



# HOW TO MAINSTREAM CONTAINER-BASED SANITATION

Leaving no one behind in urban sanitation



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**Cover photo:** A Kaloola container-based toilet (purple structure in centre) in an informal settlement in Durban, South Africa. Credit: Kaloola / Loowatt

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[cbsa.global](https://cbsa.global)



[tippingpoint.space](https://tippingpoint.space)

## PREFACE

**Having spent years at the helm of corporate strategy and development at Manila Water, a private utility serving over seven million people in the Philippine capital, I have learned that when it comes to delivering sanitation, there is no one-size-fits-all solution. A diverse, portfolio approach is essential.**

The 2019 World Bank evaluation of container-based sanitation (CBS) highlighted the need for it to be an integral part of the toolkit for sanitation authorities. Back in 2015, while at Manila Water, we piloted 300 container-based toilets in Barangays Macabaling and Poooc. This initiative was born out of an urgent need to serve low-income communities while addressing open defecation and poor sanitation service resulting in high levels of organic pollution and harmful bacteria caused by inadequate waste disposal and treatment. For people living in informal settlements—places where traditional sanitation solutions often fall short—CBS emerged as a fitting, scalable alternative. This created a clear opportunity to address the sanitation needs of communities living in such challenging environments.

For CBS to thrive, sound regulatory frameworks, scalable solutions, financial sustainability and appropriate technology and service designs are critical, particularly those that ensure cost recovery. Partnerships between CBS providers and established local utilities such as Laguna Water, one of the subsidiaries of Manila Water, are equally vital in facilitating this process. Applying business principles—such as cost-effectiveness, customer satisfaction, accountability, and innovation—within public services can significantly enhance efficiency, financial sustainability, and service quality. CBS inherently embodies these principles, and it's promising to see the Container-Based Sanitation Alliance increasingly pushing to mainstream CBS into sanitation services.

I encourage colleagues to use this guide, which provides a renewed look at the untapped potential of CBS. Now more than ever, CBS presents a bold, innovative solution to some of the most pressing sanitation challenges. It's time to rethink what's possible. With stronger partnerships, smarter strategies, and well-targeted investments, CBS can evolve into a mainstream solution that reshapes the future of urban sanitation. Together, we can close the sanitation gap and ensure no community is left behind.



Perry Rivera, Founder and Managing Consultant of WatSan Analytics and Container-Based Sanitation Alliance Advisory Committee Member.

“Since rolling out container-based sanitation with Fresh Life, we have managed to reduce outbreaks of waterborne disease and reach out to a bigger proportion of people who otherwise were not having toilets.”

Jason Ochola,  
Head of  
Commercial  
Services at Kisumu  
Water and  
Sanitation  
Company, Kenya<sup>i</sup>

“Container-based sanitation (such as the EkoLakay service) adds a new option to the menu of non-collective sanitation services approved by the public WASH sector, allowing us to reach a subset of the population which was previously out of reach due to a lack of appropriate services.”

Edwige Petit,  
Coordonatrice  
Générale, DINEPA,  
Haiti

“The CBS pilot in DR Congo demonstrated that the approach is culturally acceptable and revealed an untapped sanitation market. I am convinced CBS has a bright future, particularly in densely populated areas that lack urban planning, and at the very least as transitional measure.”

Lucas Cornet, Water  
& Sanitation  
Specialist

“[The CBS provider] Sanima is a highly significant unconventional technology experience. It has enormous potential to scale up to other localities in Lima and nationwide, and we believe they will be a crucial partner in the Ministry of Housing’s policy to ensure that no Peruvian is without access to water and sanitation nationwide.”

Max Carbajal,  
General Director of  
the Ministry of  
Housing,  
Construction, and  
Sanitation, Peru

“CBS is a good option as it supports behaviour change and provides ease and safety for sanitation workers. Please invest in it. I guarantee that providing it as an option will encourage others to accept it.”

Evans Mambwe,  
FSM INSPECTOR,  
Lusaka Water  
Supply and  
Sanitation  
Company, Zambia

**“... CBS addresses the significant ‘physical and financial barriers’ that impede the rapid deployment of traditional sewer-based sanitation, acknowledging the reality that ‘investment-heavy solutions may not be forthcoming at scale in the foreseeable future’”**

Evaluating container-based sanitation, World Bank, 2019<sup>1</sup>

## ABOUT THIS RESOURCE

This resource illustrates the potential of container-based sanitation as a sustainable and scalable solution for addressing global sanitation challenges, deployed in conjunction with other urban sanitation options. Targeted primarily at municipalities and utilities, it outlines the benefits and limitations of CBS, the rationale for its mainstreaming, and provides guidance on how to get started.

This resource does not provide detailed technical guidance on how CBS works or how it can be implemented. Instead, it focuses on strategic insights, case studies, and analysis to inspire others to explore the potential of CBS – and signposts the tools to persuade their colleagues and partners.

Above all, it should provide useful insights for those who make decisions within municipalities, water utilities and sanitation ministries and regulatory agencies in developing country and emerging market contexts.

It sits at the centre of a suite of materials developed by the CBSA, all geared at better informed decision-making about meeting the needs of the estimated 1.1 billion urban households that currently lack safely managed sanitation worldwide.<sup>2</sup>

Further technical guidance on CBS, see [cbsa.global/implementationguide](https://cbsa.global/implementationguide)

Work with CBSA: [cbsa.global/workwithus](https://cbsa.global/workwithus)

# 1. INTRODUCING CONTAINER-BASED SANITATION

## KEY TAKE AWAYS

Container-based sanitation (CBS) is:

**Innovative:** CBS services address sanitation challenges in areas lacking traditional infrastructure by using toilets that securely contain and safely treat or dispose of waste.

**Legitimate:** recognized by UNICEF/WHO in 2019, CBS is endorsed as a safely managed sanitation service under the Sustainable Development Goals, providing it with high-level legitimacy.

**Globally applicable:** CBS services are active worldwide, with 50,000 toilets serving over 550,000 people, primarily benefiting those in informal settlements and areas with severe environmental challenges.

**Adaptable:** CBS is ideal for densely populated and challenging environments, reducing environmental contamination and promoting public health while supporting the circular economy through waste recycling.

**Cost-effective:** CBS relies on user fees and subsidies, with future potential for increased funding from climate finance sources.

**Scaling slowly:** Despite its potential, the adoption of CBS has been slower than expected. Currently primarily limited to early adopters and has not yet met the ambitious forecasts of pioneer enterprises and philanthropic funders.

## 1.1 What is container-based sanitation?

Container-Based Sanitation (CBS) is an innovative approach designed to address sanitation challenges, particularly in areas where traditional infrastructure faces serious challenges.

