C40 PATHWAY TOWARDS ZERO WASTE

How cities are accelerating the reduction of methane emissions

© PeopleImages.com / Depositphotos

C40 CITIES

2023 Report

ACKNOWLEDGEMENTS

This report was created in collaboration with officials in the C40 Pathway Towards Zero Waste signatory cities, C40 funders, and C40 staff. Thank you to everyone who has contributed to the report and the actions that are driving forward immediate and inclusive climate solutions to achieve the commitments of the C40 Pathway Towards Zero Waste. For further information on the C40 Pathway Towards Zero Waster, please check out the accelerator webpage.

CONTENTS

Foreword	**4**
Introduction	**5**
Signatories	**6**
Progress Overview	**7**
Data Analysis	**8**
City Progress Summaries	**10**
Barriers to Achieve the Commitments	**32**
Conclusion	**33**

© Ahmed Gaber / C40 Cities

FOREWORD

We are in a climate crisis, as demonstrated by 2023 being the first recorded consecutive 12-month period of over 1.5 degrees warming above pre-industrial levels. Rising levels of greenhouse gases in the earth's atmosphere are causing climate breakdown. Waste is a big contributor to these emissions – especially from methane, which is generated by decomposing organic matter. As methane is a short-lived climate pollutant with 87 times more heat-trapping capacity than carbon dioxide in the near term, it is one of the fastest ways to slow global heating and stay within the 1.5°C target of the Paris Agreement.

Cities in the Global South have not caused the climate crisis but are disproportionately feeling its effects. Their mayors recognise the urgent need to respond, and I applaud their leadership as they recognise the unique opportunities around implementing sustainable waste management as climate solutions.

C40 accelerators demonstrate the highest level of mayoral leadership on urgent climate action. They are based on the most ambitious, science-based targets and lay out concrete delivery milestones, both for mitigation and adaptation. Through the C40 Pathway Towards Zero Waste, cities in the Global South are taking critical steps to reduce emissions and deliver immediate local benefits to their communities, including cleaner neighbourhoods, increased resilience, improved health and air quality, and the creation of good green jobs. In just over a year, signatories have shown outstanding leadership.

Towards the commitment of delivering timely city-wide waste collection services by 2030, Accra is now recognising and supporting the informal sector, creating hundreds of good green jobs and increasing collection in frontline communities. In Dar es Salaam, where organic waste makes up roughly 70% of waste in the city, the city composts 360 tons per day from public markets and is taking steps to increase this to 1,000 tons per day towards meeting the commitment of treating 30% of organic waste. Rio de Janeiro has based its Caju Ecopark on the principles of a circular economy, processing organic waste from schools and supermarkets into compost and biogas. The Ecopark will also launch a food bank to donate surplus food from supermarkets to people experiencing food insecurity, effectively avoiding food waste. In Curitiba, the city provides segregated waste collection for five different waste streams, and has implemented new recycling points which can extend the current landfill lifetime, which will effectively contribute towards reducing 30% of waste disposal emissions by 2030.

We are grateful to the leadership the C40 Pathway Towards Zero Waste signatories are showings, as they set an example for the world's cities to follow.

Mark Watts
Executive Director of C40

INTRODUCTION

Waste management is one of the primary services that city governments provide to make cities clean, liveable, competitive, resilient and equitable. Even so, rapidly growing and developing cities in Africa, Latin America and Asia are facing the consequences of old economic models of linear production and disposable consumption, with their residents and environment bearing the costs.

When cities generate waste faster than they can manage, it leads to operational challenges like uncollected waste, illegal dumping and overflowing landfills that produce methane. Such challenges can also lead to illegal open burning practices, burdening communities with polluted air and water and clogged sewers, leading to flooding and the spread of disease. In many cities around the world, waste picking is among the few livelihood options for unemployed youth, people who have migrated or been displaced, and low income individuals with low levels of education. While this is an important source of livelihood and contribution to waste management, waste picking comes with social stigma, marginalisation, hazardous working conditions, low wages and little protection.

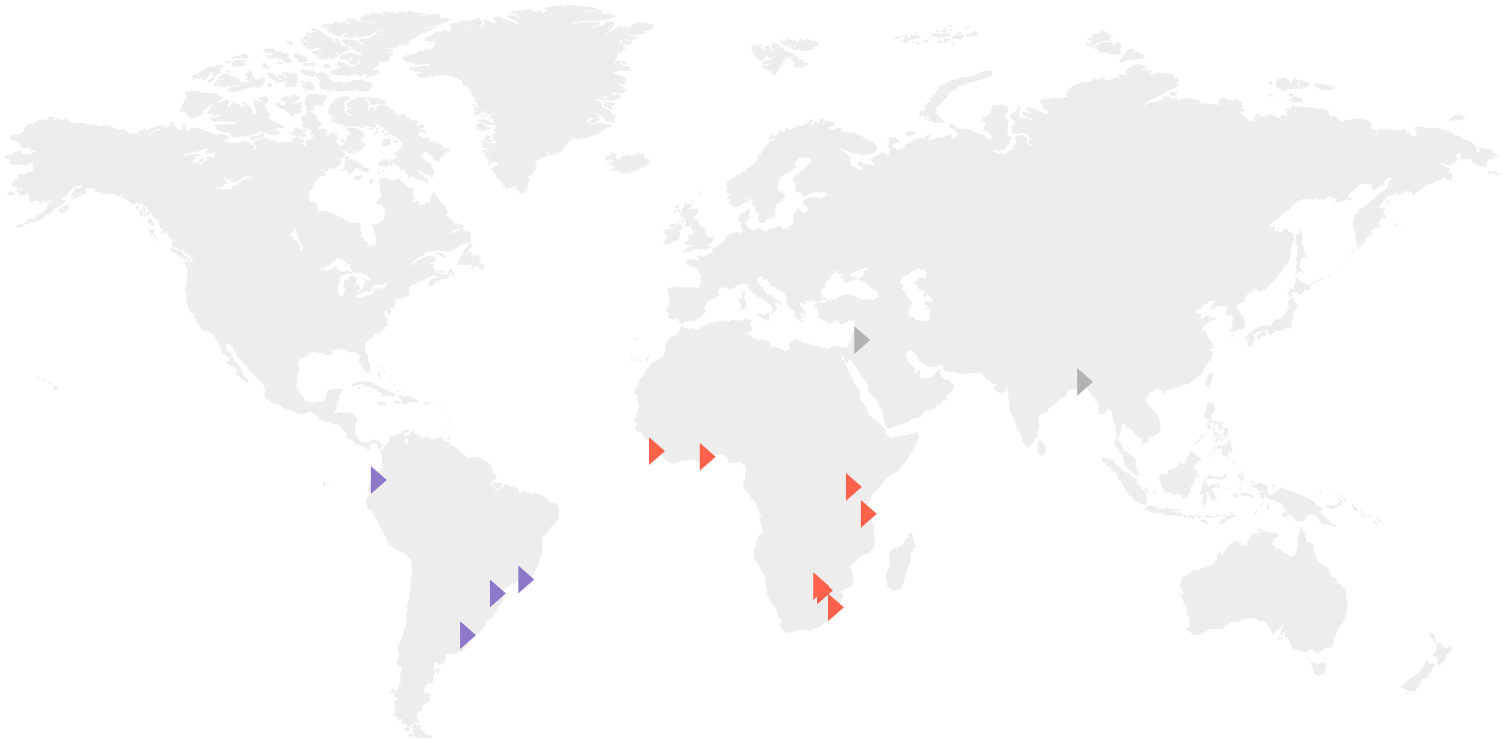
Cities are ideally positioned to address this complex set of issues through sustainable waste management. Cities have the authority to create more circular economies; segregate universal waste collection; appropriately treat and safely dispose of waste; and support and integrate the critical services delivered by informal waste workers into the solid waste management efforts of the city.

