NO TIME TO WASTE

Improving waste management in African cities

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ICLEI Local Governments for Sustainability AFRICA

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About ICLEI
ICLEI - Local Governments for Sustainability is a global network of more than 2,500 local and regional governments committed to sustainable urban development. Active in 125+ countries, we influence sustainability policy and drive local action for zero emission, nature-based, equitable, resilient and circular development.

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Foreword

Across Africa, our cities are expanding at a remarkable pace. By 2050, the continent's urban population is expected to more than double, reaching 1.5 billion people. As cities grow, so too does consumption, and with it, the challenge of managing the waste we produce. Today, African cities generate over 125 million tonnes of municipal solid waste annually, a figure projected to more than double by mid-century, but for many citizens, unmanaged waste is not a distant statistic, it is a daily reality.

Waste is connected to every aspect of sustainable urban development. It affects water quality, public health, infrastructure, tourism and the dignity of our communities. It shapes how our children play, how our markets operate, and how resilient our cities are to floods and disease. When poorly managed, it also contributes significantly to climate change, as open dumping and burning release harmful greenhouse gases. Addressing waste is therefore not optional; it is fundamental to building sustainable, climate-resilient and inclusive cities across Africa.

This report, No Time to Waste, comes at a pivotal moment. It speaks directly to the African context, where waste streams are rich in organics, landfills are at the point of collapse, municipal budgets are constrained, and the costs of imported "one-size-fits-all" solutions are too often borne by cities that can least afford them. The report makes a compelling case for African solutions to African realities, approaches that reflect our cities' scale, resource base, and social and economic fabric. It shows that progress will come through contextual, decentralised systems supported by regional coordination and financial aggregation, enabling cities to scale solutions and attract investment. If structured well, these systems can create jobs, nurture local enterprises, and build circular value chains that benefit both people and planet.

For ICLEI Africa, this work is central to our mission: To build sustainable, low-emission, and nature-positive cities that offer healthy and dignified lives for all. Waste is not a peripheral issue, it lies at the heart of urban wellbeing, climate action and resilience. We are proud to have developed this timely report and stand ready to work with governments, financiers and communities to translate its insights into action.

Waste management can no longer wait. With the right vision, coordination and investment, Africa's cities can lead a new generation of climate-smart, circular systems. The solutions exist; what is needed now is shared purpose and sustained commitment. Together, we can turn one of Africa's most pressing challenges into an opportunity for transformation.

Kobie Brand
Regional Director: ICLEI Africa

Executive summary

Solid waste management (SWM) is an essential and foundational public utility service and right, with clear benefits for public health, sanitation, and livelihoods, and serious consequences when neglected. In African cities, SWM plays a uniquely critical role, given rapid urbanisation, dense informal settlements, and high rates of unemployment. It is both an urgent need and low low-hanging fruit for addressing broad sustainability outcomes.

Throughout its wide network of member cities and partners, ICLEI Africa widely reports that across the continent, cities are calling for urgent and considered technical and financial support to strengthen solid waste management services. This is not only to reduce environmental harm, but to unlock job creation, improve public sanitation, and support local manufacturing.

ICLEI Africa confirms findings from the World Bank's What a Waste 2.0 and other reputable waste characterisation studies that in most African cities, waste collection is concentrated in core urban zones and reaches only around 40% of total waste generated. Recycling capacity, driven almost entirely by the informal sector and opportunistic recovery of rigid plastics and high-value recyclables, typically hovers at a dismal 4% to 7%.

Adding insult to injury, even where collection does occur, waste is often dumped in uncontrolled dumpsites nearing or exceeding designed airspace, with minimal environmental safeguards. Peri-urban and rural areas are frequently left out of formal collection systems altogether, lacking both land-use planning and basic waste infrastructure, leading to widespread environmental pollution and open dumping.

In this report, we provide clear focus areas for transformative action by local governments and their partners. Through deployment of these actions, the expected outcomes would include increased waste collection coverage and diversion from dumpsites; improved local capacity and financial sustainability of waste services; enhanced livelihood opportunities and social inclusion in the waste value chain; and practical scalable models for circular urban economies, linked to SDG 11, 12, and 13.

This report advocates for cities to regain control of foundational infrastructure, particularly unmanaged dumpsites, and to prioritise landfill remediation tools and approaches. The report further calls for the improvement and adoption of efficient, lower cost and iterative waste collection and transfer systems to achieve more equitable and sustainable service coverage.

For recycling and recovery, ICLEI Africa emphasises the need to harness partnerships with the private sector and to strengthen the enabling environment for the informal sector and SMEs. Municipal budgets across the continent are rarely able to support large-scale investment in waste recovery infrastructure, while dumpsites continue to deteriorate. Rather than attempt to shoulder this burden alone, municipalities should enable the private sector to lead, providing light-touch support through targeted investment in decentralised, low-cost and mobile waste management solutions such as modular transfer stations, mobile compactors, scalable off-grid recovery units, and technologies suited to local skill sets and municipal capacity.

For more ambitious infrastructure and service developments, this report highlights a number of less orthodox but smart financing mechanisms, along with targeted regulatory and bylaw reforms, to unlock greater private sector participation and support municipalities in further industrialising their waste economy. These include introducing cost-reflective tariffs and landfill tipping fees to give market actors a real incentive to divert waste from landfill, amending zoning regulations to enable service delivery in both low- and high-income areas, and providing subsidies and incentives for entrepreneurs to invest in the recycling and recovery sector — particularly for organic waste, which typically accounts for around 60 percent of the total waste stream in African cities. Such mechanisms are particularly important given changing fiscal realities, and international donor priorities placing increasing pressure on public budgets, as global finance increasingly shifts from grant-based aid toward performance-driven and blended investment models. In this evolving landscape, cities must demonstrate financial viability and regulatory readiness to attract funding.

Lastly, this report also presents a selection of case studies from ICLEI Africa's member and partner cities, where initial requests for funding and support often failed to align with local market conditions or municipal capacity. In these instances, ICLEI was able to redirect efforts toward more grounded, sustainable, and iterative solutions within municipal reach. These included support for bylaw and policy reform linked to Extended Producer Responsibility (EPR) and circular economy principles, appropriate waste management technologies and transfer infrastructure, and practical local solutions delivered through in-kind partnerships with existing stakeholders. Leveraging ICLEI's extensive network, the organisation successfully brokered relationships between municipalities, local partners, and private sector actors to enable impactful, scalable interventions.

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Abbreviations and acronyms

ACEA	African Circular Economy Alliance
ACEF	Africa Circular Economy Facility
AfDB	African Development Bank
BOT	Build-Operate-Transfer
BSF	Black Soldier Fly
CDM	Clean Development Mechanism
CE	Circular Economy
CERs	Certified Emission Reductions
DBO	Design-Build-Operate
DBSA	Development Bank of Southern Africa
DFI	Development Finance Institution
EPR	Extended Producer Responsibility
ESG	Environmental, Social, Governance
GCF	Green Climate Fund
GEF	Global Environment Facility (GEF)
IFC	International Finance Corporation
KOAFEC	Korea-Africa Economic Cooperation
KCCA	Kampala Capital City Authority
LMICs	Low- and Middle-Income Countries
MSW	Municipal Solid Waste
MTPD	Metric Tonnes per Day
NGOs	Non-Governmental Organisations
PAYT	Pay-as-you-throw
PPP	Public Private Partnership
RDF	Refuse Derived Fuel
SDG	Sustainable Development Goals
SMEs	Small and Medium-Sized Enterprises
SWM	Solid Waste Management
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNEP	United Nations Environment Programme

1. Introduction

One of the most frequent requests for support that ICLEI Africa receives from its membership of subnational governments is related to solid waste management. Given the mandate for refuse collection and environmental cleanliness, waste management typically falls directly within local government's mandate, thus holding a level of political certainty not afforded to many other sustainability priorities, which often straddle multiple disciplines. At the same time, waste often holds the most linkages with other urban sectors[1], meaning that if local governments get their waste management systems right, they are already improving a multitude of other developmental and sustainability priorities. Waste is also a sector that benefits from an abundance of theory and practice around the world, with many proven technologies, processes and systems that can provide insight and inspiration to local government.

That said, solid waste management (SWM) remains one of the most under-resourced yet essential urban services across African cities. For instance, a recent meta-analysis found that waste collection and coverage rates average only about 65–67% in Sub-Saharan African cities[2], leaving large volumes of waste uncollected and unmanaged. As rapid urbanisation outpaces infrastructure investment and institutional capacity, the waste challenge is growing more visible and urgent. African cities have experienced roughly 3.5% annual population growth over the past two decades; urban residents now make up about 50% of the population and are projected to reach ~60% by 2050[3]. From overflowing landfills to open dumping and burning, the impacts of unmanaged waste are being felt across public health, the environment, and local economies. Indeed, it is estimated that roughly 90% of waste in Africa is disposed of in uncontrolled dumpsites or openly burned[4], exacerbating pollution, greenhouse gas emissions, and disease vectors.