CBS features toilets with containers that are frequently sealed and collected so that the waste can be safely treated, reused or disposed of. It thus differs from conventional sewer networks – or systems based on septic tanks and pit latrines, emptying trucks and treatment plants – partly due to its emphasis on providing a sustained sanitation service.



Examples of the CBS chain, including: a Sanima toilet, container collection by SOIL, composting of waste collected by Clean Team and briquettes made by Sanivation.

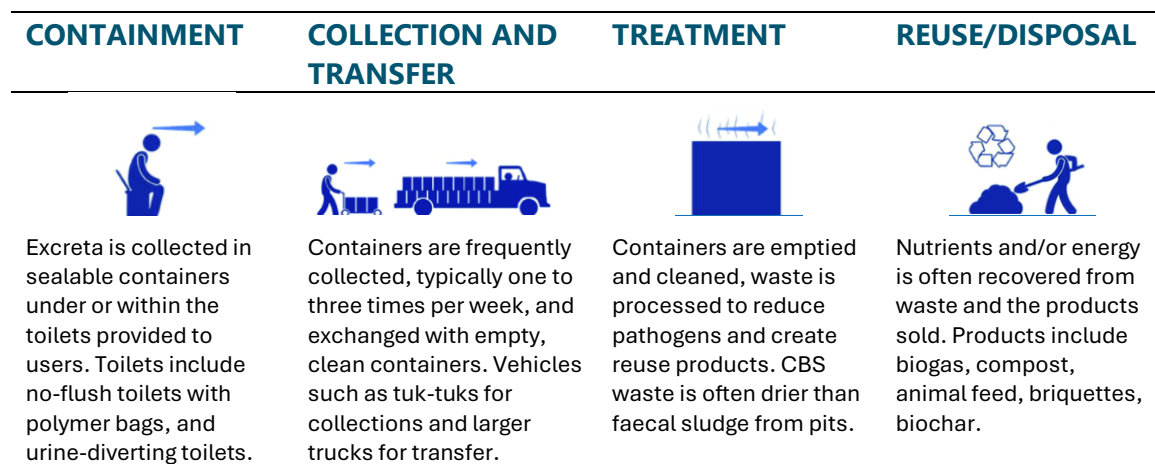


Figure 1: The CBS service chain

## WHAT CBS IS NOT

Approach	What is it?	How is it distinct?
Biodegradable bag toilets	A portable sanitation option using biodegradable bags to collect and contain waste. Users dispose the waste through the solid waste system or bury it.	Echoes CBS's ethos of containment and portability but lacks servicing and reusability. It is not suitable for dense urban areas or areas with little or no solid waste management where waste cannot be buried or easily disposed.
Portable chemical toilets	A movable sanitation unit that uses chemicals to disinfect and break down waste, typically found at outdoor events or construction sites.	Involves mobility and containment but uses chemicals, are not placed in dwellings and typically remove waste using a specialized vacuum trucks or pumps that may not be suitable in informal settlements.
Bucket toilets	Waste collected in a bucket and manually removed for disposal in unsafe conditions. Used frequently prior to the middle of the 20th century from the UK to Kenya. Viewed negatively due to its unhygienic nature.	While bucket toilets have a similar servicing model, the approach does not follow CBS's rigorous safety protocols for user and collection staff.
Conventional urine-diverting dry toilets	Separates urine from faeces in vaults underneath for separate treatment, with users managing the waste. Better suited to rural areas due to space requirements and user involvement.	Aligns with those CBS providers who prioritise environmental re-use and recovery – but onsite treatment differs from CBS's servicing and off-site waste processing.

## i. Scale and legitimacy

CBS providers are active across Africa, Asia, Europe and the Americas. By the end of 2023, around 50,000 toilets were being regularly serviced, and more than 550,000 people are served this way. This is done by a few municipalities, and by around 15 non-governmental providers, including non-profits and businesses.

In many instances, the early drivers of CBS have been social enterprises, seeing it as a confluence of three opportunities:

- to deliver services to those who would otherwise lack sanitation
- to build up local enterprises that offer an ongoing service, creating ‘green jobs’ in the process.
- to harness the potential of circular economy approaches – something that initially focussed on nutrient recovery and waste recycling.

In 2019, the UNICEF/WHO Joint Monitoring Programme formally recognized CBS as a type of improved sanitation, endorsing it as a safely managed sanitation service under the Sustainable Development Goals. Thus, CBS has legitimacy at the highest level and can be considered appropriate by regulators, governments and service utilities.

At the community level, the legitimacy of CBS services is evidenced by high rates of customer satisfaction and payment rates.<sup>3</sup> Emerging research from the Global Challenges Research Fund Scaling Off-grid Solutions for Sanitation project, which surveyed a sample of customers subscribed to **Sanima**’s CBS service in Peru weekly for a year throughout 2022-23, found that, at all times, 100% of respondents said they would recommend the service. This success is rooted in the close relationships many providers cultivate with the communities they serve, fostering trust among users. By providing clean, high-quality, and dignified services, CBS providers meet both the sanitation needs of the community and ensure the service is valued by users.

Unfortunately, the pace of CBS adoption has not matched some of the more ambitious forecasts of pioneer enterprises. Whilst the reach of existing CBS services is both impressive and growing, the approach remains largely confined to what technology analysts refer to as early adopters. Nor has CBS scaled to match the hopes of several of the early philanthropic funders that have supported CBS providers to date. This is explored more in [chapter three](#).

### THE CONTAINER BASED SANITATION ALLIANCE

Many CBS providers have come together under the umbrella of a membership association known as the Container Based Sanitation Alliance (or CBSA) to address systemic blockages. Their members have pioneered the adoption of CBS in a range of contexts. The pioneer locations share a need for innovation to meet urgent sanitation needs in relatively challenging environments. As of April 2024, CBSA members served over 274,400 people, serviced over 16,800 CBS toilets, removed over 23,600 tons of sludge, and provided over 610 jobs, operating over nine countries and 25 municipalities.