With the support of the C40 Sustainable Waste Systems network, C40 created the Pathway Towards Zero Waste to help focus cities' sustainable waste management efforts on the most impactful climate actions to reduce methane emissions, while at the same time deliver immediate local benefits to their communities by creating cleaner, healthier, more resilient, and inclusive cities. In the Global South, waste is an especially large contributor to municipal emissions – responsible for up to 35% of cities' overall emissions, primarily from methane generated by organic waste, which can constitute up to 70% of total waste generated in some cities. The 2022 Intergovernmental Panel on Climate Change (IPCC) Report showed clearly that reducing methane emissions is the fastest way to tackle the climate crisis, due to its powerful near-term impact. Meeting cities in the Global South where they are on their journeys towards a near zero waste future, the commitments of the C40 Pathway Towards Zero Waste by 2030 are to:

1. Provide timely, city-wide waste collection
2. Treat at least 30% of organic waste
3. Reduce our waste disposal emissions by at least 30%

The C40 Pathway Towards Zero Waste was launched in 2022. The 13 signatories of the pathway are located across three regions, and all reported in 2023, demonstrating how they are actively leading and providing a model for other cities in reducing the impacts of climate breakdown for this generation and delivering immediate local benefits to their communities by creating cleaner, healthier, more resilient and inclusive cities.

SIGNATORIES



- Accra
- Amman
- Buenos Aires
- Curitiba
- Dar es Salaam
- Dhaka South
- Ekurhuleni
- eThekwini
- Freetown
- Nairobi
- Quito
- Rio de Janeiro
- Tshwane

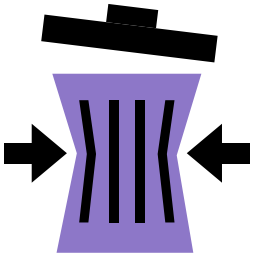
PROGRESS OVERVIEW

This is the first C40 Pathway Towards Zero Waste public report. It contains the baseline waste scenarios in signatory cities, and an overview of actions cities will take to reach the 2030 commitments. The progress summaries are organised into three areas of intervention aligned to the pathway's commitments – collection, organic waste treatment, and disposal emissions reduction.

As each city is at a different stage on the path towards a zero waste future, the summaries include a wide spectrum of efforts, starting with planning and pilots, through to improving the efficiency of existing systems. Regardless of the stage cities are in, this report shows how signatories have committed to ambitious steps in developing zero waste roadmaps, providing details on the actions and milestones that will be met.

Almost 70% of signatories provide timely, universal city-wide collection, with all other signatories committed to reaching this target by 2030. As evident in Accra, cities are also addressing the unequal distribution of waste collection services across formal and frontline communities and recognise the critical role of informal waste workers in improving city-wide waste management.

Cities emphasised the importance of phasing out organic waste disposal to reduce methane emissions, by nutrient recovery through composting and/or energy generation through anaerobic digestion. Curitiba launched a Domestic Composting Programme in 2023, delivering home composting kits to residents, and will implement a Municipal Composting Programme with a composting yard processing waste from street and municipal markets.



Cities are also putting plans in place to pilot and/or scale recycling efforts through increased collection and sorting points and engaging the informal sector to support and value their efforts. In 2024, Amman will double the number of sorting points in the city to quadruple recycling annually. The city will also pilot two recycling banks using a trash-to-cash mechanism, to improve the livelihoods of informal workers.

In terms of safe disposal, more than 60% of signatories are using sanitary landfills with gas capture, with at least one city considering the decommissioning of landfills and putting circular plans in place for a near zero waste future. The remainder of signatories are in the process of implementing sanitary disposal infrastructure by working on retrofitting dumpsites or building new sanitary landfills, both with gas capture and flaring. eThekwini will soon undertake a feasibility study to investigate the use of landfill gas as biomethane fuel in the city's fleet vehicles.

Signatories also outlined barriers to meet the pathway commitments. Their feedback informs the C40 Sustainable Waste Systems network's focus of support for 2024 and include the need for upgrading or implementing new waste infrastructure, aspects of waste finance starting with planning to secure funding and income to maintain operations, timely and accurate data monitoring, capacity building and training, making waste systems inclusive and equitable, as well as the development of clear information products implemented through well designed communication strategies.

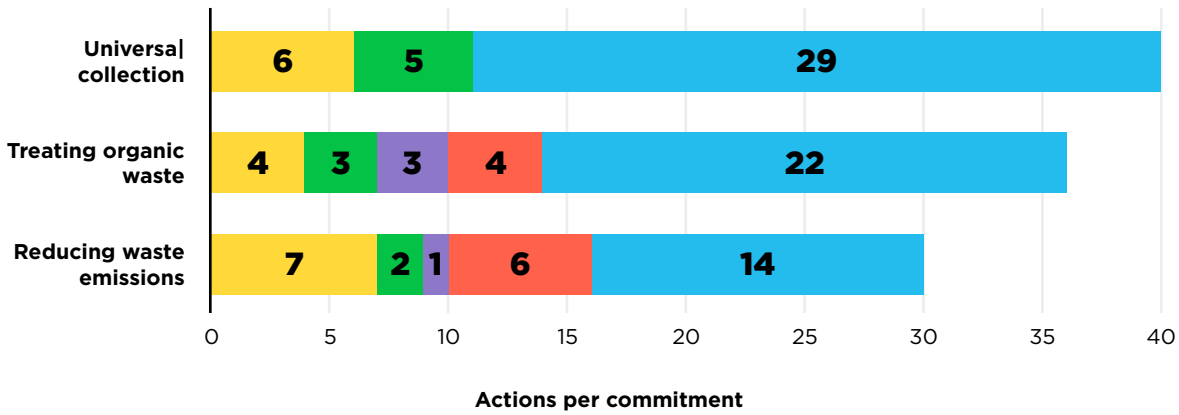
DATA ANALYSIS

As part of the annual reporting process, cities submit detailed information about the actions they are implementing to deliver on the pathway commitments, as well as available waste data to show progress. This section highlights key insights drawn from this data.

The status of actions towards the C40 Pathway Towards Zero Waste commitments

Signatories have identified 110 initial actions towards meeting the three commitments of the pathway. Of these, 83% are on track and 9% are already achieved, indicating that signatories are delivering on the milestones they set.

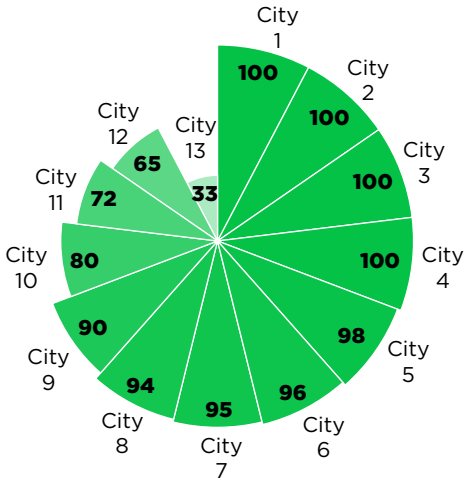
The majority of initial actions are committed to universal collection, and most of them are on track. Actions related to treating organic waste are mostly on track, but cities have also refined their approach to this commitment as they receive feedback from waste composition and feasibility studies, as well as pilots. There have been some delays with regards to reducing disposal emissions, but these actions are also mostly on track.



Universal collection

A foundational activity of the pathway is addressing waste collection gaps. Of the signatories, 30% provide 100% collection coverage. Another 46% are achieving collection coverage above 80%. Cities with high but incomplete collection coverage will continue to increase it, especially to marginalised communities. They will also focus on implementing three-stream segregate collection (organics, recycling, and residuals). Cities with lower collection coverage will focus on implementing the necessary collection infrastructure such as bins, fleet vehicles, transfer stations, or weigh bridges.

Average % of universal waste collection



For many cities not yet at 100% collection coverage, reaching marginalised communities remains challenging. Cities are recognising the critical role of the informal sector in this regard and thus supporting their efforts and integrating them into their respective waste management systems.