Although many African cities have developed ambitious plans to tackle waste (from large-scale recycling centres to waste-to-energy projects), the reality on the ground often tells a different story. Fragmented service delivery, constrained municipal budgets, and underdeveloped regulatory frameworks make implementation difficult. For example, Accra (population ~2 million) generates ~900,000 tonnes of solid waste per year, yet only ~70% is collected, while informal workers account for over half of all waste pickups[5]. Similarly, Lagos State (23 million people) produces about 5.46 million tonnes of waste annually[6], and Nairobi (~4.4 million people) generates ~2,400 tonnes of waste per day[7], but these cities still struggle to provide reliable collection to all areas. In practice, waste budgets consume a large share of municipal resources (often 20–50% of city budgets[8]), yet formal collection often excludes poor and remote neighbourhoods. Informal settlements are frequently omitted from municipal services[9], and where collection exists, it tends to focus on basic pickup and landfill disposal rather than recycling or reuse. Basic collection services are still not universally available, especially in peri-urban and informal areas, reinforcing a linear "take–throw" system.

Meanwhile, the vast majority of waste generated is organic (food and yard waste), often cited around 50 to 60% of MSW, and is wet, acidic, and quickly putrescible. This composition,

combined with limited source separation and high contamination of recoverable materials, makes most streams unattractive for private-sector recovery. For example, Addis Ababa's waste stream is roughly 60% organic, yet only about 5% of the city's waste is recycled, and another 5% composted[10]. With valuable recyclables mixed with high-moisture organics, the marketable fraction is low. The result is a systemic mismatch between cities' high goals and what the private sector can profitably support, given current waste quality and volumes. In practice, cities often aim for advanced recycling technologies; however, the available waste is primarily low-grade organics and plastics with little value, and municipalities lack the capacity to bridge the gap in the short term.

Rather than advocating one-size-fits-all solutions or overengineered infrastructure, this report highlights practical, scalable models that can succeed in resource-constrained environments. It draws on a thorough review of international best practice (including UN and World Bank findings) and ICLEI Africa's own field experience across the continent to identify what works, where, and why. The focus is on shifting from idealistic plans to on-the-ground action and viable business models, such as decentralised collection networks, community recycling cooperatives, and modular composting schemes – all of which have demonstrated success in African contexts. By learning from programmes like UN-Habitat's Waste Wise Cities and other local initiatives, cities can develop incremental, locally-led strategies that turn waste management challenges into economic and environmental opportunities. While challenges are profound, cities across Africa are rethinking waste as a resource stream, and are increasingly taking on simple yet effective approaches to manage and valorise waste.

Based on insights drawn from deep engagement with local, subnational and national governments across the continent, and presented in this report, we recommend a suite of policies and interventions, summarised below. The table provides an overview of the actions proposed in each focus area:

No Time to Waste – Action Matrix

Focus areas	Proposed actions	Unpacked in report sections
Governance and institutional foundations	• Strengthen local government capacity for integrated planning, data management, and regulation. • Clarify mandates and improve bylaw enforcement to ensure equitable service coverage. • Promote resource pooling across sectors and departments by demonstrating linkages with other local government mandates, such as health, climate, nature, transport and public realm interventions. • Build multi-level coordination between local, national, and regional governments to ensure supportive and enabling legislative and economic environment for local action. • Institutionalise the inclusion of informal waste workers and private actors in service delivery.	1, 2, 3.4, 6
Infrastructure and service delivery transformation	• Prioritise low-cost, modular, and distributed infrastructure (e.g., transfer stations, compost hubs, BSF units). • Rehabilitate or close unsafe dumpsites and develop small-scale, decentralised treatment facilities. • Adopt context-appropriate technologies suited to local skillsets and material characteristics. • Integrate logistics optimisation and data-driven planning to improve efficiency.	2.1–2.2, 4
Financing and market enablement	• Introduce cost-reflective tariffs, tipping fees, and cross-subsidisation mechanisms. • Implement Extended Producer Responsibility (EPR) schemes and green procurement policies. • Mobilise blended finance—combining municipal revenues, donor grants, and climate funds. • Foster inclusive public-private partnerships (PPPs) and SME participation in recycling and recovery.	5, 6.2
Social and economic inclusion, and planetary health	• Formalise and empower the informal sector through cooperatives, contracts, and training. • Create green livelihood opportunities through small-scale recovery, repair, and composting enterprises. • Embed gender and youth equity in waste management systems. • Enhance community awareness, participation, and accountability in waste separation, service monitoring and ending open waste burning. • Making linkages across sectors for the promotion of environmental and human health through reducing waste generation, flooding, disease vectors and environmental pollution.	2.3, 2.4
Innovation, learning and circular transition	• Pilot innovative and adaptive technologies (e.g., BSF composting, digital tracking, waste-to-product start-ups). • Facilitate peer learning and Communities of Practice across cities. • Develop bankable project pipelines linking pilots to scaled implementation. • Integrate circular economy principles into city climate and development plans. • Monitor and evaluate through outcome-based metrics: diversion rates, job creation, emissions reduction, and revenue generation.	3, 5.3, 6

ICLEI Africa deploys these actions through a tiered approach, contextualising these actions in cities based on their size, economic profile, and current policy and infrastructure assets. Deeper insights on these actions, as well as ICLEI Africa's orientation to waste management, are articulated throughout this report[11];

2. Insights and lessons on waste management in African cities

Despite growing political attention and municipal ambition, African cities continue to face deeply rooted systemic challenges in waste management that undermine both public service delivery and private-sector participation. Most municipal systems remain focused on basic collection and disposal, with little emphasis on diversion, recovery, or circularity. This is not due to a lack of will, but a lack of enabling infrastructure, regulatory incentives, and cross-sectoral coordination. Insights from ICLEI Africa's ongoing programming and member cities, reveal four core bottlenecks hindering progress, along with examples of how they can be addressed.

2.1 Current collection rates and dumpsites

Current urban waste collection systems are generally inadequate. Studies report SSA-wide collection in the 40 to 65% range[12], with recent city figures often in the low end of that range. For example, Kampala's capital authority (KCCA) collected roughly 1,200 of 2,500 tonnes generated daily (≈48%) as of 2024[13], with private contractors handling most loads. By contrast, Kisumu's municipal data estimate only 25% coverage[14]. The fiscal shortfall is severe: many households in low-income areas pay nothing for service, and municipalities devote 75 to 100% of SWM budgets to mere collection and haulage, leaving little for treatment or expansion[15].

The uncollected remainder is routinely burned or dumped in informal sites. Across the continent, over 90% of waste is disposed of in unregulated landfills or open dumps. These "black spot" dumps (19 of the world's 50 largest dumpsites are in Africa[16]) create health and environmental hazards. For example, Kampala's 2011–12 data show that ~40% of generated waste (≈28,000 tonnes/month) reached Kiteezi landfill, with the rest illegally dumped[17]. In Freetown, only ~30% of waste reached legal disposal in 2019[18]. The overall result is that African cities routinely "battle pollution" from uncollected waste piling up in markets, streets, or drainage channels. Weak finance and governance exacerbate the problem: many governments underinvest in operations, and fragmented service areas result in inequitable coverage.

2.2 State of decentralised infrastructure

Most African cities lack intermediate processing facilities (transfer stations, sorting centres, composters, etc.). The existing waste infrastructure is either heavily centralised (e.g. represented by a singular municipal sanctioned legal dumping ground–an uncontrolled dumpsite) or absent all together. For example, a Kanifing case study notes, "the city has no transfer stations, and there are no official systems or facilities for waste separation and recycling"[19]. Similarly, an ODI review observes that many city councils have only raw dumps with little infrastructure beyond "a few inadequately maintained landfills", and that formal recycling systems are essentially non-existent. Incomplete networks force reliance on distant landfills, as waste is carted out of the city with few or no local drop-off points, thereby raising transport costs. In response, some cities have begun building transfer hubs; Freetown, for instance, has opened six transfer stations (for tricycle-based collection) to reduce travel time and expand coverage.

In general, decentralised collection and processing are undeveloped. Most organic waste, for example, is sent directly to the dump, even though it often accounts for more than 60% of the stream. Few urban areas have composting or anaerobic digestion, and little door-to-door segregation. Budget and planning constraints contribute to a lack of effective waste management systems that support segregation, recycling, reduction, and reuse, as well as limited budgets for infrastructure. The result is that each city's SWM rests on an underbuilt backbone of dumps and trucks, with minimal processing, a system ill-suited for modern sustainability or of prospective interest to private investors and local entrepreneurs who could help shoulder the burden for the municipality.