## ii. Benefits and applications

**CBS offers a flexible, scalable approach, particularly suited to densely populated urban areas, informal settlements,** and regions where either land use or environmental conditions pose significant challenges to standard sanitation practices. Key benefits include:

- **SAFELY MANAGED:** By ensuring that waste is securely contained, CBS significantly reduces the risk of environmental contamination and exposure to pathogens, contributing to public health and well-being. In several contexts, it has been adopted due to its potential to limit localised pollution of water bodies and the environment. Globally, a range of CBS providers have also explored the benefits that CBS offers to the circular economy, by recycling and reusing waste safely.
- **CAN WORK IN DIFFICULT AREAS:** The primary beneficiaries of CBS are residents of areas where conventional sanitation is inaccessible. This includes informal settlements, which often lack the infrastructure for traditional sewer systems. To date, CBS has been delivered primarily in urban and peri-urban contexts, but it has potential in other contexts. It is suitable for many areas where environmental conditions – such as those with high water-tables or at risk of flooding – make conventional systems impractical. CBS provides a dignified, safe, and hygienic sanitation option for these communities, directly impacting their health, environment, and quality of life.
- **ADAPTABLE:** CBS's flexibility makes it a potentially adaptable option for disaster-stricken areas where quick and effective sanitation solutions are crucial. Thanks to removable and sealable containers, CBS systems are climate resilient and can survive, function and quickly recover in the face of climate-related shocks, chronic stresses and seasonal variabilities, such as flooding and drought, to ensure that faecal matter is safely contained throughout the sanitation service chain. CBS systems also use little if any water and are thus well suited to areas facing water scarcity.
- **CLIMATE-SMART:** Furthermore, research increasingly demonstrates that addressing emissions from sanitation can greatly support climate change mitigation. By quickly treating waste and production of reuse products such as soil amendments (compost, biochar), alternative fuel (biofuel, biogas, briquettes) and black soldier fly animal feed, CBS systems emit much less methane – making it a climate-smart approach. Efforts are being made to use these diverse climate contributions as rationale for accessing climate finance.

Read more about benefits on the CBSA website: [cbsa.global/benefits](https://cbsa.global/benefits)

## A NOTE ON LANDLORDS, RENTERS AND THE BENEFITS OF CBS

There is often a relatively complex interplay between land tenure and sanitation in cities in developing countries and emerging markets. The way that urban sanitation challenges are dealt with can be significantly impacted by issues around land tenure as well as by renting patterns.

In cities with high proportions of renters, persuading people to invest in local sanitation infrastructure can be a challenge, particularly in informal settlements. Landlords are not always incentivised to invest in improvements. In many places, regulation is not properly enforced, for example in Haiti where it is technically illegal to rent a house without a toilet. Tenants, fearing eviction or rent increases, may not demand better sanitation. In areas with greater proportions of ownership, even though residents may invest in individual solutions, co-ordinating neighbourhood-wide sanitation programmes can be challenging. The actual, or suspected, transient nature of renters can also influence investment decisions.

From the perspective of local authorities, where land ownership is contested, installing permanent sanitation can be perceived as conferring legitimacy on existing and contested settlements. In such contexts – such as informal areas with a significant proportion of renters or in settlements with contested land tenure – CBS can offer a practical solution. With CBS toilets being both non-permanent and portable, with easy installation and relocation, many of these challenges can be sidestepped. Moreover, in some areas, such as Durban in South Africa, CBS providers have had success in bringing on board landlords looking to improve their properties by installing a CBS toilet.



A Kaloola toilet in Durban, South Africa Credit: Loowatt / Kaloola

### iii. Funding model

CBS is delivered through a range of models, including as a public service and by social enterprises. Where it is offered on a user-pays principle, households contribute a small, affordable weekly or monthly fee to pay for the service.

However, revenue from collection fees doesn't always cover the full costs of the service. This funding gap is not unique to CBS; it's a common challenge for safely managed sanitation services, particularly those serving poor communities. It is increasingly accepted that one of three service challenges will need to be compromised in any given case: i) profit/commercial viability, ii) serving low-income customers/ the mass market, and iii) disposing of waste safely.<sup>4</sup> See more on this in [chapter four](#).

In recognition of the social, environmental, and economic benefits of providing sanitation to all, the public sector or external donors have frequently chosen to subsidise CBS services. Such subsidies are not atypical for pro-poor sanitation services that are safely managed. However, these subsidies have tended to be limited and time-bound, which have constrained the expansion of CBS services.<sup>5</sup>

## 1.2 Case study: Providing services to vulnerable residents in Cape Town's informal settlements

The city of Cape Town provides two kinds of services that it calls CBS, which serviced a total of 36,500 toilets as of 2024.<sup>ii</sup> The experience of Cape Town showcases how CBS can be championed by a municipality or a utility. In this case, partly driven by a desire to provide services in difficult areas and increase safety for women and children.

In Cape Town – a city of between four and six million people – over a quarter of the residents live in informal settlements. Notably, a sprawling area of low marshy terrain called the Cape Flats houses upwards of one million people. Characterised by sandy soils and proximity to wetlands, the Cape Flats present unique challenges for traditional sanitation solutions. Not entirely coincidentally, the City of Cape Town is one of the largest providers of CBS on the planet.

Historical attempts to bring conventional sewer systems to the Cape Flats met with limited success, hindered by the area's sandy soils and frequent flooding. The same soils, combined with a frequently high water-table, have also challenged pit latrines and septic tanks.



Informal settlements in Cape Town. Credit: Supplied to GreenCape.

Meanwhile, sanitation access has been a hotly contested political issue in South Africa for more than a decade. Spurred on in part by this political competition, in 2013, then-mayor Patricia de Lille, announced the rollout of thousands of portable sanitation units. This initiative was announced as the final eradication of bucket toilets, something that had become a symbol of apartheid-era inequality – and a stick to pillory politicians with. The rapid deployment of 23,000 portable sanitation units, bought from an Italian provider of camping equipment, was widely publicised. CBS was pitched not just as an innovative solution, but as a way to provide immediate, dignified sanitation options.

A particular driver for providing CBS options was improving safety for women and girls and recent research confirms that they particularly value the service.<sup>6</sup>

Over time the City's CBS offering has converged on two primary services: portable flush toilets (PFTs) and container toilets. Collectively 36,500 remain in service as of 2024.

PFTs, issued to individual households, offer a safe, private alternative to shared facilities – which are more commonplace. The PFTs are lightweight, portable and easy to use. They can also be accommodated within the small dwellings that characterise many of Cape Town's informal settlements. PFTs are especially appreciated by disabled individuals, partly down to their user convenience, partly because of legitimate concerns around nighttime safety. Container toilets are a type of CBS that is integrated within precast concrete structures and are shared facilities, serving multiple households.

The City contracts out the servicing of the CBS units – with outside firms responsible for the regular collection, cleaning, and maintenance of the containers. This frequent servicing (four times a week for PFTs) is crucial for preventing overflows and maintaining sanitation standards. The waste is transported to a specialised faecal sludge management facility at Borchers Quarry, where it undergoes treatment and processing. The service is funded by the municipal water and sanitation budget, supported by volumetric sewerage and water rates charged to wealthier residents.

There is significant demand for CBS services, something that is not easy for the City of Cape Town to keep up with. That said, there has been some dissatisfaction with the service, linked to issues around smell, service disruption and cleanliness challenges during emptying.<sup>7</sup> Keen to address this, the City has invested considerably in addressing complaints, developing quality guidelines,<sup>8</sup> engaging with communities and negotiating with contractors. Understanding the community's needs and concerns has been a central preoccupation.