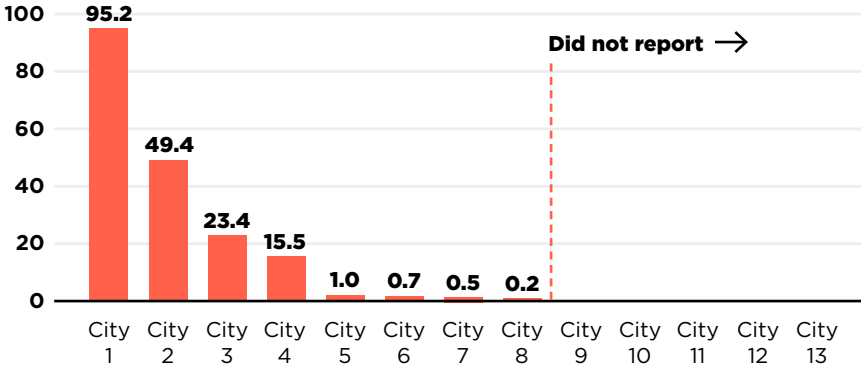
Universal three-stream segregate collection is not a commitment of the pathway, yet 16% of signatories are delivering it, and all signatories acknowledge it as a crucial step towards successful organic waste treatment, with many cities reporting plans, pilots, and ongoing infrastructure upgrades to reach universal three-stream collection.

Organic waste treatment

In the first year of reporting, cities reported a range of organic waste treatment capacity. Most reported little capacity or could not provide data. Considering an average of 50% organic waste composition, an average organic waste treatment capacity of 10.3% across cities is indicated.

Data remains an ongoing challenge for most signatories of the pathway and will be a key focus area for C40 support going forward. C40 is working with signatory cities to help them with waste composition and treatment data. Through the network and technical support programmes, C40 will also assist cities to identify the most appropriate organic waste treatment solutions, including required financial and policy structures.

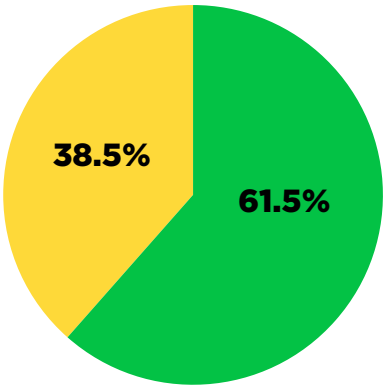
Average capacity % for treating organic waste: 10.3%



Although there is a lack of data, cities are not waiting to increase their segregate collection and organic waste treatment options, as expressed in the individual city summaries.

Disposal emissions reduction

A sanitary landfill is a key tool in reducing emissions, as it minimises methane generation from organic waste decomposing. Almost 62% of signatories have sanitary landfills with capping and gas capture in place. These cities are working towards greater diversion rates through increased organic waste treatment and recycling rates, in order to extend the lifetime of landfills, and/or working towards a near zero waste future and circular economies through which these landfills will be decommissioned.



% of signatories with sanitary landfill with gas capture

- No
- Yes

Cities without sanitary landfills have started the work to identify appropriate land and contract service providers to build new sanitary landfills, or work has started to retrofit dumpsites for safe disposal.

© Juan Arredondo / Getty Images

CITY PROGRESS SUMMARIES

The following section of this report contains progress and action summaries that were self-reported by each of the C40 Pathway Towards Zero Waste Accelerator signatory cities. The city summaries showcase past, present, and future actions the city is undertaking to achieve the implementation milestones of the Accelerator.

SIGNATORY CITIES IN

AFRICA

ACCRA

GHANA

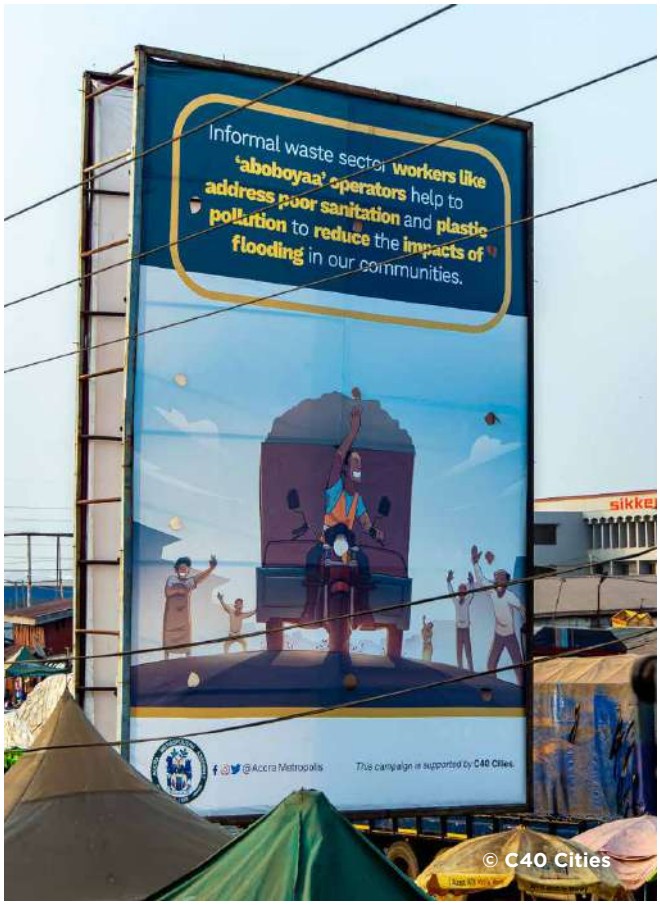
Universal collection

The Accra Metropolitan Assembly (AMA) has contracted municipal waste collection to private service providers that charge a fixed tariff, which the city reviews annually. These companies have exclusive rights to collect waste in specific areas. To ensure efficient waste collection services, AMA will monitor their daily activities and non-performing service providers will be sanctioned.

Informal waste collectors make an important contribution to waste management in the frontline communities of Accra. The AMA is improving the working conditions of hundreds of informal waste workers, including women and people who have migrated or been displaced. Efforts include dialogue with representatives to understand their perspectives, capacity building, and the development of policies that can better protect them in their work.

Accra aims to both increase the waste collection coverage and provide efficient services to households in underserved and frontline communities. AMA is facilitating the formation of cooperatives for informal waste service provider cooperatives, which can then be awarded concessions in these communities. The target for 2024 is to inaugurate at least ten cooperatives.

The AMA plans to collect at least 120 metric tons of waste daily from public places and institutions including markets, schools, and transport terminals. This will be achieved with internal resources as well as private formal and informal service providers. A study on appropriate financial models for municipal solid waste management will be undertaken in 2024 under the Accra – Paris Technical Cooperation Programme. The objective of the study and subsequent actions is to ensure financial sustainability.



© C40 Cities

Organic waste treatment

The city has started to implement a city-wide source separation programme to improve waste collection and treatment of organic waste and divert it from landfills. The implementation will take place between 2022–25 and includes a pilot source separation and compost project in four communities. Actual collection of separated waste will commence in the first quarter of 2024, and the pilot project will provide important lessons for city-wide implementation of the source separation programme.

Separated materials will be delivered to existing compost and recycling facilities for processing. At least one community compost facility will be set up to produce compost for use within the community, for example greening of public open spaces, backyard gardening and beautification. Community volunteers will be selected and trained in composting and encouraged to retain some percentage of organic waste to produce compost for community greening programmes and home gardening.

In collaboration with C40 Cities under the C40 Climate Action Implementation (CAI) programme, an independent consultant was contracted to carry out waste studies. The expected outputs include developing a waste optimisation strategy, a recommendation for review of sanitation by-laws to make waste segregation mandatory, and a roadmap for the implementation of a pilot source separation and community composting project. This assignment will be completed by mid–2024.

The AMA with the support of C40 Cities Finance Facility (CFF) and the German Agency for International Cooperation (GIZ) has engaged several consultants to carry out feasibility studies towards developing a large-scale composting facility for treatment of organic waste that would be collected after implementation of a city-wide municipal solid waste (MSW) source separation programme. All consultants are required to complete their respective assessment by the end of 2024. The outputs will include making a business case for composting and securing funding.