2.3 Unlocking the private sector's role in waste management

ICLEI Africa notes that the private sector's role in solid waste collection and disposal services as well as in the recycling sector is often marginal, fragmented, or poorly coordinated – in this way it is ready for structured partnerships.

In the solid waste collections and public utility service delivery space, while many cities contract out collection or processing, companies frequently operate in isolation or under weak contracts. For instance, Kampala's experience shows a "dilemma" in regulation: stringent rules favour formal firms, yet informal collectors actually do most service in unplanned settlements[20]. This disconnect means that over 60% of Kampala households may not pay for or formally receive a service, even as municipal authorities have formal contracts.

Even where formal private companies work, cost-recovery problems abound. In Freetown, the municipal council discovered that tipping fees were set so low (about US$6 per full truckload) that large contractors essentially dumped for free or had no incentive to divert waste from landfill or recycle[21]. The city's largest private operator paid a flat fee (~$231/month) regardless of volume, creating a subsidy that the city deemed "overly

beneficial to the private sector". In effect, neither side had sufficient incentive: companies underbid to win contracts, while councils lacked funds to enforce standards or expand services. Coordination is also weak: private firms may cover or cherry pick only select routes or neighbourhoods with a higher propensity to pay (or pay more), leaving unplanned settlements and the urban poor without a public or private sector rendered service.

In the recycling and recovery value chain, ICLEI Africa observed that diversion and processing capacity is overwhelmingly driven and owned by fast-moving consumer goods (FMCG) manufacturers seeking raw, non-virgin feedstocks. These market systems result in a narrow and opportunistic value offering, with minimal actual diversion from landfill. Fees are typically paid only for a small basket of desirable waste commodities, particularly rigid plastics (PET, HDPE, PP), clean and dry paper and fibres (OCC, K4, HL1), whole glass bottles, and ferrous and non-ferrous metals.

This commodity trade largely operates on a business-to-business basis, between large-scale waste producers with uniform waste streams, waste reclaimers and FMCG manufacturers seeking cheaper alternatives to costly petrochemical or fibre imports. Notably, ICLEI Africa found that these market-driven recycling flows are almost entirely absent of government involvement, with little to no public subsidies or in-kind support, despite the fact that these actors often represent the continent's largest recycling capacity and force.

Due to recycling taking place through a largely opportunistic and free-market lens, ICLEI Africa has observed significant variation in how recycling capacity and stakeholders function across different African cities. In Dar es Salaam, Nairobi, and Kampala, the mega-cities and industrial hubs of East Africa, robust and competitive recycling systems exist for a wide range of waste commodities. These cities have managed to divert meaningful quantities of waste from landfill, despite little to no reported government involvement or support.

In contrast, cities like Windhoek, Walvis Bay, Harare, and Maputo have some recycling capacity, but operate within more volatile, thinner-margin value chains that rely heavily on the strength and purchasing appetite of South African industry for waste commodities. Lastly, in countries such as Rwanda, Sierra Leone, and Zambia, even basic rigid plastic recycling remains limited. Despite strong political will, the absence of local FMCG manufacturing, weak private sector demand, and a lack of critical mass have all contributed to poor recycling opportunities.

These contrasting systems between municipal solid waste management public utility services and the recycling value chain highlight how opportunistic, fragmented, and largely uncoordinated the waste sector remains across much of Africa. Yet they also reveal clear opportunities for improvement. In many cases, the largest recycling and recovery actors operate in complete isolation from municipal waste systems. With targeted programmatic support, such as that provided by ICLEI Africa, there is strong potential for progress through affordable, in-kind reforms, improved bylaws, and practical partnerships grounded in local realities.

2.4 Feedstock reliability and policy support: Foundations for a thriving waste economy

The recycling value chain across many African cities operates as an ungoverned and opportunistic "wild west," led largely by private actors responding to short-term commodity demand. At the same time, governments offer little incentive to intervene, with uncontrolled dumpsites remaining free to use, there is no tipping fee or regulatory mechanism to discourage dumping. This creates the perfect storm: a volatile and unreliable supply of waste for prospective recyclers and investors, undermining efforts to build more stable and impactful recycling systems. Yet with light-touch, practical reforms, this system could evolve into a complementary public utility service that supports economic development and environmental goals.

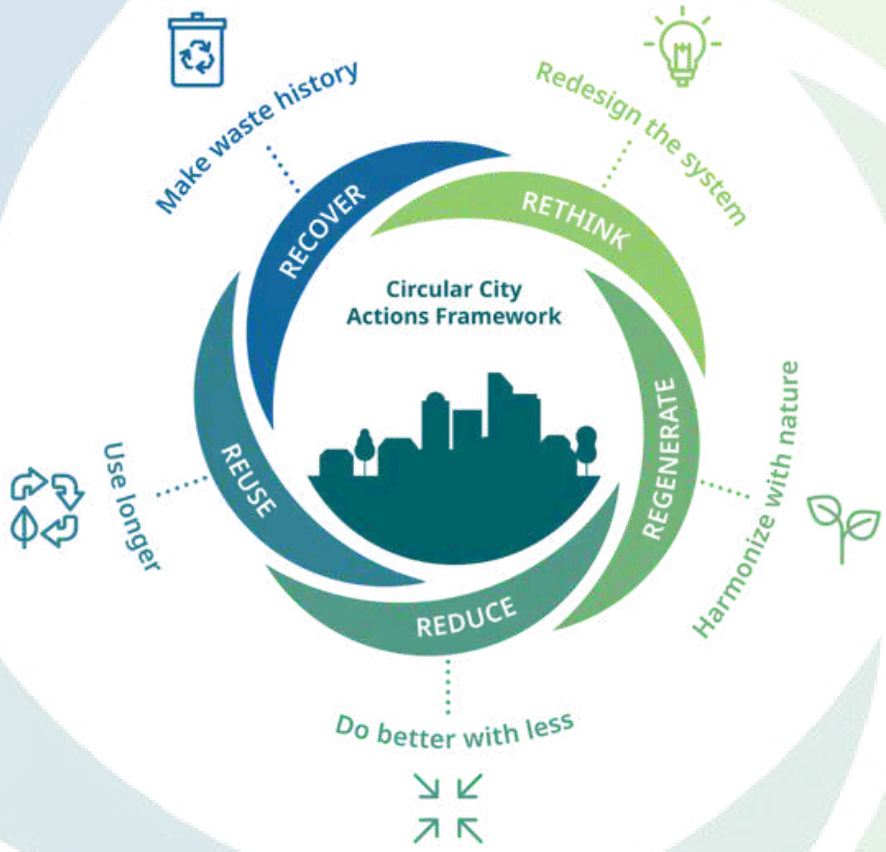
Larger, more capital-intensive investments such as composting facilities, MRFs, refuse-derived fuel production, or waste-to-energy plants require consistent, well-managed waste streams that only municipalities can realistically deliver. However, evidence shows that municipal authorities often lack meaningful control over these flows. As a result, valuable materials are routinely lost to uncontrolled dumping, open burning, or underutilisation.

ICLEI Africa's work points to a more grounded approach. Prioritising investments in logistics, waste transfer infrastructure, and basic operational governance may offer more immediate and sustainable impacts than large, capital-heavy facilities that assume waste conditions which simply don't yet exist. Simpler approaches, in enhanced stakeholder engagement and collaboration, could also lead to more meaningful and strategic approaches to public utility service delivery and recycling capacity.

3. Circular economy principles and bankability

The circular economy (CE) is a model of sustainable production and consumption that minimises waste by keeping products and materials in use through reuse, repair, recycling, and "closing the loop"[22]. Rather than the linear "take-make-dispose" model, the circular approach designs products for long life, disassembly, and material recovery, thus reducing resource extraction and pollution. ICLEI advocates for the localisation of CE principle through the Circular Cities Actions Framework that presents five principles for circularity transition that engage with local government mandates.

Circular Cities Actions Framework:



In African development, CE is now seen as a prerequisite for a sustainable economy: it underpins climate mitigation and adaptation goals while creating jobs and improving competitiveness[23]. For example, a recent analysis notes that CE practices in Africa have "vast potential to create jobs and improve productivity," reinforcing both environmental sustainability and economic competitiveness. The African Circular Economy Alliance (ACEA), a "government-led coalition of African countries", is promoting the development of national circular economy plans across the continent, while African Circular Economy Network is

mobilising private sector, entrepreneurs, civil society and consultancies around promoting circular economy knowledge and approaches. AfDB's Circular Economy Facility emphasises that CE offers "significant economic and social benefits" and supports climate action by reducing greenhouse gases, managing waste, conserving energy, and promoting sustainable consumption[24]. In practice, CE policies (such as reuse schemes, product-as-service models, repair networks, and recycling mandates) can directly advance Sustainable Development Goals (e.g., SDG 12 on responsible consumption and production) and local resilience against resource shocks.