When it works well, CBS makes a significant contribution to a cleaner urban environment, reducing faecal waste polluting the local environment (which threatens the health of children in particular). Moreover, given the water scarcity challenges faced in Cape Town - home of the infamous Day Zero water crisis – it helps that CBS systems require much less water than flush toilets.

Some projections suggest that 53% of all new Cape Town households in the next two decades could be informal. With a challenging economy, and few viable alternatives, demand for innovative sanitation solutions is not going away. In Cape Town, as elsewhere, informal settlements often develop on marginal land. This brings with not just issues around land tenure but makes it hard for these new settlements to be

connected to existing water supply and sanitation networks. In responding, CBS is a valuable tool for the municipality to act quickly – one reason that CBS has proven an enduring and valuable component of the City’s long-term urban sanitation planning.



Community focus group session held in Cape Town by CORC. Credit: Supplied to GreenCape.

## 1.3 Conclusion

CBS has already contributed to addressing urban sanitation challenges, particularly in areas where traditional infrastructure struggles, but its impact remains limited in scale. This is partly because market forces alone can’t be relied on to drive deployment of safe sanitation, there is much need for public support, not just in financial terms. Authorities can make the path for innovative service providers easier, through policies, laws and permits as well as public contracting and funding. To fully realize its potential and support global sanitation goals, CBS must be integrated into existing sanitation systems. Partnering with utilities and municipalities is crucial for scaling CBS, as these entities have the infrastructure, capacity, and legal mandate to implement and expand it to underserved communities. Their ability to navigate regulatory frameworks and secure essential resources positions them to accelerate CBS adoption and enables them to create more flexible, comprehensive urban sanitation solutions.

## 2. WHY MAINSTREAM CBS?

### KEY TAKE AWAYS

CBS remains a critical approach for increasing sanitation coverage:

**A significant need:** CBS can support making commitments to Leave No One Behind a reality by providing to sanitation to marginalised communities, particularly those living in informal settlements, where over a billion people currently reside.

**Inclusive:** CBS significantly benefits women, girls, older people and people with disabilities by providing increased safety, privacy, and overall well-being, crucial for their health, education, and economic opportunities.

**Encouraging trends:** There are increasingly stronger and deeper partnerships between CBS providers, utilities, and governments. A few trends underpin this, including a greater acceptance of the need for long-term subsidies for sanitation, heightened awareness of the links between sanitation and climate and a general move towards Citywide Inclusive Sanitation approaches.

**Climate-smart:** CBS is valuable approach in the face of the escalating climate crisis, as it produces fewer greenhouse gas emissions, is resilient to climate shocks, can ensure continued service during extreme weather events and is water saving.

## 2.1 A significant unmet need

More than a billion people currently live in informal settlements globally, the number of which continues to increase in the face of widespread urbanisation.<sup>9</sup> Of these, over 700 million urban residents live without improved sanitation services. This lack of access leads to severe health and environmental problems, as human excreta are often not disposed of safely, contaminating food and water sources.<sup>10</sup>

There also are significant inequalities in access to sanitation within informal settlements, particularly affecting vulnerable populations. A lack of adequate sanitation disproportionately impacts women and children, who face increased health risks and barriers to education and economic opportunities. Poor access to sanitation also increases the risk of violence and harassment for women and girls, who often face threats to their safety when accessing sanitation facilities, especially after dark. Older people and people with disabilities often face additional challenges and affronts to their dignity due to inaccessible toilets, making them more susceptible to disease and at greater risk of abuse. All this before one considers the broader socio-economic impacts of poor sanitation.

On the other hand, women and girls especially experience significant gains in quality of life when sanitation access is improved.<sup>11</sup> Improved sanitation facilities lead to increased safety, privacy, and overall well-being for women and girls – all crucial contributors to their health, education, and economic security. Research has found that CBS is particularly valued by women.<sup>12</sup> Given that CBS can help address exactly these challenges, there is scope for it to make significant and important contribution to leaving no one behind.



A Sanima employee delivering a CBS toilet to a customer located in the hard to access and water-scarce settlements around Lima where the provider operates. Photo: Sanima

**“The small scale of individual providers creates a fragmented view of CBS impact potential. Viewed individually, the scale of individual enterprises is dwarfed relative to the need for safe sanitation.”**

Outcomes-Based Finance for Container Based Sanitation, Social Finance, 2023

## 2.2 Supportive trends

Although CBS adoption may not yet have grown at the speed required by global sanitation needs – or hoped for by its advocates – several encouraging trends are emerging. These include: the paradigm shift to Citywide Inclusive Sanitation (CWIS), increasing partnerships between public entities (such as water and sewerage utilities) and sanitation entrepreneurs, growing recognition that most safely managed sanitation services require subsidies and growing awareness of sanitation-climate linkages that highlight CBS’s advantages for climate adaptation and mitigation.



Fresh Life Operator in Nairobi, Kenya. Photo: Fresh Life

## i. The shift to City-Wide Inclusive Sanitation

CWIS is a public service approach to urban sanitation focused on inclusivity and sustainability. CWIS has an explicit focus on reaching marginalised groups, improving health outcomes and service delivery across an entire urban area. At the forefront of promoting the CWIS approach are global and regional funding organisations such as the World Bank, Inter-American Development Bank, Asian Development Bank, the Bill & Melinda Gates Foundation and UN-Habitat.

CBS aligns well with the CWIS framework by offering a flexible, scalable solution particularly adept at serving dense urban areas and informal settlements – areas where traditional infrastructure might not be viable. With CBS filling a niche that other sanitation offerings struggle to serve, it scores highly on both ‘city-wide’ and ‘inclusive’.

Consequently, the World Bank has officially recognised the need for CBS to be included in the menu of sanitation options – to enable comprehensive and inclusive urban sanitation strategies. The suggestion is that by integrating CBS into CWIS, stakeholders can enhance the adaptability and resilience of urban sanitation systems, ensuring that no one is left behind.

CWIS is not just about extending and sustaining sanitation services across urban areas – it also aims to improve health outcomes. Health outcomes tend to rely on a certain density of safe sanitation provision, making the gap-filling role of CBS highly relevant. Importantly, this can be achieved cost effectively.

### LEVERAGING COMMUNITY BONDS TO REAP THE BENEFITS OF FULL SANITATION COVERAGE

In Peru, historically many families and entire neighborhoods migrated to the outskirts of Lima, settling in areas without infrastructure, financial support, or social safety nets. In response, these communities organised themselves to meet their basic needs, including access to food, safety, and water.

This collective effort extended to securing further communal necessities such as roads, stairways, retaining walls, and legal representation to secure government recognition of property deeds and access to basic services. Today, much of Lima is divided into community-based territories consisting of 50 to 200 households, each with its own administrative structure.

Recognising the critical importance of full sanitation coverage for public health, the CBS provider [Sanima](#) is piloting a model that serves entire territories rather than individual households. By targeting communities as a whole, the model leverages the existing bonds and organisational frameworks within these communities to ensure safe and comprehensive sanitation services.