Disposal emissions reduction

The Adepa disposal site, which was an open dump, has been retrofitted. Waste Landfills Limited, a local private company, is constructing a new cell with liners, gas collection and flaring system at the same location. A new cell was also constructed with liners and a gas collection system, and commissioned in February 2023. It is currently in use and will greatly reduce disposal emissions when the flaring of landfill gas commences.

© Jevgenijs Sulins / Getty Images

DAR ES SALAAM

TANZANIA

Universal collection

To improve its waste collection efforts, the City of Dar es Salaam has been maintaining the non-tarmac roads in collaboration with national agencies such as Tanzania Rural and Urban Roads Agency (TARURA). As a result, six more wards are now accessible for waste collection compared to 2022. The city has also increased the number of local small and medium sized community-based contractors from 20 to 26, to collect waste from remote and inaccessible areas. The city aims to service all 36 wards by 2025, compared to the current 26 wards where effective waste collection services are operational.

Organic waste treatment

Organic waste makes up roughly 70% of waste in the city. Currently, some of it is diverted as animal feed and composted for gardening use. The city currently composts 360 tons per day and aims to increase this to 1,000 tons per day. The informal sector currently composts about 50 tons of organic waste per day in the Mabwepande area. The city is working on identifying and empowering informal groups and community-based organisations that could collect and treat organic waste, including the steering of local compost plants. The city also aims to increase waste segregation from one ward, Bonyokwa, to all 36 wards.

Through the C40 Climate Action Implementation Programme and C40's Inclusive Climate Action (ICA) project, the city continues to design and deliver capacity building sessions to city officials, politicians, the public and business owners, about accelerating zero waste practices and investment. Advocacy efforts for a circular economy, whereby solid waste is reused or used in other productive activities such as recycling and composting, will reduce waste emissions in the city.

Disposal emissions reduction

The city is currently reviewing a waste management study of Dar es Salaam conducted by the government of the Netherlands, and as a result looking into infrastructure and financing options for dumpsite decommissioning, as well as designing new sanitary landfills for all municipalities in the city. Dar es Salaam is also undergoing an assessment for the recovery of methane gas from Pugu Kinyamwezi Dumpsite and other recovery facilities.

EKURHULENI

SOUTH AFRICA

Universal collection

Ekurhuleni is committed to delivering universal waste collection to both formal and informal neighbourhoods in the city. To measure and track the efficiency of this service, the Environmental Resources and Waste Management Department reports collection coverage on a quarterly basis, as per the city's Service Delivery Implementation and Budget Implementation requirements. Although informal settlements in the city increased to 163 in 2022–2023, the city continues to provide full collection coverage to these settlements and all 733,591 formal households.

Organic waste treatment

With the support of C40, Ekurhuleni conducted a Waste Characterisation and Quantification Study, which indicated an organic waste component of 53%. Ekurhuleni completed a budget analysis and is finalising its action plan detailing the pipeline projects the city wishes to implement in the next three years in order to treat organic waste to meet the C40 Pathway Towards Zero Waste 30% diversion commitment.

Disposal emissions reduction

Ekurhuleni's Green City Action Plan (GCAP) includes a commitment to reduce the amount of waste sent to landfill by 65% by 2030, and thus reduce waste emissions. The city is currently revising its Integrated Waste Management Plan (IWMP) to address all waste streams.

The GCAP prioritises five waste measures that will contribute to a 65% waste diversion goal, including composting, anaerobic digestion, the development of a Materials Recovery Facility, collection segregation, and energy generation from landfill gas. The anticipated greenhouse gas reduction compared to the business-as-usual case is 3.6%, equivalent to 0.5 $MtCO_2e$. The new IWMP will be aligned with the measures of the GCAP, while its Waste Minimisation Plan, which is currently being finalised, will elaborate on the IWMP and provide day-to-day waste minimisation activities and programmes. These efforts will all be supported by C40.

© michaeljung / Getty Images

ETHEKWINI

SOUTH AFRICA

Universal collection

To improve its waste collection coverage of 95%, the city of eThekwini has focused on replacing its ageing waste collection fleet and optimising its use of resources. In 2024, the city will develop a fleet replacement model and supplement capital investments. The city has also taken a conscious step to reconfigure its separation at source programme to increase the diversion of waste and integrate informal waste workers. While formal household waste collection receives a high level of service, action is needed to improve waste collection in informal housing areas. All actions are to be measured through performance monitoring data.

Organic waste treatment

The city's strategic plans to treat organic waste include achievable targets such as garden refuse beneficiation. The city will also undertake a waste characterisation study by 2025 to inform eThekwini's Integrated Waste Management Plan (IWMP), which will map an integrated organic waste strategy by 2026. In addition, the waste management by-laws will be revised to regulate separation at source. The city also plans to pilot anaerobic digestion from different organic waste sources to inform a full scale implementation and feedstock collection and management programme.

Disposal emissions reduction

To reduce disposal emissions, the city plans to supplement and optimise existing landfill gas recovery projects at the Bisasar Road and Mariannhill landfill sites, as well as extract and treat landfill gas at the Buffelsdraai landfill site. Closed landfill sites will be capped and rehabilitated to deal with fugitive landfill emissions. The city will also undertake a feasibility study to investigate the use of landfill gas as biomethane fuel in the city's fleet vehicles.

Loganathan Moodley

Deputy Head: Plant & Engineering, heading up the Plant & Engineering Division of the Cleansing and Solid Waste unit, City of eThekwini

> What actions have you been involved in with your team that make you proud?

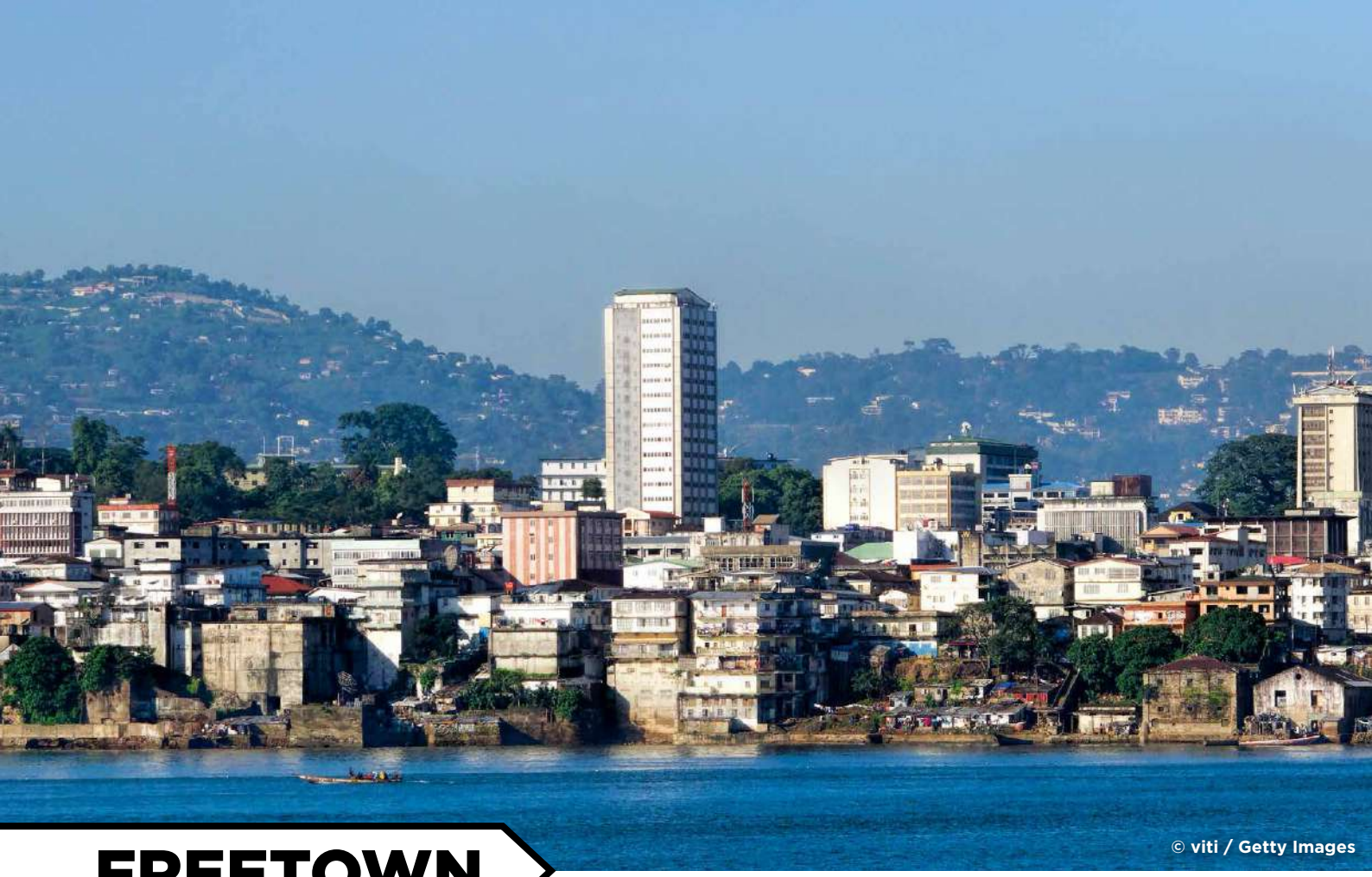
I am proud to be part of a beautiful city that is taking conscious climate change action for a resilient and sustainable future. I am equally proud to have contributed as a professional engineer using analytics and interpersonal skills to lead and inspire others in this space, on innovative climate change projects both locally and internationally.