CE proposes a system-wide transition that requires lifecycle thinking, design and monitoring, and upstream actions that are explicitly about preventing resources and products from becoming 'waste' in the first place. For example, circular economy approaches such as lifecycle procurement, design for modularity, quality or deconstruction, sharing economies and reuse systems, material substitution and natural regeneration are all aimed to reduce disposal culture and waste generation. By the time materials are discarded, or waste arrives in a jurisdiction, there is limited recourse for circularity; effective waste management principles and interventions become more important for reducing the impact of these wastes.

That said, applying CE principles to urban waste management can improve the bankability (i.e., financial, social, and environmental viability) of projects. By generating new revenue streams and cost savings, circular strategies strengthen financial viability. For example, instead of costly landfill disposal, organic waste can be converted via community composting or biodigesters into fertilizer and biogas for sale. At the same time, plastics can be collected and sold into recycling markets. These activities create economic value from waste, as International Finance Corporation highlights, "value creation from waste" is a core focus of major investors[25] and diversify a project's cash flow. Socially, circular waste projects often generate many jobs at the community level. In Durban, South Africa, a zero-waste composting initiative demonstrated that composting creates roughly three times as many jobs per ton of waste as landfilling or incineration[26], employing local youth in waste collection, sorting, and compost operations. The Warwick market composting pilot now plans to expand to multiple markets and is already "creating locally accessible jobs" while improving conditions for informal waste collectors. Environmentally, circular projects reduce pollution, greenhouse gas emissions, and public health risks. For instance, source-separated composting can prevent ~99% of landfill methane emissions. All these factors, diversified revenues from recycled products, job creation, and demonstrable climate benefits, make a project more attractive to investors and financiers who increasingly value ESG (environmental, social, governance) outcomes.

Nonetheless, significant barriers hinder financing of circular waste projects in low- and middle-income countries (LMICs). Many projects remain small, informal, or early-stage, making them "not bankable" by conventional lenders. For example, adaptation and circular ventures often face a "lack of bankable or investable projects" due to their innovative or early-stage nature and insufficient project preparation. It can be hard to bundle dozens of micro-scale initiatives (e.g., community composters or plastic collection cooperatives) into a financeable portfolio. Weak planning data and fragmented waste streams add uncertainty to revenue forecasts, while underdeveloped capital markets in sub-Saharan Africa force reliance

on foreign-currency loans, exposing projects to exchange-rate and interest risks. Regulatory and policy gaps also raise perceived risk: without clear EPR laws, standards or purchase guarantees, lenders are wary. Complex due diligence and high upfront costs for pilot projects further impede access to commercial capital. In practice, most African municipalities lack creditworthy balance sheets, and many potential waste entrepreneurs have no credit history or collateral. These factors make even strong circular ideas "unbankable" without concessional or blended finance.

To overcome these barriers, development finance institutions (DFIs) and donors have begun to step in. The African Development Bank, for example, has established the Africa Circular Economy Facility (ACEF), a multi-donor trust fund, to catalyse CE projects. ACEF provides grants and technical assistance for capacity building, policy reform, and business development to "support the adoption and diffusion of circular practices" across Africa[27]. In practice, ACEF is funding national circular-economy roadmaps in many countries, including Benin, Cameroon, Chad, Ethiopia, and Uganda, in line with ACEA priorities. ACEF is also running an "AfriCircular Innovators" programme to grant seed capital and training to dozens of circular SMEs in Abidjan, Accra, and Kigali[28]. Similarly, the AfDB's Korea-Africa Economic Cooperation (KOAFEC) program is financing a green waste-management initiative in Algeria, Ethiopia, and Rwanda, aiming to demonstrate sustainable urban waste practices and unlock further public-private investment. International Environment Funds have also supported CE projects: the Global Environment Facility (GEF) co-finances circular economy interventions in African textiles and electronics. For instance, GEF grants are enabling multi-country projects to introduce cleaner chemistry and recycling in the textile industries of Lesotho, Madagascar, and South Africa, and UNEP/GEF is aiding Nigeria in designing a national extended producer responsibility policy for electronic waste. These cases show how blended public finance (grants, concessional loans, guarantees) can de-risk circular projects and make them bankable.

Beyond DFIs, green finance markets offer growing opportunities. African governments and cities have issued climate and sustainability bonds, and multilateral climate funds, such as the Green Climate Fund (GCF), are open to urban waste adaptation projects. For example, the GCF has approved preparatory funding for a "Waste Management Flagship Programme" led by the Development Bank of Southern Africa (DBSA)[29], indicating interest in leveraging GCF finance for large-scale waste initiatives. Likewise, the World Bank Group has supported numerous waste-sector reforms and has a portfolio of solid-waste and climate projects in Africa (e.g. its urban development and solutions-for-youth programs). At the same time, private climate finance is mobilising: IFC reports over USD 1.5 billion invested globally in waste-management projects (noting that many of these involve "value creation from waste")[30]. In summary, CE-aligned waste projects can tap a variety of green and development funds (from ACEF and GEF to green bonds and climate funds) – provided they meet the financiers' criteria and are well-structured.

4. Large-scale vs. decentralised approaches

Large-scale, centralised waste facilities (e.g., mega-landfills or incinerators) are often not feasible in African cities. Waste generation in many cities is diffuse, low-density, and dominated by high-moisture organic fractions. For example, Ghanaian officials note that about 60% of domestic waste is organic, with ~40% moisture, making high-temperature incineration inefficient (it requires extra fuel to evaporate moisture) and expensive[31]. The Accra Metropolitan Assembly warns that incineration "is not a good option" under such conditions, as it increases greenhouse gas emissions and can release toxic gases. In general, modern incinerators cost hundreds of millions of dollars to build and operate, locking cities into long-term payment schemes. Moreover, large plants produce very few local jobs: studies find incinerators create far fewer jobs than recycling or composting. The same holds for mega-landfills, which require extensive land, numerous trucks, and substantial maintenance budgets that many African municipalities lack. As a result, past efforts to import Northern-style waste technologies have often stalled or failed. Experts note that Northern incinerator designs face uncertain budgets, a lack of monitoring, and climate and waste conditions in the South that can render operations difficult or impossible. The experience of Accra and other cities confirms this: without heavy subsidies, centralised waste-to-energy projects may never generate returns, and can even undermine existing recycling networks.

In contrast, decentralised and mobile waste solutions can be far more practical and beneficial. Decentralised systems treat waste at or near its source, often on a community or neighbourhood scale, thereby avoiding the high transport costs and infrastructure needs associated with large plants. Mobile initiatives, such as waste collection trucks equipped with on-site baling or shredding units, can efficiently gather recyclables in informal settlements. At the same time, community-scale facilities (e.g., rooftop or market composters, containerised biodigesters, small anaerobic digesters) can handle organic waste locally. These approaches require far less capital and can be phased or scaled up gradually. For example, the Durban "Warwick Market" project turned market organics into compost on-site at the Botanic Gardens, utilising local labour and yielding nutrient-rich soil amendment without any landfill[32]. Such models are easily replicable: Durban plans to expand to all markets and even other cities because they save public funds and create locally accessible jobs. Similarly, Dow's Project REFLEX in Nigeria piloted collection kiosks and a mobile app to engage waste-pickers in gathering used drinking-water sachets. Communities returned plastic waste to local kiosks in exchange for groceries or cash, creating a reliable feedstock for recycled resins[33]. This decentralised reward system gave informal collectors a stake in recycling, improved waste capture rates, and even attracted further investment to build local plastics-processing capacity.

Taking a decentralised approach to waste processing technology allows integration with community-led waste collection and separation systems. An example of effective community-mobilised waste management is from Dar es Salaam and Arusha, Tanzania[34]; led

by Nipe Fagio, who promote zero-waste concepts, such initiatives have demonstrated that local collection cooperatives and ward-based micro-enterprises can achieve high recovery rates at minimal cost. These systems work because they combine social mobilisation with simple, modular technologies such as tricycle-based collection, transfer points, and small composting hubs that match local capacity and feedstock realities. By situating treatment closer to where waste is generated, transport costs and landfill burdens are reduced while livelihoods are created for women and youth in sorting and composting activities. This model naturally evolves toward low-cost, ward-based material recovery centres, where communities, SMEs, and municipalities jointly manage segregation, recycling, and organic processing—making the municipality's task of coordination and oversight easier while reducing waste burdens.