## ii. A growing track record of partnership

For several decades there has been a push for stronger and wider partnerships between public entities (such as water and sewerage utilities) and sanitation entrepreneurs. Whilst there is still room for improvement, progress is being made.

In line with this trend, CBS providers are increasingly asking – and being asked – to partner directly with local authorities and water utilities. This can take various forms, one being where the CBS provider is contracted on behalf of the municipality or utility to provide services to residents. Contracts with public bodies – or the occasional private sector utility – can offer each party advantages. Examples of innovative collaborations between sanitation authorities and CBS providers include burgeoning relationships in Lusaka (Zambia), Nairobi, Mombasa and Kisumu (Kenya), Kumasi (Ghana) and Cap-Haitien (Haiti).

For municipal authorities, or their equivalent, such partnerships can offer a route to reaching citizens that otherwise remains elusive. An important consideration is that CBS can help to lower the upfront capital costs of infrastructure provision.

For CBS providers, such collaboration can also make it easier to navigate – or influence – the existing regulatory landscapes, which can have important impacts on their operations. Collaboration is also essential for CBS providers seeking to access public funding.

**“Most local governments rarely engage directly with sanitation entrepreneurs in order to support and encourage them, rather than to regulate and control them ... yet productive dialogue between the public and private sector is fundamental to the creation of partnerships and markets that are inclusive and innovative.”**

Sanitation - Just Another Business? Building Partnerships for Development, 2010<sup>13</sup>

### iii. Rising acceptance of the need for public subsidies for non-sewered sanitation

There is some evidence that public subsidies for non-sewered sanitation are gaining acceptance globally.<sup>14</sup> Take Kenya, where the government's National Water and Sanitation Investment Plan aims to incorporate non-sewered options alongside traditional sewer systems to achieve 100% coverage of safely managed sanitation. National sanitation goals were recently revised from 80% sewers and 20% non-sewered sanitation, to 40% and 60%, respectively.

This shift, which is significant, will not only require partnerships between the public sector and private operators – but the (re)allocation of public funding to ensure successful implementation.

It also helps that non-sewered sanitation is being explicitly supported by influential organisations and becoming more mainstream. One example is the creation of ISO standard 30500, a standard that is aimed at non-sewered systems (in this case prefabricated integrated treatment units). Another is IWA's hosting of the first Non-Sewered Sanitation Conference in South Africa in 2023.

**“Sanitation is a public good in need of public funding that will allow everyone to benefit from improved health as well as social and economic development. Poor sanitation creates serious negative externalities, creating public health hazards and jeopardizing economic development for all. Conversely, good sanitation generates economic benefits and unlocks human productivity.”**

State of the World's Sanitation: An urgent call to transform sanitation for better health, environments, economies and societies,  
UNICEF and WHO, 2020

## iv. Heightened awareness of sanitation-climate linkages

The WHO has noted that “poorly managed sanitation systems impacted by climate hazards create major health and contamination risks, and also contribute significant greenhouse gas emissions.”<sup>15</sup>

Sanitation services themselves are particularly vulnerable to the climate crisis. Extreme weather events, such as floods and droughts, can damage infrastructure, disrupt service delivery, and increase contamination risks. Hence the impetus behind the Climate Resilient Sanitation Coalition – a group that works to integrate sanitation into climate policies, ensuring that both adaptation and mitigation strategies are included in planning and implementation processes.<sup>16</sup>

Recent research by WaterAid in Mozambique into climate-resilient sanitation is emblematic of this growing awareness.<sup>17</sup> The research emphasized the importance of resilient infrastructure that can withstand extreme weather events and highlighted the need for substantial investment in innovative, climate-smart sanitation technologies and facilities to protect vulnerable communities and ecosystems.<sup>18</sup>

Concerning emissions, some findings are particularly alarming, such as research that revealed that over 50% of a city’s total emissions in Kampala, Uganda, could stem from sanitation.<sup>19</sup> This has fueled a growing interest in climate-smart sanitation strategies aimed at reducing emissions throughout the entire sanitation service chain. A 2023 USAID report on the climate impact of sanitation specifically advocated for investment in CBS, highlighting its significant potential for methane reduction.<sup>20</sup>

As CBS produces fewer greenhouse gas emissions, is water saving and resilient to climate events, it presents a promising solution to mitigate both the environmental and health risks associated with traditional sanitation systems.

**“For example, although CBS is not a universal solution, adoption by the population using dry pit latrines with unlined pits below the groundwater table in urban Sub-Saharan Africa can reduce projected methane emissions in 2030 by around ~12.0 percent.”**

Managing the climate impact of human waste – a study to understand the impact of methane emission from faecal sludge and potential abatement approaches,  
USAID, 2023

## 2.3 Case study: Zambia, an enabling context come to life

**Zambia exemplifies an ideal environment for CBS implementation, characterised by several key factors: utilities have expanded their mandates to include non-sewered sanitation; national policies now integrate non-sewered sanitation solutions; mechanisms are in place to focus on low-income users; and efforts are underway to formalise the informal sanitation sector. Additionally, in Lusaka, the introduction of decentralised treatment facilities provides further incentives for CBS pilot projects, contributing to an ecosystem supportive of innovative sanitation solutions.**

In Zambia, approximately 5.1 million people lack access to adequate sanitation facilities.<sup>21</sup> Yet over the last two decades Zambia has invested significantly in refining the architecture of its water and sanitation sector, in part via the establishment of an autonomous regulator (NWASCO) and the creation of independent, autonomous utilities. Originally called water and sewerage utilities, their mandate shifted in the mid-2010s to focus explicitly on sanitation. For instance, Lusaka Water was officially renamed Lusaka Water and Sanitation Company (LWSC) in 2019, and the regulator directed all utilities to change their names include sanitation instead of sewerage by 31 July 2019.<sup>22</sup>

In Zambia, there has been a recent push towards the formalisation of the sanitation sector, with existing service providers – including both the operators of vacuum trucks and manual emptiers – integrated into formal modes of service provision (a transition facilitated through the development and enforcement of guidelines, licensing, and service provider certification).

In Lusaka, these changes have been accompanied by the introduction of decentralized faecal sludge treatment plants. These facilities treat waste near its source, providing a practical solution in areas lacking traditional sewer infrastructure or where existing systems are overwhelmed. This decentralized treatment infrastructure can reduce the logistical challenges and costs of transporting waste from pit latrines, septic tanks, and CBS services to centralized treatment facilities.