> What inspires you in the work you do to improve waste management in your city, and achieve the commitments of the C40 Pathway Towards Zero Waste?

I am inspired by eThekwini's bright future, as the Gateway to Africa. The city is actively applying research, development, innovation and partnerships to make eThekwini the most caring, liveable and chosen city in South Africa. In this light, our waste team has specifically worked towards a new waste-as-resource economy, leading with best practices and progressing to meet the commitments of the C40 Pathway Towards Zero Waste.

> What impact has your work had on the quality of life of your city's residents, and what does this mean to you?

The city's landfill gas project was Africa's first landfill CDM project, destroying 2.5 million tons of carbon equivalent to date and is still one of the most successful in the world. Using climate change as a radical driver, our team also linked sustainable good practices with community beneficiation and ecological restoration. The city employs local communities to do invasive vegetation clearing and indigenous reforestation for carbon sequestration. The various landfill best practice models have contributed to managing environmental assets more effectively, cleaning the environment, strengthening local communities and building social cohesion, improving education and skills development, and promoting economic growth.



© viti / Getty Images

FREETOWN

SIERRA LEONE

Inadequate management of solid and liquid waste is the third largest source of greenhouse gas emissions in Freetown. It accounts for almost one third (29%) of the city's total emissions in 2018 and results in a series of health, occupational and environmental impacts. Over 68% of waste generated is dumped illegally, while the remaining 32% is directly disposed of in the Kissy and Kingtom dumpsites, without any segregation or recycling.

Under the leadership of C40 Co-Chair Mayor of Freetown Yvonne Aki-Sawyerr, the city will continue to scale up programmes and activities under its Transform Freetown Plan, which prioritises the development of waste management infrastructure and capacity

Universal collection

Freetown intends to expand its waste collection capacity in public spaces and households, including those that are hard to reach. The city will access these areas through the expansion of community-based micro-enterprise projects and the recycling of organic waste in 15 communities. The collection coverage and general waste management in other areas will be improved through public-private partnerships, particularly the operationalisation of six transfer stations. These stations will avoid duplicated collection routes and minimise the distance travelled by collection vehicles by 60% by 2030.

Freetown also intends to procure 53 additional waste collection tricycle carts to enhance its waste collection in public spaces by 80% by 2030. The city will continue to build and strengthen its fleet and data management system to efficiently monitor and supervise fleet operations and enhance timely waste collection and pick-up, with an overall collection target of 70% by 2030.


© Francis Ogunyemi / Climate Visuals Countdown

Organic waste treatment

To divert waste from the Kingtom and Kissy dumpsites, the city has started to scale up the treatment of organic waste and recycling of plastics through household and business waste segregation and organics treatment. In early 2024, waste segregation and organic treatment will also be rolled out in 15 hard-to-reach communities. To support urban farming activities in communities, 15 women's groups, made up of ten women each, will be trained on waste processing to compost. Freetown aims to compost 40% of organic waste by 2030 and 70% by 2050.

Freetown will also continue to expand its waste to energy efforts in partnership with the Freetown Waste Transform, using bio-digesters to convert waste into energy. The city has already installed two bio-digesters – one at the Aberdeen Women's Center and another at the Bombay market in Susan's Bay.

Disposal emissions reduction

As 60% of the waste composition is organic, and with a clear objective to reduce waste emissions and reach carbon neutrality by 2050, the elimination of illegal dumping, segregated collection, recycling and the treatment of organic waste for diversion is vital. Freetown is also being supported by the World Bank to construct a new sanitary landfill by 2030 with a materials recovery facility to promote the reduction, reuse and recycling of waste, and gas capture. Kingtom will be retrofitted to become an engineered landfill with gas capture, while Kissy will be safely closed. By 2030, the city aims to capture 25% of landfill gas and 50% by 2050.

Eugenia Kargbo
Chief Heat Officer and TA Support on Climate and Environmental Management, City of Freetown

"Climate change is upon us and we have set ambitious targets to mitigate its many impacts. Freetown's waste sector accounts for 29% of its emissions and 60% of the waste is food waste. My participation in the C40 Pathway Towards Zero Waste has increased my knowledge on prioritising interventions throughout the waste system that would deliver multiple benefits such as health, economic and environmental impact, specifically by reducing, reusing and recycling organic waste. This action will not only reduce methane emissions, but also create green jobs, support circularity, increase health and air quality, and reduce ground water level contamination."


© Derejeb / Getty Images

NAIROBI

KENYA

Universal collection

To increase collection efforts, Nairobi has hired private contractors to provide collection services. In addition, dumpsite roads are being renovated to facilitate the tipping of waste and turn around time of trucks at the dumpsite. A new process of dumping waste in maintained cells and compacting it has started to create more space for incoming waste. New machines will be procured to maintain the cells as well as a new weighbridge to keep track of waste flow and increase efficiency in waste tipping monitoring. The city will create 3,500 new green jobs to assist with the loading and clearing of waste, as well as removing general waste from stormwater drainage canals to reduce pollution and flooding, as well as waste emissions.

Organic waste treatment

To improve organic waste treatment and recycling, the city will collaborate with the Kenya Residents Association to increase source separation at household level. Nairobi will involve 500 community-based organisations in waste separation, working with stakeholders in selected markets to collect and treat organic waste. The city will also work with urban farmers, providing them with animal feed and compost for their farms.

Disposal emissions reduction

Nairobi intends to work with a number of stakeholders including private contractors, residents, and urban farmers, to increase source separation of waste and generate cleaner waste streams for composting and effective recycling. By doing so, the city will reduce the amount of waste going to the dumpsites as well as waste emissions. Nairobi will also develop a waste stakeholder inventory that registers community-based organisations involved with recycling, to connect them to circularity companies. The city will also educate stakeholders on the Waste Management Action Plan, Nairobi's guiding policy framework for waste management.

© Edwin Remsberg / Getty Images

TSHWANE

SOUTH AFRICA

Universal collection

The City of Tshwane provides waste collection services to all 2,351 areas with formal households. A total of 174 informal settlements are serviced weekly. To close the gaps in Tshwane's waste collection coverage in informal settlements, the city is encouraging residents to use waste bins. In collaboration with a non-governmental organisation (NGO) Asivikelani, the city improves and monitors the efficiency of the waste collection in informal settlements. In 2024, the city will work with private waste collection partners to expand their coverage.