Another example of decentralisation is distributed biological treatment. Black soldier fly (BSF) composting has been tested in several African settings. In Nigeria, a joint farm incubation project trained farmers to raise BSF larvae on food scraps, producing high-protein livestock feed and organic compost[35]. Lab studies show that BSF treatment can reduce organic waste mass by 80–85% and simultaneously yield two valuable by-products (protein meal and fertilizer), making it an "economically viable" solution even at moderate scale[36]. This semi-centralised model, where a small central facility breeds larvae and many local units process waste, promises low transport cost and high flexibility. Other low-cost circular technologies include community worm-composting huts, small-scale biogas digesters (for cooking fuel from slurry), and "refuse" practices like turning plastic into bricks or mining landfills for recyclables. All are suited to dense urban areas and can be managed by local entrepreneurs or cooperatives. Critically, these technologies engage the informal sector and workforces that already handle a significant portion of the waste. For instance, African informal recyclers (such as Cairo's Zabbaleen) have long demonstrated that decentralised, labour-intensive systems can divert over 85% of household waste from disposal[37], a performance unmatched by any large plant.

As many African countries fall into the low and lower-middle-income brackets, several factors must be considered when selecting waste management models or technologies. These considerations include:

- Availability of local skills and expertise for effective system management
- The sensitivity of the technology to fluctuations in waste quantity and composition
- Environmental impacts associated with the technology's operation
- Capital investment requirements
- Operational and maintenance (O&M) costs

- Land, energy, and water resource needs
- Potential for cost recovery
- Utility of the end product
- Overall efficiency of the technology
- Involvement of both formal and informal participants in the system

A key principle should be that technology must fit the context. Simply importing Global North systems (such as giant incinerators, distant landfills, and automated sorters) without adaptation to the local context often fails. Waste in many African cities is mixed, contaminated, and collected irregularly; solutions must be robust to those realities. For example, Ghana's experience shows that advanced incineration plants not designed for high-moisture, high-organic waste will underperform and emit pollutants[38]. Likewise, high-tech equipment that requires continuous electricity or spare parts can stall when power grids are unreliable. Instead, appropriate technologies emphasise low energy use, modularity, and local maintenance.

Homegrown innovations – such as manually operated bale presses or solar dehydrators for wet waste – are often more reliable. In short, transferring technology "as-is" is a poor policy; success comes from *co-design* with local communities and incremental pilot testing.

5. Alternative financing mechanisms and business models

As outlined in previous chapters, African cities frequently struggle to secure the financial resources needed to deliver foundational solid waste management (SWM) services and develop essential infrastructure such as landfills, transfer stations, and materials recovery facilities. Several systemic challenges create a fundamentally disincentivising environment for investment and capital mobilisation in the waste sector:

Absence of cost-reflective tipping fees

Most government-sanctioned dumpsites and landfills either lack tipping fees altogether or apply flat-rate charges, regardless of the volume or type of waste delivered. This removes any incentive to divert waste from landfill and directly undermines circular economy and recycling targets.

Weak tariff structures and zoning regulations

Many cities lack full-cost accounting in setting tariffs, and zoning regulations often fail to establish clear operating standards, service coverage obligations, or quality controls. This enables service providers to cherry-pick wealthier areas where user fees are higher and payment rates more reliable, while low-income communities are left underserved.

No support or coordination for private recycling actors

Informal entrepreneurs, recyclers, and FMCG-aligned manufacturers operate in isolation from municipal systems, with little to no public subsidy, coordination, or policy support, despite being the largest actors in the recycling value chain in many contexts and acting, de facto, as the largest buyers and recyclers of waste feedstock aggregated and sold by the informal sector.

Inefficient revenue collection systems

In many cities, user fee recovery remains low due to weak billing systems, a lack of municipal ringfencing and public resistance to paying for services perceived as inadequate or as a basic entitlement rather than a utility.

Over-reliance on donor or concessional funding

Many initiatives rely on external funding to jump-start waste reforms, yet fail to address the underlying structural disincentives, such as the lack of tipping fees, that must be resolved for investments to succeed or scale.

Given the pressures of rapid urbanisation and increasing waste volumes, innovative financing mechanisms are urgently needed to bridge the gap between available resources and sector needs. The following section explores several such mechanisms that have been implemented or proposed in African cities, evaluating their design, challenges, and opportunities for replication. These mechanisms must be viewed in tandem with establishing effective multistakeholder governance and innovative capacities at city-level, in order to realise locally driven finance, and reduce dependence on external capital.

5.1 Taxes and user fees/tipping fees

Taxes and user charges (including tipping fees) play a critical role in municipal financing for waste management, encompassing general taxes, local taxes like property taxes, specific taxes levied on producers and importers of waste-generating products, pay-as-you-throw schemes, and tipping fees for the disposal of waste either in dumpsites or treatment facilities. Property taxes, in particular, are a common source of revenue for solid waste services, with a percentage earmarked for waste management. User charges involve households and businesses paying a fee for waste collection services. In some cities, fees are paid directly to private operators, while local governments regulate pricing. These charges can be based on the volume or weight of waste, creating incentives to reduce waste (e.g., pay-as-you-throw schemes).

Cities can recover the costs of waste collection, treatment, and disposal through local taxes, tariffs, service charges, and tipping fees. These charges often vary depending on the type of waste generator, such as households, businesses, or industrial facilities. Cities can decide to implement lower collection fees for rural or low-income households. Additionally, many cities impose "tipping fees" on waste haulers when they deliver waste to treatment or disposal facilities, with the revenue used for facility maintenance and upgrades. However, some city officials have cautioned that tipping fees might inadvertently encourage illegal dumping, as waste haulers may seek to avoid fees by disposing of waste at unauthorised sites. To address this risk, many cities that use tipping fees have implemented monitoring and enforcement strategies. For example, municipalities may equip waste collection vehicles with GIS tracking systems and install CCTV cameras at disposal facilities to verify that waste reaches designated sites and to deter unauthorised dumping. Such fees can be gradually raised to cover costs (with exemptions for the poorest) and bundled into other bills to improve collection. For example, municipalities often add a SWM charge to electricity or water bills, tapping into payment systems that citizens prioritise. Similarly, in Kenya and elsewhere, mobile-money platforms can enforce payments (locking out users from other services until debts are paid)[39]. Palfreman notes that authorities often fail to ringfence even modest revenue (e.g., tipping fees), forcing reliance on general taxes. Instead, cities should institute small waste-related levies that are pro-poor (e.g., a flat sanitation charge per household or hotel night) and treat waste providers as a public service. “Recyclers” can be granted VAT waivers or classified as essential utility services to attract investment. In practice, local ordinances might mandate annual waste-service payments at affordable rates while allowing higher fees for larger producers. Such payment schemes have been effective: for instance, in Kigali, Rwanda, the city government has designed a cross-subsidisation model within its waste management contracts. Private waste companies are required to service both high-

income and low-income areas as part of their contracts. Profitable commercial and affluent neighbourhoods effectively subsidise collection in poorer communities, ensuring universal service coverage. The city also enforces compliance through strict regulations and monitoring. This model has been recognised as an innovative approach to equitable waste service delivery in African cities[40].

Potential challenges with the application of taxes and user fees/tipping fees for waste management financing and solutions to the challenges are presented in the table below:

Challenge	Solution
Property taxes are often under-assessed or not regularly updated, leading to inadequate revenue collection.	Computerisation and self-assessment can enhance tax collection efficiency in municipalities. This involves digitising tax records, billing systems, and payment processes to reduce manual errors and improve tracking of payments. Municipalities can introduce online platforms or mobile apps where property owners and businesses can self-report their taxable assets or income and calculate their own tax liabilities (self-assessment), subject to later verification. Such systems not only make it easier for residents to comply but also help local governments reduce administrative costs, broaden the tax base, and improve overall revenue collection[41].
The irregular collection process and poor economic activity linkage make it difficult to align tax increases with rising costs.	Online platforms and mobile payment mechanisms can enable automated fee linkage to inflation and economic activity, fostering consistent revenue streams.
Estimating actual costs is complicated, as labour for sanitation and waste management is frequently bundled into general salary budgets.	Separate budgeting for sanitation labour and standardised gate-fee reporting can be adopted to enhance transparency in municipal accounting.
Affordability remains a significant challenge for many African households, especially those with low incomes.	The introduction of cross-subsidised tariff structures, such as tiered or lifeline rates, can help ensure that essential waste services remain affordable for low-income households.
Without equitable tariff policies and cross-subsidisation, poorer households are disproportionately affected.	Cities can consider designing equitable tariff policies with subsidised rates and volume discounts for low-income zones.
High gate fees at landfills may lead to illegal dumping or fly-tipping, exacerbating waste management challenges.	Cities should adopt volume- or weight-based "Pay-as-you-throw" fees tied to waste containers, not flat gate fees. Additionally, cities can implement monitoring and enforcement strategies such as equipping waste collection vehicles with GIS tracking systems and installing CCTV cameras at disposal facilities to verify that waste reaches designated sites and to deter unauthorised dumping.
Gate fees can also be manipulated by accounting for the same waste multiple times, inflating disposal figures.	Cities can implement online weighbridge systems and digital tracking, ensuring real-time recording of incoming waste with CCTV cameras positioned at strategic locations at disposal facilities.