In a strategic effort to address Zambia's sanitation challenges, LWSC is partnering with the CBS provider **Fresh Life** to deploy CBS solutions in peri-urban and low-income areas. The partnership's phased rollout of CBS began with a pre-pilot in Kafue District's Zambia Compound, installing six Fresh Life toilets to enhance access to non-sewered sanitation and assess the impact for future scalability. Following a successful pre-pilot phase, the project will scale up with the deployment of 200-300 Fresh Life toilets over the next year. LWSC has committed both financial and in-kind support, contributing \$195,000 to the project and providing administrative and operational office space, as well as warehouse facilities for storing Fresh Life toilet parts. Additionally, LWSC is

offering waste discharge services at its Kafue treatment plant at no cost, further enhancing the project's feasibility.

This partnership highlights the potential of CBS to complement traditional sanitation methods, particularly in areas where conventional sewerage systems are either unfeasible or insufficient. By integrating CBS into the formal sanitation landscape, Zambia is pioneering innovative approaches to meet the specific needs of its low-income and peri-urban communities.



Fresh Life and Lusaka Water Supply and Sanitation Company colleagues visit CBS pilot in Kafue District, Zambia. Credit: Lusaka Water Supply and Sanitation.

## 2.4 Conclusion

The need for improved sanitation is urgent, with over 700 million urban residents lacking access to adequate services. CBS presents a flexible and effective solution, especially for underserved communities in informal settlements, offering safety, privacy, and dignity to vulnerable populations. Recent developments, such as CWIS, growing partnerships between CBS providers, governments, and utilities, and increasing acceptance of public subsidies, have created a more favourable environment for CBS adoption. Its rapid deployment and lower costs make CBS an attractive alternative to traditional sewer systems, particularly in resource-constrained areas. Despite these advantages, CBS has not scaled as expected. The following chapter explores the reasons for this.

## 3. UNDERSTANDING CURRENT SCALE

### KEY TAKE AWAYS

**Relatively slow growth:** Comparison of CBS with PAYG solar services is instructive with CBS having grown slower than PAYG solar.

**Community engagement:** Unlike PAYG solar, which involves selling products to individuals, CBS is a service which requires significant community engagement and trust-building to introduce new sanitation solutions.

**Institutional engagement:** CBS providers must navigate complex regulatory environments and often face conflicting policies that impede scaling.

**Key gatekeepers:** CBS relies on institutional support from utilities and regulators, and key decisions by external parties can either drive or halt its progress.

**Market conditions:** CBS requires a concentrated customer base for operational efficiency, unlike PAYG solar, which can scale across dispersed users.

## 3.1 A study in contrasts – a cross-sector comparison

The growth of CBS has been slower than expected, particularly when compared to the rapid expansion of the Pay-As-You-Go (PAYG) solar industry. Both CBS and PAYG solar offer affordable solutions for low-income households, but differences in regulatory, industry, and cultural factors have impacted their trajectories.

PAYG solar has transformed access to energy in developing markets, particularly in East Africa. Companies like M-KOPA, which began in Kenya in 2012, rapidly scaled up. By 2014, M-KOPA raised \$20 million and by 2015, had sold 80,000 solar home systems, doubling that figure by 2017. By 2023, M-KOPA had 3 million customers across multiple countries and expanded to selling smartphones and electric motorcycles.

In contrast, in 2016, a single PAYG solar firm sold 40,000 units, about ten times more than all CBS members combined in 2021. The disparity can be attributed to four factors: cultural perceptions, systemic challenges, gatekeepers, and customer density. This chapter explores these elements in more detail.

### i. Cultural perceptions

Sanitation service provision is a deeply local affair. Cultural perceptions and ingrained social norms play a crucial role in the adoption – or rejection – of CBS. Introducing new sanitation options requires overcoming community scepticism and building trust – often at a community level, which is hard. Thus, unlike PAYG solar – who can sell to individuals as individuals – CBS necessitates a deep understanding of local contexts and engagement strategies specific to each community. CBS providers invest significantly in community engagement to understand user needs and co-develop solutions that are tailored to their specific contexts. Crucially, PAYG solar is a product, and CBS is a service (with providers removing and treating waste on an ongoing basis, something far less relevant to PAYG solar providers).

Furthermore, local government officials and community leaders' willingness to adopt CBS solutions can also significantly drive adoption, as seen in the case of Cape Town. This is true both at the very local level, where CBS might need a license to operate within certain communities – and higher levels, where decisions made by the mayor or councilors are influenced by the interweave of political, financial, and social considerations.

As Cape Town suggests, CBS can speak particularly to political leaders who are serious about tackling inequality in their jurisdiction. Politicians may also value the job creation and economic returns brought by CBS, alongside any discussion of public health benefits and rapid improvements in living conditions. Moreover, if flooding or cholera have been recent challenges, the climate resilience of CBS can provide a persuasive argument for its adoption.

## THE VALUE OF PARTICIPATORY SERVICE DESIGN

Community engagement has been key to the success of container-based sanitation (CBS) programs in countries such as Kenya, South Africa, Madagascar, and beyond. The City of Cape Town is making it a priority to engage both communities and researchers.

Participatory processes and continuous dialogue with target communities go beyond simply understanding their needs and designing culturally appropriate CBS models. These approaches help build a social license to operate, which is essential for any new technology, especially sanitation solutions. This requires earning trust and demonstrating the tangible benefits of the service.

**Mosan**, a CBS provider in Guatemala, exemplifies the value of participatory service design<sup>23</sup> by actively involving local communities in every step of its service development. By including community leaders in identifying families for the service, Mosan ensures the system is culturally appropriate, and its benefits are clearly understood. This collaborative decision-making process fosters trust and has led to community members themselves becoming champions for CBS.

In this process, Mosan uses a multi-actor model where community leaders, local authorities, health clinics, NGOs, and other stakeholders are involved in designing sanitation services. Through capacity building and stakeholder coordination, the community is empowered to lead the service in the long term. Mosan's strategy fosters creativity, problem-solving, and shared ownership, leading to higher adoption and sustainability of the CBS system.

The inclusive and participatory design not only challenges power dynamics but also promotes co-ownership and empowerment, ensuring that communities are actively involved in maintaining and growing the service after implementation. The ultimate goal is for the service to become fully community-led.

## ii. Systemic challenges

CBS faces a patchwork of policies and conflicting regulation. These frameworks can act as substantial impediments to scaling, with CBS providers having to navigate a patchwork of institutional responsibilities. Unlike PAYG solar, they must deal with regulatory standards more often tailored to traditional sanitation systems.

In India, the concept of CWIS has been enthusiastically embraced by some municipalities and states. Indeed, on the surface, India is a very promising market for CBS, sharing many of the factors that have made the City of Cape Town a major CBS provider. Yet whilst Indian cities such as Wai and Sinnar have adopted CWIS principles – and the national government has championed sanitation via its Swachh Bharat campaign – there are no known CBS providers currently operating in India.

The reason? A law against manual scavenging – initiated in 1993 and reinforced in 2012 – has been championed by various important role-players, including civil society organisations and human rights activists. The consequences of this legislation have effectively prevented the implementation of CBS systems in India, as they could potentially be interpreted as a form of manual scavenging.