Organic waste treatment

While Tshwane does not offer collection of garden waste from households, residents are encouraged to drop off their garden waste at local garden refuse sites. The city introduced garden waste shredders in some of the garden refuse sites and also partnered with the private sector to pilot the collection of the shredded garden waste material for organic waste treatment into compost. The city also organised a workshop with external stakeholders to identify gaps, needs, and opportunities for the organic waste diversion from landfill in Tshwane. In 2024, the city intends to increase organic waste treatment by the private sector and to acquire the necessary infrastructure to support it.

Disposal emissions reduction

The city is committed to ensuring all residual waste is disposed of in a sanitary landfill to reduce waste emissions. The city also established a waste-to-energy task team to facilitate a new waste-to-energy project. In 2023, the city planned to advertise a request for information to assist the city with the appointment of companies to implement landfill gas capture and gas extraction projects.

SIGNATORY CITIES IN

LATIN AMERICA

© anibaltrejo / Getty Images

BUENOS AIRES

ARGENTINA

Universal collection

Buenos Aires provides universal two-stream collection of general waste and recyclable materials to all residents and businesses. General waste is collected through more than 29,000 black or grey containers placed on streets throughout the city. These containers are lifted by specialised trucks during the night and the material is taken to three transfer stations. From there the waste is transported to the landfill. Recyclable materials are collected in more than 4,500 green containers located on the streets throughout the city, as well as by 4,042 urban collectors that carry out door-to-door collection. Recyclables are then processed in 16 Green Centers.

The city has been developing different organic waste collection programmes, with more than 60 reception points installed in different parks and squares where residents can drop-off their organic waste. Buenos Aires also began a pilot test for home collection of organic waste within the last year. Currently, organic waste is being collected from 30 buildings, with more than 600 units. These efforts are accompanied by environmental education through public awareness and training campaigns.

Organic waste treatment

In 2023, the city continued the treatment of organic waste collected from the 60 drop-off material reception points. The city currently has a daily treatment capacity of 30 tons at its organic waste treatment plant, and 40 tons of green waste at the city's composting centres. By early 2024, the daily processing capacity of the organic waste treatment plant will be increased to 40 tons. The city is also currently reviewing options for either a composting or biodigestion plant, to treat organic waste collected from households through a large-scale collection plan that will be fully implemented by 2033.

Disposal emissions reduction

By focusing on upscaling organic waste collection and treatment capacity in the next ten years, Buenos Aires intends to significantly reduce its waste emissions by 2033.


© Daniel Jacobsen_EyeEm / Getty Images

CURITIBA

BRAZIL

Universal collection

The City of Curitiba provides universal waste collection for five different waste streams: domestic rubbish, recyclables, toxic waste, electronic waste, and organic/plant waste. The city has renewed its contract for waste collection, transport, and handling, as well as public sanitation. It has also reviewed its Municipal Integrated Solid Waste Management Plan and implemented new recycling points. Curitiba recycles up to 23% of its waste. By increasing its recycling rate to a 85% target, the current remaining landfill lifespan can be extended beyond 2030 to 2058.

Organic waste treatment

As universal segregated collection is already in place, Curitiba plans to now focus on the treatment of various waste flows, in particular organic waste. To increase organic waste collection and treatment, the city uses environmental education and training to increase public awareness on the topic. The city launched the Domestic Compost Programme at Ecopoints, which are public locations where small volumes of organic waste can be handed in voluntarily. The caretaker receives the organic waste, inspects and weighs the material and puts it into the composter. When the compost is ready, the product is distributed to the community.

In addition, the Municipal Composting Programme (PMUC) was presented and approved at the Municipal Council for the Environment. In the second stage of the PMUC, scheduled for the end of 2024, a municipal composting yard will be implemented to process organic waste from street markets, municipal public markets and other generators, giving scalability to the programme. In the third stage, the PMUC will be expanded to municipal schools and other public institutions. The Municipal Composting Programme will have a control mechanism to measure the quantity of organic products deviated from landfill.

Disposal emissions reduction

Curitiba's organic waste treatment expansion efforts will greatly reduce the city's waste emissions. Curitiba's PlanClima, its climate crisis mitigation and adaptation strategy, estimates an ambitious scenario reduction of around 25,000 tCO_2e by diverting organic waste from landfill. This represents 28% of emissions compared to the base year, 2016.

The city's emissions inventory shows emissions of 90,910 tCO_2e from landfill sites. In the Extended Scenario to 2030, the emissions reduction goal from deviating organics from landfill is 40,000 tCO_2e. Additionally, the scenario foresees a reduction of around 20,000 tCO_2e due to reduced waste generation. Therefore, the total reduction in emissions could reach approximately 65.7% of emissions from the base year.

Curitiba has also launched a public call for accreditation for the treatment of solid waste from consortium municipalities, and final disposal of waste in landfills. The landfill site that receives the largest amount of waste from the city is subject to studies to licence the use of biomethane generated. At present, around 60% of the gas is used to generate electricity.

Finally, in March 2023, Curitiba also officially launched its Solar Pyramid using photovoltaic cells (PV) on a deactivated landfill site in Caximba, on the city's southern outskirts. It is a landmark project representing the first solar plant to be built on a former landfill in Latin America.


© Victor Vargas / Getty Images

QUITO

ECUADOR

The Metropolitan District of Quito's (DMQ) Secretary of the Environment (SAQ) governs all waste management in the city. Based on the guidelines and vision of the current municipal administration, under the leadership of the SAQ, together with its affiliated companies, the Quito Metropolitan Public Cleaning Company (EMASEO EP) and the Metropolitan Public Company for Comprehensive Solid Waste Management (EMGIRS-EP), the DMQ has a new inclusive solid waste management model focused on waste prevention and reduction.

Universal collection

The efforts for the implementation of the DMQ Environmental Complex stand out. The EMASEO EP is the municipal institution in charge of cleaning public spaces in Quito, as well as collecting non-hazardous household and industrial solid waste. EMASEO EP collects and transports waste from the north, centre, south, and informal neighbourhoods of Quito. It works every day of the year to serve approximately 2.5 million residents.

Through home, curbside and containerised collection services, EMASEO EP collected around 88% of the total solid waste generated in 2023 – a 1% increase from the previous year. The city provides segregated collection and the recovery of recyclables through its clean collection points. The city has seen a 3% increase in the total amount of material recycled in 2023.

EMASEO EP also supports community clean-ups, known as mingas, to reduce flooding risks by keeping drains and riverways clean. Highlights include clean-ups of the watercourses El Carmen, Inchapicho and El Cebollar, and in the neighbourhood of Patrimonio Familiar. In September 2023, the company participated in the Zambiza-Cocotog megaminga, which involved manual waste sweeping and collection services for old furniture.

Aligned with the C40 Pathway Towards Zero Waste Accelerator, EMASEO EP's vision is to provide an exemplary solid waste management service by 2027, through continuous

improvement and the implementation of technical, innovative, efficient, and inclusive processes that engage residents to promote responsible environmental practices. EMASEO EP is currently implementing a cleaning services optimisation project which will be complete by 2027; as well as a project to improve collection and transportation services financed with the State Bank, to be completed in 2024. This includes the replacement of an obsolete vehicle fleet; the replacement of old containers, and the acquisition of containers for recycling to improve household waste segregation and collection; and the use of renewable energy for the electrical equipment used to clean the Historic Centre of Quito.

Organic waste treatment and disposal emissions reduction

The El Inga sanitary landfill is close to reaching its operational end. Consequently, a diagnostic and feasibility study of city-owned land for the development of the new DMQ Environmental Complex was completed in April 2023. The study identified a property with an area of 119.5 hectares to create an Environmental Complex including a landfill with a lifespan of 20 years. The EMGIRS-EP is in the process of identifying a partner to implement more efficient waste management practices including automated processes, and improved efficiency in the segregation and treatment of materials to reduce the amount of waste sent to landfill.