Identified opportunities in the application of taxes and user fees/tipping fees for waste management financing include:

The implementation of **specific environmental taxes** on items like imported tires (as proposed in Kenya[42] and South Africa[43]) can generate targeted revenue for waste management programs.

In cities where **waste collection is franchised to private operators,** the privatisation model has been successfully implemented. Households pay a regulated fee directly to operators, improving service delivery and fee compliance.

Tax incentives, exemptions, and rebates could further motivate compliance and revenue generation.

Volume-based charges encourage waste reduction and recycling, aligning with circular economy goals.

Properly managed fee structures can ensure steady revenue flow and create opportunities for private sector participation in waste management.

5.2 Subsidies

Many African cities rely on their operating budgets to fund solid waste management, with some national governments offering subsidies to help local governments fill funding gaps[44]. Although subsidies can facilitate the introduction of innovative waste management solutions, which provide social and environmental benefits beyond immediate financial returns, these funding sources are not always dependable, and general budget funds are often better allocated to activities or programs with limited potential for self-sustaining revenue. As a result, cities should prioritise dedicated local revenue sources such as taxes and user charges, rather than relying on their general operating budget.

Potential challenges associated with the application of subsidies for waste management financing, along with solutions to these challenges, are presented in the table below:

Challenge	Solution
Subsidies are subject to political interference, which can distort market mechanisms and lead to inefficiencies.	Cities can focus on performance-based subsidies tied to defined outcomes. Structuring subsidies as grants or co-financing dependent on measurable recycling/diversion targets ensures objective disbursement and reduces political capture. This output-oriented approach mirrors models like Brazil's PRODES, where reimbursements are contingent upon proven wastewater treatment performance[45].
They often promote technologies that may not be financially viable without external support, potentially leading to dependency.	Time-bound incentives with clear exit strategies and cost-sharing mechanisms should be implemented. It is evident that waste treatment firms relying entirely on subsidies often lack incentives to become financially sustainable, with many inefficiencies persisting across regions[46]. A phased subsidy model, where support reduces over time and is capped, and co-financing by private/public actors can prevent dependency. Complementing this with performance-based criteria ensures that only viable, outcome-oriented technologies receive support.

Identified opportunities associated with the application of subsidies for waste management financing include:

- Targeted subsidies for low-income households can improve access to essential waste collection services while promoting social equity. Subsidies can help to reduce the financial burden on vulnerable groups, hence increasing participation in formal waste management systems and reducing illegal dumping. These subsidies can be funded through various mechanisms. Sources include cross-subsidisation, where higher fees from commercial establishments or high-income households offset costs for low-income users; earmarked taxes or tipping fees dedicated to waste services; government grants or transfers; and, in some cases, donor or climate finance targeting inclusive waste management programs.

- Performance-based subsidies, such as grants or co-financing mechanisms linked to recycling rates or waste diversion targets, can incentivise innovation and efficiency in public and private sector waste service delivery. This approach encourages continuous improvement and aligns subsidies with measurable environmental outcomes. Such subsidies can be mobilised through public budgets, donor funding, or public-private partnerships, depending on local financing structures.

5.3 Concessional loans and grants

Many African cities lack the balance sheets to borrow commercially. Concessional loans and blended grants from development institutions can de-risk projects. Global funds (e.g. Green Climate Fund) and multilateral concessional funds can cover initial investment costs or viability gaps. However, unlike national governments, African cities often lack credit ratings, collateral, and legal authority to borrow, especially in volatile macroeconomic contexts. Indeed, the World Bank notes that across developing countries "most municipalities…have little or no access to repayable finance. Where borrowing is permitted, it is confined to a few large, creditworthy cities," usually via national development banks or donor agencies rather than private markets[47]. For example, the African Development Bank (AfDB) and United Nations Capital Development Fund (UNCDF) have supported projects in Freetown's faecal waste and street-cleaning programs. Legislative or fiscal rules in many countries also bar cities from debt without central approval. As a result, only a handful of major cities (e.g., Johannesburg, Nairobi, and Dar es Salaam) issue bonds; the rest rely on grants and central transfers[48]. Moreover, a significant portion of climate and infrastructure finance is disbursed as loans to sovereigns, rather than cities, making it challenging for many cities to access climate finance. Most climate finance is provided in the form of loans. In short, purely concessional loans tend to flow only to already-creditworthy borrowers, leaving smaller cities stranded.

At the same time, grant funding is limited and shrinking. Global aid budgets are under pressure: OECD projects official development assistance (ODA) will fall by ~9–17% in 2025 (following a 9% drop in 2024[49]). According to the same OECD report, Sub-Saharan Africa is expected to lose 16–28% of its aid.

However, non-creditworthy African cities can still benefit from blended finance structures and risk-sharing tools. These mix concessional funds (grants, subordinated loans, guarantees) with commercial capital. Key examples include:

First-loss grants and credit guarantees

First-loss grants and credit guarantees: Development agencies (e.g., UNCDF, national DFIs) will sometimes provide first-loss capital or guarantee portions of city loans so private lenders take less risk. As UNCDF explains, it "provides first-loss capital, credit guarantees, and concessional finance to absorb risk and attract private investments" into climate-smart projects[50]. For instance, in Tanzania, UNCDF used $1 million to unlock $20 million in domestic capital for a subnational green bond[51]. In 2023, the African Guarantee Fund and Aqua for All partnered to provide local private banks (including Sidian Bank and Family Bank) with increased access to guarantees to provide financing to the water and sanitation sector in Africa (including Kenya)[52]. Such guarantees (from funds like the African Guarantee Fund) can catalyse private lending for recycling plants or landfill gas projects by helping cities to issue debt (or attract commercial loans) even if they cannot pay full commercial rates.

Mezzanine and subordinated debt

Some regional DFIs offer layered financing. The East African Trade and Development Bank (TDB), for example, explicitly uses mezzanine debt and guarantees. Its own marketing notes: "TDB uses direct financing via senior and mezzanine debt or equity… often in co-financing arrangements… [including] loan guarantees"[53]. Its Trade and Development Fund even provides concessional financing to marginalised groups. Similarly, Rwanda's new Green Investment Facility (with AfDB support) acts like a "green bank" by offering subordinated loans and extended-tenor debt; it uses "debt, credit enhancements such as sub-debt, tenor extension and collateral support" to leverage private investment in green projects[54]. These instruments absorb much of the project's risk or financing gap, making the remainder bankable.

Typically, concessional loans are accompanied by a sovereign guarantee from a national government. This guarantee ensures that the loan is secured and often involves passing the funds through to national governments, either as debt or as a partial grant. This structure helps city governments access necessary financing at reduced costs. For instance, in June 2023, the AfDB extended a US$115 million loan to Abia State (through federal government arrangements) for roads, erosion control, and solid waste management[55]. The project specifically included preparing new solid waste management facilities in the state capital, Umuahia, and the commercial city of Aba. In effect, the national government sponsored this concessional loan (guaranteed at the federal level) and passed the financing on to state/city utilities to upgrade waste infrastructure. This enabled local governments in Abia to commence plans to build proper landfills and disposal systems with lower-cost funding. The Abia case confirms that national governments can secure concessional borrowing (often with sovereign guarantee) and channel it as either debt or subsidised grants to cities for waste projects.

Additionally, grants, particularly those from development institutions, aim to enhance urban governance and support waste management initiatives. They often include technical support, feasibility studies, and capacity building.

A significant consideration when dealing with concessional loans is the currency in which the debt is denominated. If the loan is provided in a foreign currency, local governments may face substantial foreign exchange risks, which can pose financial challenges. Therefore, loans in local currencies are generally preferred as they mitigate the risk of currency fluctuations and make financial management more predictable for local authorities.

Potential problems associated with the application of loans for waste management financing, along with solutions to these challenges, are presented in the table below:

Challenge	Solution
Loans require significant revenue streams to cover repayment, often difficult to secure without robust user fee systems or conservancy taxes.	Establishing robust user-fee systems or dedicated results-based financing (RBF) pilots can empower cities to generate predictable revenues through user fees, while using RBF grants to incentivise early performance. The World Bank notes that operating income must exceed expenses to enable loan repayment, and RBF can help initiate sustainable fee collection[56].
Many municipalities are considered poor credit risks, which may deter banks or investors unless backed by national government guarantees.	Cities can utilise national government guarantees and involve green bank–style credit enhancements. Enhancing creditworthiness through sovereign guarantees, blended finance, or green-bank mechanisms (like loan-loss reserves) can encourage private capital participation.
Revenue from waste management activities often falls short of covering capital investment costs, particularly for low-value by-products.	This can be mitigated by implementing cross-subsidisation. Charging businesses or wealthier users higher fees (e.g., waste taxes or zoning levies) helps cover capital costs across the value chain, not just operations.
The lack of financial sustainability is a key issue with grant-funded projects, as they often rely on external support and may struggle once the funding ends.	Loans can be linked to project performance, with repayments starting gradually after an initial grant period and supported by increasing revenue from user fees.