The purpose of highlighting this is not to pick out India as uniquely hostile to CBS. The example merely illustrates that while contexts – and global trends – can indeed be enabling, certain factors can be equally disabling.

**“The policy and regulatory framework for CBS services is unequally developed. CBS is a functionally distinct category of sanitation, but it has yet to be recognized as such by most policymakers and regulators as it is still a relatively new approach. Its association with bucket latrines among some policymakers in Ghana and elsewhere has left CBS in a legal gray area.”**

The world can't wait for sewers: Advancing container-based sanitation businesses as a viable answer to the global sanitation crisis,  
EY (Ernst & Young) and WSUP (Water & Sanitation for the Urban Poor), 2017

### iii. Gatekeepers

While PAYG solar operators can pitch directly to customers, CBS is not a simple business-to-customer proposition and involves more complex institutional engagement. As a service, the nature of the sanitation chain means engaging the authorities in a way that mobile solar providers do not have to. There is thus more that can stall or undermine innovative sanitation solutions, including gatekeepers as well as mere institutional inertia.

Pivotal decisions by external parties can significantly shape whether and how CBS is adopted:

- **UTILITIES:** The role of utility managers can be pivotal. Decisions to integrate CBS, like in Cape Town and Laguna Water, depend on considerations around financial viability, regulatory compliance, and operational concerns. Utilities may also worry about managing raised expectations in informal settlements and their engineers can be concerned innovative aspects of CBS. Even when not directly contracting services, utilities can affect CBS by deciding whether to accept CBS waste for treatment.
- **REGULATORY AUTHORITIES:** Regulatory bodies that typically need to approve new sanitation solutions play a crucial gatekeeping role. Their acceptance or rejection of CBS as a viable sanitation solution can make or break its adoption. This is evident in the [case of Laguna Water in The Philippines on p34](#), with regulatory approval crucial for the approval of the cross-subsidy model that underpinned the project vision. Regulators can also come in via non-financial matters – such as health and safety or environmental concerns.
- **DEVELOPMENT FINANCE INSTITUTIONS (DFIS):** DFIs or their equivalent can play positive or negative roles. Many sanitation projects in developing countries and emerging markets benefit from cheap(er) funding that is made available to infrastructure projects in low- and middle- income countries. DFIs are both the root source of some of this funding – as well as influential in thinking about what should get funded, how and why. Where DFI representatives are sceptical about CBS, whether because of concerns around the financial sustainability of CBS projects or for other reasons, they can have a chilling effect on innovation and adoption.

**“Our analysis suggests that a purely private enterprise model of CBS provision is viable on paper, given the right circumstances, but that those circumstances may rarely converge in reality. Making CBS work at scale – and in a sufficient range of conditions to make a dent in the global sanitation crisis – needs investment and support from donors, financing institutions and governments at national and metropolitan levels.”**

The world can't wait for sewers: Advancing container-based sanitation businesses as a viable answer to the global sanitation crisis, EY (Ernst & Young and WSUP (Water & Sanitation for the Urban Poor), 2017<sup>24</sup>

## iv. The importance of customer density

PAYG solar does not require the same customer density as CBS, though it remains somewhat relevant. MKOPA's initial product offered a major improvement over candles, paraffin lamps, and car batteries, making it easy to attract customers.<sup>25</sup> In contrast, CBS competes with existing options like pit latrines and shared public toilets, leading to a more dispersed customer base. This makes it harder for CBS providers to achieve the local economies of scale necessary to lower costs.

PAYG solar involves a one-off distribution of a physical product, requiring minimal ongoing interaction after installation. Customers can be geographically spread out, with the main interaction being payments, often handled remotely. CBS, on the other hand, requires regular waste collection, necessitating a concentrated customer base to remain operationally efficient and cost-effective.

The difference in service models affects scaling. PAYG solar can easily attract customers, even if dispersed, as each new user functions independently. CBS, however, requires a critical mass of customers in one area to keep the cost of waste collection and treatment to a reasonable level. Competing with other sanitation options further complicates CBS expansion, as convincing enough people to switch is difficult.

In summary, customer density is crucial for CBS. CBS needs localised economies of scale to offer affordable services, posing a unique challenge in achieving the rapid growth seen in PAYG solar.

### A VIABILITY STUDY ON THE POTENTIAL OF CBS IN KATHMANDU

A 2019 study focusing on the capital of Nepal considered logistical and practical factors essential for market entry of CBS services. These factors including distance to treatment plant, traffic levels, accessibility for emptying and transfer, and the existence of an acceptable treatment plant or recycling facility.

Early on the researchers concluded that there were not enough potential customers in any one specific community to sustain an autonomous CBS operation. To progress, the study aggregated four different informal settlements across Kathmandu and, even then, found too many barriers to entry. A key challenge flagged by the authors was that beyond merely the total number of possible customers in a given area, the density of those customers is crucial.<sup>26</sup>

## 3.2 Case study: a utility experiments in The Philippines – the case of Laguna Water

**The case of Laguna Water, explored here, illustrates both the potential and challenges of utility-led CBS implementation. While initial regulatory changes and community engagement showed promise, a leadership change halted the project's scaling. Despite its discontinuation, the project left a positive legacy in regulatory reforms and demonstrated the importance of sustained institutional commitment for successful CBS adoption.**

Laguna Water is a privately run water utility, with more than 130,000 water service connections, on the main island of the Philippines. Private utilities are relatively common in the Philippines and have responsibility for sanitation as well as water services. From around 2015 onwards Laguna Water showed keen interest in testing CBS and worked with several international partners and donors in order to get a pair of influential pilot projects running.

The Philippines, like many emerging market countries worldwide, still has many people living in informal settlements. Getting access to these settlements is difficult and many households live on marginal land, often with uncertain land tenure. Frequently, providing conventional infrastructure – whether sewer connections or septic tanks – is difficult (either expensive, technically challenging, or both). At the same time, those living in informal settlements are used to using local ponds and water sources for water needs, particularly non-drinking water ones. Yet with high population densities and poor sanitation coverage, these water bodies are increasingly polluted and unsafe. Partly to safeguard the environment, partly to find ways to expand sanitation coverage in such contexts, Laguna Water was driven to test the viability and community acceptance of CBS (which it called Portable Toilet Solutions, or PTS) in two localities – Barangays Don Jose, Pooc, and Macabling, Sta. Rosa.

The utility received international grant funding to simultaneously test two innovative container toilet prototypes, initially across 30 households but with a view of scaling to reach 30,000 households. Several factors were in favour of a CBS pilot, including that senior management had long had an interest in how private utilities can reach low-income communities and how national regulations could accommodate and drive this. Moreover, there was already a cross-subsidy between water revenue and sanitation spending in place. Laguna Water advocated for an amendment to existing regulations around how this cross-subsidy was applied, ensuring that it could also be applied to CBS. They also needed to have CBS acknowledged by the regulator as an appropriate means of sanitation provision, something that was aligned with safely managed sanitation in the country.