Within the minimum infrastructure requirements for the new development, there is a composting plant with a minimum capacity of 50 tonnes per day (2.5% of the total municipal solid waste generation in the DMQ) to treat organic waste. This plant will receive waste from the city's wholesale market and other smaller markets throughout the city.

© Marcelo Nacinovic / Getty Images

RIO DE JANEIRO

BRAZIL

Universal collection

The Municipal Urban Cleaning Company of Rio de Janeiro (Comlurb) provides universal collection coverage to the city's residents. Comlurb also collects recyclable materials from households in 122 neighbourhoods, with door-to-door collection once a week on alternating days. All collected materials are delivered to 28 cooperatives of informal waste workers who sort and sell the products.

The Municipal Department of Social Action also promotes the Recicla Comunidade programme, which offers informal settlement residents income generating waste management opportunities. Participants receive a card credited with the value of the recyclable materials they have delivered to collection points. This credit can then be used at local businesses engaged in the initiative. The Recicla Communidade not only promotes more sustainable waste management but also strengthens the economy and provides economic mobility, particularly for women engaged in the programme.

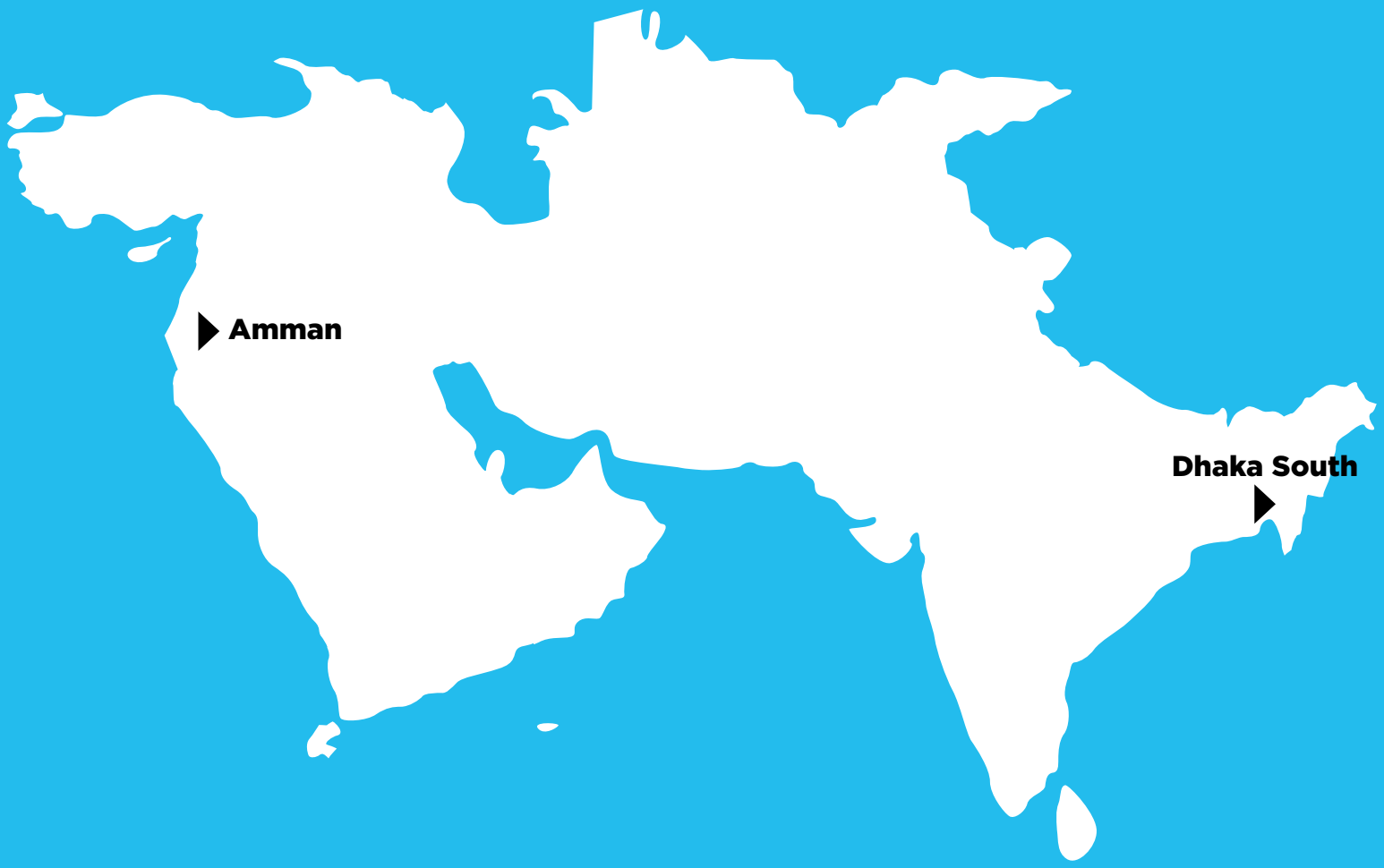
Organic waste treatment

Comlurb also manages the Caju Ecopark responsible for processing approximately 850 tons of organic waste per month. The Caju Ecopark is based on the concept of a circular economy for organic waste. Food waste is collected from municipal schools and supermarkets and treated using biomethanisation and composting. Organic waste is transformed into biogas – a valuable resource used for electricity generation, and organic compost – used in urban gardens and soil restoration. In addition to organic waste treatment, the facility has a mechanical processing unit for the city's pruning waste, that produces biomass suitable for co-processing in the ceramic industry. The Ecopark will also launch a food bank, with a mission to donate surplus, unsold food from supermarkets to people experiencing food insecurity and socioeconomic hardship, particularly in areas that are vulnerable to the impacts of the climate crisis.

Rio de Janeiro has set an ambitious goal to treat 30% of organic waste produced in the city. Comlurb has been studying the technical and economic feasibility of expanding biomethanisation and composting processes and has been encouraging the activities of companies involved in the collection and treatment of household organic waste, such as Ciclo Orgânico, Casca, and Compostaê.

Disposal emissions reduction

To reduce waste emissions, Rio de Janeiro closed its largest landfill, Gramacho, 11 years ago. Since then, the city has been committed to mitigating the environmental impacts and environmental restoration of this closed landfill. Currently, the municipality disposes of urban solid waste in a modern sanitary landfill, equipped with processes for treating leachate and harnessing biogas for electricity and renewable fuel (biomethane). These actions aim to ensure the reduction of greenhouse gas emissions and more sustainable waste management in the city of Rio de Janeiro.



SIGNATORY CITIES IN

SOUTH AND WEST ASIA

© Emad Aljumah / Getty Images

AMMAN

JORDAN

From 2024, the Amman Vision for Waste Recycling and Treatment, a private company owned by the Greater Amman Municipality (GAM), will conduct solid waste management for the city in partnership with the private sector.

Universal collection

To improve segregated waste collection and recycling efforts, the Mayor of Amman Yousef Shawarbeh launched the Strategic Framework for Solid Waste Recycling in the Commercial Sector in February 2023, with the support of the United States Agency for International Development (USAID). In addition, GAM and key partners cooperated in implementing a behaviour change communication strategy to reduce waste generation in the commercial sector by promoting the benefits of recycling. GAM is also in the process of reviewing the city's waste collection fees for the commercial sector to standardise them. As a result of these various efforts, relationships between private sector recyclers and waste generators have improved.

To support the informal waste workers that contribute to waste collection and recycling efforts, GAM co-sponsored a Waste Picker Training and Certification Programme, targeting 1,800 people by 2025. To date 1,000 people have been trained, of which 88 are women. The city issued new instructions to support the organisation of informal workers and integrate them into the city's solid waste management and will implement them between 2023 and 2026. GAM has also allocated an administrative unit to organise the informal sector and integrate waste pickers into recycling value chains ensuring continuity of training and granting the necessary work certificates and permits. The city also reviewed the licence fees to standardise the process for registering recycling companies, to help improve the legal recognition of certified waste collectors.