Identified opportunities in this section:

- Grants provide an excellent opportunity for municipalities to conduct feasibility studies and build bankable projects that can attract private sector investment later.
- International development institutions and city networks also offer expertise, knowledge sharing, and connections to finance institutions, enabling municipalities to implement best practices from around the world.

5.4 Public-Private Partnerships (PPPs)

In larger cities, municipalities can attract private capital for infrastructure. Concession models (e.g., Build–Operate–Transfer or Waste-to-Energy Public-Private Partnerships) enable the implementation of projects such as composting plants, transfer stations, or biogas facilities. For instance, Kisumu (Kenya) has pursued a Public-Private Partnership (PPP) model for a large waste-to-energy facility, financed through bank funding and power-purchase agreements (allegedly with no county subsidy)[57]. However, PPP success hinges on realistic cash flows. Therefore, contracts must ensure operators receive stable payments or tipping fees.

African cities can adopt various forms of public-private partnerships (PPPs) to undertake infrastructure projects, with the extent of private sector involvement ranging from minimal to substantial. When private sector participation is limited, the private partner may simply be contracted for construction or operational duties.

However, the private sector's role can be more extensive under different PPP arrangements:

Lease agreements

The private company manages the infrastructure, pays a lease to the government, charges users for services, and keeps a portion of the profits.

Build-Operate-Transfer (BOT) concessions

The private partner funds, builds, and operates the infrastructure for a set period before transferring ownership back to the government.

Design-Build-Operate (DBO) concessions

The private entity is responsible for designing, constructing, and operating the infrastructure.

These arrangements can be based on revenue generated by the asset, such as fees from landfill operations, or through availability payments, in which the government compensates the private partner based on infrastructure performance rather than actual usage. In some cases, hybrid models are used, blending different revenue and payment structures.

Such arrangements often involve the creation of a Special Purpose Vehicle (SPV) to manage the project. In some cases, PPPs can evolve into joint ventures, where the public and private sectors share ownership and responsibilities.

Potential challenges associated with the application of PPPs for waste management financing, along with solutions to these challenges, are presented in the table below:

Challenge	Solution
Developing effective stakeholder models can be complex, as conflicting interests between public and private partners often arise.	This can be addressed by establishing structured stakeholder engagement processes. Setting up formal coordination platforms, joint steering committees, and clear dispute resolution mechanisms helps align the interests of municipalities, private companies, and community groups.
Financial viability may be uncertain, especially when roles and institutional arrangements among municipalities, NGOs, and private actors are unclear.	Cities can improve project viability by conducting detailed feasibility assessments and clarifying institutional roles in formal agreements. Utilising national government guarantees, blended finance approaches, or green-bank mechanisms (such as credit enhancements or loan-loss reserves) can also help attract private investment and stabilise financing structures.

Identified opportunities through a PPP financial model:

- PPPs offer access to commercial finance and private sector innovations in waste management technologies, reducing risks for municipalities.

De-risking strategies, such as feed-in tariffs for energy-from-waste, can further encourage private sector investment in waste management projects.

5.5 Carbon financing

Carbon financing involves generating certified emission reductions (CERs) by capturing methane from solid waste disposal sites, which can then be sold on carbon markets. The Clean Development Mechanism (CDM) is an example of this approach. Under the CDM, projects that achieve significant emission reductions can earn carbon credits - certified reductions in greenhouse gases. These credits can be sold on the international carbon market to high-emission companies that need to acquire additional credits to meet their national emission reduction commitments.

Potential challenges associated with the application of carbon financing in the waste management sector, along with solutions to these challenges, are presented in the table below:

Challenge	Solution
The administrative process for carbon financing can be lengthy and complex, making it challenging to implement.	Simplifying the process requires engaging carbon market experts early and investing in digital monitoring and reporting tools to speed up verification and approval timelines. Developing local technical capacity also reduces long-term administrative hurdles.
Carbon financing is primarily a cost-recovery tool rather than a primary financing mechanism for waste management.	To address this, cities should treat carbon financing as a complementary funding source. Pairing it with more reliable financing options, such as grants, concessional loans, or user fees, ensures that core project costs are covered while carbon revenues offer additional support.

Identified opportunities associated with carbon financing models:

- The decarbonisation goals set out in the Paris Agreement provide a significant opportunity for African cities to tap into international carbon markets.
- Development institutions often provide blueprints and technical support to help municipalities navigate the carbon financing process.

5.6 Extended producer responsibility

Extended producer responsibility (EPR) is a policy approach that holds producers accountable for their products throughout their entire lifecycle, including the post-consumer stage. By doing so, it helps achieve environmental goals such as recycling targets. At the same time, EPR generates funding from producers that helps cover the costs of collecting, sorting, and recycling waste products, as well as provides detailed information on production, products, waste generation, and treatment.

Targeted EPR schemes are effective in revenue generation. For example, Uganda's new plastics strategy (with UNEP support) includes a beverage-industry EPR fund[58]. Deposit-refund systems for glass bottles or batteries and bans on "hard-to-recycle" polymers (polyvinyl chloride, polystyrene, filled or opaque polyethylene terephthalate) can raise the market price of recyclables and generate fees[59]. These approaches must be carefully calibrated so extra charges do not cripple businesses. But by funnelling small add-on fees into a dedicated fund, governments can channel resources to collection and recycling infrastructure. Currently, EPR is being piloted or legislated in several African countries, building on international examples.

Ultimately, EPR policies result in higher recycling and collection rates, lower overall waste and

landfill management costs, and drive environmentally conscious innovations in product design, such as improved compostability, reusability, and extended product life cycles.

Potential challenges associated with the application of EPR in the waste management sector, along with solutions to these challenges, are presented in the table below:

Challenge	Solution
Some existing EPR regulations in developing countries are disjointed and lack coordination, allowing manufacturers to continue producing and selling non-recyclable or hard-to-recycle products to consumers without facing any repercussions.	Strengthening policy coherence is essential. Governments can establish national EPR frameworks that clearly define product categories, recycling obligations, and penalties for non-compliance, while also phasing out problematic products through eco-design standards and material bans.
The funds generated through the EPR scheme are insufficient to cover the management of all municipal solid waste, as companies only contribute based on the specific products they place on the market.	Closing this funding gap requires expanding EPR coverage beyond just packaging to include other high-volume product categories. Introducing minimum contribution thresholds, setting fees based on environmental impact, and combining EPR revenues with municipal funds can help ensure more comprehensive waste management financing.

Identified opportunities in EPR financing models:

- EPR shifts some burden of waste management from the customers and government to the producers of certain products.
- EPR can provide resources for broader waste management infrastructure or systems

6. Lessons learned

6.1 Lessons learned: funded waste initiatives across Africa

6.1.1 The inefficiency of large-scale solutions

The case study below highlights the importance of developing waste management solutions that are aligned with the local context.

The project was built for US$95 million, and spans 37 hectares on the outskirts of Addis Ababa, Ethiopia, in the Koshe area of Kolfe Keranio sub-city, home to the country's largest landfill. The construction of Reppie began in 2014 under an agreement signed between UK-based Cambridge Industries and the Ethiopian government. Development, design, and construction of the project were jointly conducted by Cambridge Industries Ltd. and its partner, the China National Electric Engineering Company, under the auspices of the state power generator, Ethiopian Electric Power, who was being advised by Ramboll of Denmark.

The Reppie facility was expected to revolutionise waste disposal for Addis Ababa's rapidly growing population, and it was expected to serve as a model for waste management across sub-Saharan Africa. The plant was designed to supply 50 MW of electricity to the national grid, covering around 25% of the city's power needs, and processing 1.4 million kilograms of waste daily. Additionally, it was expected to recycle 3,600 tons of metal annually and use the residue ash to produce up to 27,000 bricks per day.

However, the project failed due to a combination of technical, financial, and management issues. One of the main reasons for the failure was technical difficulties with the plant's design and operation. The facility struggled to process waste consistently due to challenges with waste composition in Addis Ababa, where much of the waste is organic and moist, which is not ideal for incineration. This led to operational inefficiencies and breakdowns that made it difficult to generate energy at the intended capacity.

Financial issues also played a significant role. The project, which was supported by external investments, experienced high operational and maintenance costs. These costs, coupled with lower-than-expected energy production, placed a significant strain on the project's financial sustainability.

Moreover, there were management challenges and a lack of adequate infrastructure to support the plant's operations. The city's waste management system was not fully aligned with the plant's needs, particularly in terms of sorting and delivering waste suitable for incineration.

6.1.2 Innovative PPP models in developing countries

The case study below highlights an innovative PPP model that has been used for sustainable waste management in Ghana.

