing appropriate pricing and incentivising a local market for reuse of materials

Municipal recycling is unlikely to make the city money, but revenues should be maximised. To understand how much revenue can be earned from your city's recyclables, speak to secondary raw material processors about their pricing. An online search for pricing (including but not limited to processors' websites) can also be helpful to supplement this pricing picture. Pricing will differ between cities, and fluctuates alongside global commodities such as petroleum and metals, so cities should avoid setting fixed prices in contracts as they can vary significantly over time. Monitor pricing over time, and incorporate gradual trends in decision making.

To develop the local market for reuse of materials, identify options to create material 'loops' that funnel recovered materials back into local enterprise – helping to create a local 'circular economy'. Seek opportunities that also support local recycling and secondary materials markets, create jobs and insulate local material recovery from global market forces that impact prices. Opportunities to integrate recycling and recovery efforts will grow alongside the market for secondary materials.[12] This requires predictable and reliable recovery and supply, so cities should consider seasonal trends that impact on material availability (for instance there are often higher cardboard yields in holiday seasons).

Local uses of recycled materials in two United States cities

Phoenix, Arizona in the United States has partnered with Palm Silage to divert 34,000 tons of palm leaves

from landfill annually, transforming the material into an ingredient for livestock feed. This has reduced the city's annual disposal costs, while Palm Silage has created a new $10 million revenue business as well as new local jobs.[13] In San Francisco, California, food and yard waste is shipped south of the city where it is composted and sold for use in wine- and nut-growing operations in the Central Valley.