GAM currently operates three sorting at source projects that collects up to 1,000 tons of annual recyclable waste. In 2024, the number of projects will double through three new pilots, to add an additional 3,000 tons of recycling annually. The city will also pilot two recycling banks using a trash-to-cash mechanism, to improve the livelihoods of informal workers and increase recycling. These two locations are expected to be in operation in the third quarter of 2024 and will collect up to 15,000 tons of recyclable waste annually. By the end of 2024, the city will have capacity to deal with 19,000 tons of recyclable waste annually.

Organic waste treatment

GAM has several projects underway to support organic waste treatment. In September 2023, Amman invited tenders to upgrade Al-Shaer Solid Waste Transfer Station to increase its capacity, taking into account the environmental and social conditions in the area surrounding the station. The city is also working on a composting project with the German Agency for International Cooperation (GIZ), through which infrastructure in the Ghabawi landfill will be upscaled to collect organic waste from vegetable markets and horse manure from the royal stables.

The facility will be in operation in the first quarter of 2024. Amman is also encouraging organic waste treatment in the commercial sector through an ongoing project, in partnership with Chemonics and USAID, that will capture success stories for organic waste recycling.

Disposal emissions reduction

To reduce waste emissions, and in addition to the organic waste treatment initiatives already mentioned, the city has capped Cell 5 of Ghabawi Landfill in order to capture landfill gas, with a capacity of 6.5 million tons of municipal solid waste. This will be connected to a gas and electricity system in 2024. Cell 6 started operating in the third quarter of 2023. The city also opened the tender to install a gas engine facility for landfill gas in November 2023 to raise the capacity from 4.8 MWh to 7.8 MWh by purchasing and installing another two gas turbines in 2024.

Suha Shishani
Manager of the Environmental Projects, Amman

"As a city official committed to environmental sustainability, I am proud to participate in and lead initiatives aligning with the C40 Pathway Towards Zero Waste. Through innovative pilot projects and community engagement, we're shaping a future where waste is minimised and resources are maximised. Together, we're not just managing waste, we're transforming our city into a model of environmental stewardship for other cities in the region."

© Jeremy Woodhouse / Getty Images

DHAKA SOUTH

BANGLADESH

Dhaka South uses a ward-based approach to improve the efficiency of solid waste management in the city. Offices in each ward have been upgraded to handle solid waste management in addition to sanitation. These offices are responsible for safety education for cleaners, safety and sanitation committees, public awareness raising, and the improvement of waste collection services in each ward. These offices introduce new collection systems and engage the community to help improve the sanitary conditions and efficiency of waste collection.

Universal collection

According to the New Clean Dhaka Master Plan (2018–2032), Dhaka South City Corporation (DSCC) currently collects 80% of solid waste and aims to increase collection. This will be done by establishing at least seven new secondary transfer stations (STS) and upgrading at least 20 existing ones. The city will also procure at least 60 heavy vehicles and accessories for waste collection.

Organic waste treatment

The same plan outlines goals for the treatment of organic waste. By 2025, 150 tons of organic waste will be composted per day in the composting plant, while an additional 100 tons per day will be treated in the biogas plant of Matuail eco-town. To reach these goals, the city intends to develop intermittent facilities and identified investors will be approached for public-private partnership activities.

Disposal emissions reduction

Matuail landfill site is the only formal landfill site for the city, located about 4.4 km east of the DSCC headquarters. Waste dumping in Matuail started in 1993 and improved afterwards from an open dumping site to a sanitary landfill in 2007, the first sanitary landfill site in Bangladesh. To improve the treatment of organic waste and reduce the city's waste emissions, Dhaka South intends to run a pilot project for at-source waste segregation and build a material recovery facility.

BARRIERS TO ACHIEVE THE COMMITMENTS

One barrier frequently cited by cities is challenges in waste management infrastructure – ranging from challenges in maintenance, upgrade, or replacement, and particularly for collection, organic waste treatment and sanitary disposal. Some cities also expressed an urgent need for infrastructure that would allow them to accelerate the decommission of overburdened disposal sites and progress towards a near zero waste future.

Cities highlighted the need to improve data systems across waste operations to help confirm baselines, conduct technical and economic feasibility studies, inform planning of the most appropriate solutions for each case, develop business plans, manage waste systems, and monitor progress towards meeting the pathway commitments. Data systems can also place equity at the heart of waste actions by mapping the impacts of improved waste management across cities.

Signatories also stressed the importance of developing and implementing clear information products (including research, training and business models), along with climate crisis communication strategies and related waste activities. Together, these will help raise the awareness and capacity of:

- Political leaders – who are setting agendas and creating waste policies
- The general public – to improve responsible participation in waste segregation and collection
- Waste workers, including informal waste workers – to improve waste handling and consequently the quality of recyclables, to improve the competitiveness and price of recyclable materials


© South_agency / Getty Images

- Waste managers – to be able to handle all aspects of waste management in cities effectively, as well as manage project and financial feasibility studies, planning development and implementation of future projects

Cities also stressed the need to develop incentives and other enforcing mechanisms for various stakeholder groups to improve climate-relevant waste management efforts, whether for segregation, collection or treatment.

Finally, striving for equity and inclusion should be at the heart of all waste-related climate action. A sustainable waste system is an inclusive system that also creates good green jobs. Cities mentioned the need and planned efforts to ensure waste services reach underserved areas in cities, while also acknowledging the critical role of the informal sector in providing skills and experience to cities waste management efforts. This presents an opportunity for a just transition in the waste sector, through which cities can engage informal workers and support them with training, equipment and formal recognition, to ultimately integrate them into the waste management services of the city, and in so doing, create good green jobs.

CONCLUSION

Although the C40 Pathway Towards Zero Waste was created a little more than a year ago, some cities have already reported extraordinary progress and leadership, with all signatories mapping out ambitious evidence-based steps to reach the pathway commitments by 2030. This report is a useful resource that demonstrates the progress cities are galvanising. Key lessons from the signatory cities will be packaged and shared across the C40 Sustainable Waste Systems network to inspire and support other member cities to follow suit.

As a peer-to-peer platform, the C40 Sustainable Waste Systems network is a key support mechanism for C40 cities to engage, collaborate, and deliver on their equity and waste-related climate goals. The network convenes senior strategic and technical staff from C40 cities to share challenges and best practices that accelerate the implementation of sustainable waste systems.

In addition to lessons from global cities, the network captures and shares lessons from C40's regional technical assistance programmes on waste (Climate Action Implementation and Transforming Cities Waste Management), which offer support to identified cities in Africa and India. The network also collaborates with other C40 initiatives such as the C40 Inclusive Climate Action Forum and the C40 Climate Finance Facility, to share specific tools that accelerate economically viable, inclusive and equitable waste-related climate action.

Through this first reporting cycle, signatories highlighted key barriers to meeting the pathway commitments. These barriers have informed the 2024 focus areas for the network, with an overarching goal to support member cities to reduce and prevent future waste-related methane


© Alistair Berg / Getty Images

emissions by effectively collecting, treating and diverting organic waste from landfill in an inclusive way. Focus areas will include the identification of the most appropriate organic waste treatment infrastructure and the development of effective waste monitoring systems.

Strongly related to the waste infrastructure need for cities, and as important, is fulfilling waste-related finance needs. This starts with operating expenditure for comprehensive planning and budgeting for infrastructure and operations, followed by securing funding. To establish reliable data monitoring systems of the quantity and composition of waste, capacity building of waste managers across the system is also imperative.

The C40 Pathway Towards Zero Waste has created a platform for leading mayors of cities in the Global South, to champion sustainable waste management that reduces methane emissions. C40 will continue to support and collaborate with signatory and network member cities, to advance together towards cleaner, healthier, more resilient and inclusive cities through sustainable waste management.


C40
CITIES