The Jekora Ventures Limited (JVL) pilot composting plant, located in James Town, Ghana, operates under a Public-Private Partnership (PPP) structure. Constructed with grant money from CHF International, it is owned by the local community and operated by JVL, a private waste management company. The project was initiated to address the growing need for sustainable organic waste management and to support agricultural activities in the area. The collaboration between the local community and JVL reflects a model that prioritises environmental sustainability while ensuring community engagement and shared benefits. The capital expenditure for constructing the composting facility was fully funded through a grant provided by CHF International, a global development non-profit organisation. This grant financing eliminated the need for any initial capital investment from either the community or JVL, which made the project financially viable from the start. As a result, the community could establish the plant without incurring debt or requiring private investors, a key factor in its successful implementation.

In terms of operations and maintenance, the facility generates income from the sale of compost. Around 70% of the compost produced is sold, while the remaining 30% is distributed for free to NGOs, schools, and farmers for field trials. This dual approach to distribution not only helps promote the compost product and build a future customer base but also contributes to local agricultural development. The plant also benefits from significant operational savings by avoiding landfill transportation costs, which would have ranged between $19 to $28 per metric ton (MT). By processing organic waste locally, JVL was able to cut these costs, improving the plant's financial sustainability.

Another innovative model is that of a Build-Operate-Transfer PPP in Lahore, Pakistan.

In 2003, the Solid Waste Management Department of the City District Government of Lahore (CDGL), Pakistan, issued a public tender for a private company to design, build, operate, and transfer a 1,000 MTPD composting facility at the Mehmood Booti Landfill. The tender was awarded to the Safi Group, a prominent industrial corporation in Pakistan, which then formed Lahore Compost Ltd. to carry out the project. The CDGL provided the land free of charge and ensured a supply of waste from residential areas and fruit and vegetable markets. The facility began operations in 2006 with a capacity of 300 MTPD, later expanding to 1,000 MTPD by 2009. The project's total cost was approximately $5.52 million, with an initial investment of $3.11 million, funded through a mix of long-term debt ($2.87 million) from the parent company and equity ($2.65 million). Revenues from carbon credit sales under the United Nations Clean Development Mechanism (UN CDM) were expected to cover operating costs, while compost sales were intended to service the debt. The facility is set to be transferred back to the CDGL after 25 years.

6.1.3 Successful use of international public financial support

The case study below highlights the use of a loan provided by an international public institution to advance waste management initiatives in Africa.

Averda, a global waste management company, has secured a $30 million loan from the International Finance Corporation (IFC) to advance sustainable waste management initiatives across the Middle East and Africa. The loan is primarily being used to fund several projects, including the construction of a new plastics recycling facility in Rosslyn, Gauteng, South Africa. This facility will process up to 12,000 tons of plastic waste annually, converting High-Density Polyethylene (HDPE) and Low-Density Polyethylene (LDPE) into reusable A-grade plastic pellets, while creating 50 new jobs. In addition to South Africa, the IFC loan is supporting Averda's sustainable waste management projects in Oman and Morocco, aimed at reducing landfill waste, increasing recycling and composting rates, and promoting energy recovery. These projects align with Averda's commitment to fostering a circular economy and contributing to a "World without Waste."

7. Conclusion and recommendations

ICLEI Africa is working with committed local governments to improve waste management and the associated outcomes of regenerated environments, good health, climate mitigation and adaptation, and clean cities. The analysis of the existing waste management landscape underscores the challenges faced by many African cities, including inadequate infrastructure, limited funding, and high volumes of uncollected waste. These challenges necessitate innovative approaches that prioritise sustainability and resource recovery. ICLEI Africa is therefore supporting its members to be creative, while getting the basics right. This involves establishing strong institutional foundations that can deliver on existing waste mandates; challenging the narrative of largescale technological solutions, by demonstrated the efficacy of distributed, low-cost, community-engaged, waste collection, processing and treatment systems; providing guidance on innovative and sustainable financing models; and building the interest and capacity to experiment with circular models that reduce waste generation in the first place, or make effective use of waste streams.

The adoption of circular economy principles represents a transformative approach to solid waste management that not only addresses environmental concerns but also enhances the bankability of waste management projects. By shifting the focus from waste disposal to resource recovery, these principles create opportunities for economic growth while minimising the negative impacts of waste on communities and the environment. The integration of circular economy practices fosters innovation, improves financial viability, and encourages investment from both public and private sectors, particularly in developing regions where waste management challenges are most acute.

As highlighted, the potential for circular economy strategies to generate significant revenue, estimated at US$8 billion annually for the African economy, underscores the importance of implementing localised, context-specific solutions. Effective waste management must consider local dynamics, including the socio-economic environment, availability of resources, and technical capacity. It is essential to implement proven, economically feasible solutions that facilitate job creation, social inclusion, and income generation, thereby promoting sustainable development.

The key recommendations of this report are as follows:

Support decentralised solutions

Municipal planning should prioritise small-scale collection and treatment sites (e.g., communal compost yards, material recovery facilities) distributed across the city, rather than one mega-plant. Urban land-use plans can designate plots for these facilities in poor neighbourhoods to reduce transport distances. Local governments should collaborate with NGOs and cooperatives to pilot mobile collection units, communal bins, and neighbourhood shredders or balers for plastics. Given the high levels of organic waste in these regions, adopting decentralised composting and black soldier fly technologies offers a practical, cost-effective solution. These methods empower local communities, encourage better waste separation, and provide valuable employment opportunities, thus reinforcing the circular economy's benefits.

Collaboration between sectors

Strengthening the relationship between waste management and other sectors will enable the pooling of resources to deliver on multiple mandates at once; for example, connecting health priorities with reduced flooding and disease vectors through waste management; connecting climate mitigation and adaptation targets to waste; connecting public realm or road investments with waste prevention or treatment goals will improve the efficacy of these investments; connections with agriculture can create sustainable markets for compost and other products derived from waste recovery. This interconnected approach enhances the viability of decentralised waste management systems and supports local economies.

Formalise and empower the informal sector

Waste pickers and recyclers are major service providers but often lack legal recognition. Policies should recognise their cooperatives or associations, grant them access to official waste transfer stations, and integrate them into urban waste plans. Providing basic equipment (scales, gloves) and training in safety and basic bookkeeping can dramatically improve worker health and income. Cities like Kigali (Rwanda) and Pune (India) have demonstrated that integrating informal collectors through contracts or franchises boosts coverage. African cities should establish “inclusive PPPs” where government contracts with waste-picker unions for collection of recyclables or organics.

Invest in enabling infrastructure and policies

International donors and DFIs should finance master plans and data systems to assess city waste streams. Clear regulations (health codes, environmental standards) and supportive frameworks (e.g. permitting processes for small recyclers) are needed. Training programs (technical schools, apprenticeships) can build local skills in waste processing. Policymakers should also engage communities in waste minimisation campaigns and education, shifting behaviour in tandem with infrastructure.

Economic incentives

Implementing and enforcing economic instruments like "pay-as-you-throw" systems can drive responsible waste reduction behaviours while generating funds to improve waste management infrastructure and services.

Leverage green financing creatively

African cities and countries should develop "bankable pipelines" of waste projects – from small pilots through full-scale expansion – to attract investors. This could involve blending sources (e.g., municipal green bonds matched with donor grants) and using guarantee schemes to cover revenue shortfalls during start-up. Donors like the Green Climate Fund or Global Environment Facility can be lobbied to consider circular waste projects, citing their climate mitigation impact. Private impact investors are increasingly looking for "triple-bottom-line" opportunities: Africa's circular waste sector, with its co-benefits, is a prime candidate.

Incentivise circular businesses

Financial incentives (tax breaks, subsidies or concessional loans) should be offered to enterprises that turn waste into products – compost companies, recycling start-ups, repair businesses. National or city governments can institute Extended Producer Responsibility (EPR) laws for plastics, electronics and packaging, obligating manufacturers to fund collection and recycling. Deposit-refund schemes (for bottles and sachets) have worked elsewhere and could be tailored locally. Public procurement policies can create demand: for instance, requiring municipal landscaping projects to use compost from local facilities. Such measures help scale viable circular businesses.

These measures can yield a substantial economic impact. UNEP estimates that recycling currently misses out on roughly $7.6 billion in material value per year in Africa, and that fully tapping circular opportunities could yield a cumulative economic opportunity of $624 billion for the continent[60]. UNEP also projects that up to 11 million new jobs in Africa can be created by transitioning to a circular economy model. Already, sectors like compost production, plastic reprocessing, electronics refurbishment and agro-industrial reuse are creating local enterprises. For example, in Abidjan and Accra, entrepreneurs now reclaim plastic waste to make construction blocks or artisanal crafts, reducing landfill use. These emerging businesses demonstrate that with the right support, waste management can transition from a fiscal burden to a driver of local entrepreneurship.

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