Community members were engaged to champion CBS locally, helping the initial success of the pilot and shaping an intervention that was both culturally and contextually appropriate. Households were enthusiastic particularly about one of the

systems and, consequently, Laguna Water took an initial decision to scale up the use of a system produced by **Loowatt**.

While the pilot projects did not reach commercial scale the lessons learned provided valuable information and insights. A positive legacy remains with the changes in regulatory and policy frameworks. The cross-subsidy mechanism from bulk water purchases remains in place. As such there is potential for future projects – in the Philippines and elsewhere – to build on the initial groundwork laid by the Laguna Water pilots even as direct implementation has come to a halt.

### **3.3 Conclusion**

This chapter highlights the significant barriers and opportunities affecting the scale of CBS compared to the PAYG solar industry. While CBS offers crucial sanitation solutions for low-income communities, its slower growth relative to PAYG solar can be attributed to cultural perceptions, complex regulatory and policy environments, institutional gatekeepers, and the need for high customer density. Unlike PAYG solar, which benefits from relatively straightforward product distribution and less frequent interaction, CBS must navigate ongoing service requirements and broader systemic challenges. The case of Laguna Water in the Philippines exemplifies the potential of utility-led CBS initiatives but also underscores the importance of sustained institutional support and regulatory alignment. These insights are crucial for understanding the current scale of CBS and the pathways needed to enhance its expansion and impact.

## 4. FLIPPING THE SCRIPT: THE BUSINESS CASE

### KEY TAKE AWAYS

**Subsidies are essential for all sanitation models:** Research highlights that no safely managed sanitation system, including sewers and CBS, can be sustained solely by user fees. Public subsidies are necessary, especially in low-income areas where residents cannot afford the full cost of services.

**CBS is a valuable complementary solution:** CBS provides a crucial bridge where traditional sanitation systems, like sewers, are either unavailable or years away. It can support immediate needs and help build demand for future infrastructure investments.

**CBS is cost-effective and adaptable:** CBS has lower upfront costs and is more flexible in dense, informal areas. Studies show that it is competitive with traditional systems over time, with additional benefits such as reduced water usage and operational efficiency.

**CBS fosters a transition to better sanitation:** CBS doesn't just provide an interim solution—it helps households transition to improved, long-term sanitation options, supporting development goals and urban infrastructure.

## 4.1 Unpacking financial sustainability

Certain early investors—and even some CBS providers—expected rapid scaling and financial sustainability, with user fees covering all costs and generating profit. However, as CBS services have grown, most have struggled to recover significant costs from user fees alone. This has raised concerns among some that scaling CBS might require increasingly large subsidies as the customer base expands.

At the same time, risk aversion amongst institutional WASH funders further contributes to the slow adoption of CBS. These funders, along with the utilities and municipalities they support, often hesitate to back CBS, perceiving it as a riskier, more expensive option compared to traditional sanitation systems like sewers, pit latrines, or septic tanks. Many still view sanitation through the lens of traditional infrastructure investments, which involve high upfront costs and lower ongoing operational expenses. Since CBS operates with the reverse structure – lower initial costs but higher ongoing expenses – this misalignment in cash flows fosters the misconception that CBS is more expensive in the long term, limiting investment in the model.

This chapter addresses these challenges by ‘flipping the script’ and reframing common beliefs about CBS with three key points: that all safely managed sanitation, including sewers, requires public subsidy; that CBS can complement traditional systems and drive adoption of other sanitation solutions; and CBS is a cost-effective option, comparable to existing approaches when viewed over the full lifecycle.



Clean Team employee, Ghana. Photo: Clean Team

**“Estimated to pay off at a rate of up to nine to one, the case for public investment in sanitation is unequivocal. Yet what frequently stands in the way is that authorities simply don’t have the large sums needed to pay for piped sanitation.**

**In this context, the key point about CBS is that it offers the same benefits — the safe collection of waste and its transport to a place where it can be treated and re-used — at a fraction of the capital cost of sewers.**

**This a significant point and it’s why municipal authorities should consider CBS carefully when thinking about how they can bring improved sanitation to their hardest-to-reach populations**

The world can’t wait for sewers: Advancing container-based sanitation businesses as a viable answer to the global sanitation crisis,  
EY and WSUP, 2017 <sup>27</sup>

## **i. CBS requires subsidy, but so does all inclusive, safely managed sanitation**

A prevailing belief in the sanitation sector is that all sanitation services should be able to recover costs through user fees. However, research shows that this expectation is unrealistic. A recent landmark study has shown that there are no genuinely low-cost ways to deliver safely managed sanitation, with the median costs for all systems lying between \$350 and \$550 in 2020. It also highlights that CBS systems have certain advantages, such as lower upfront capital costs and greater flexibility in densely populated and informal settlements.<sup>28</sup> Another study highlights that, in low-income areas, the cost of toilet construction alone often represents 4-13% of median household income and less than 10% of residents are willing to pay market prices.<sup>29</sup> Loans or payment plans may work for some, but for the majority, subsidies will be necessary – regardless of the technology used.

Certain approaches – such as sewers – benefit from implicit subsidies that are rarely discussed.<sup>30</sup> The approach of relying on cost recovery from users for sewers was abandoned in high-income countries long ago. In places like Europe, the USA, and Japan, sewerage systems were not built through full cost recovery; instead, the costs were spread across the public through taxes and cross-subsidies.<sup>31</sup>

CBS enterprises themselves, which deliberately price the service at affordable rates that usually do not recover costs, recognise that some of the most vulnerable people living in the areas they serve do not have the means to pay even the small fees they charge, despite wanting and needing the service. As a result, several enterprises have been exploring full and partial targeted subsidies for their customers to support them.<sup>32</sup>

**"Given the high cost of toilet construction relative to income levels, it is important to recognize that demand creation alone will likely not suffice to improve access to adequate toilets in low incomes areas (LIAs). "The proportion of survey respondents willing to pay market prices for toilet construction was consistently less than 10% .... [Yet] even when considered over a ten-year period, adequate sanitation represents 4–13% of the approximate median LIA household income ....as a result, while loans or instalments may be appropriate strategies for the wealthier fraction of LIA residents, adequate sanitation will likely not be accessible to the majority without household subsidies, independent of the technology option."**

How Much Will Safe Sanitation for All Cost? Evidence from Five Cities,  
Delaire et al, 2024 <sup>33</sup>

## ii. An investment in CBS is an investment in the wider sanitation market

While understanding the role of subsidies is crucial, it's equally important to understand CBS within the broader sanitation landscape and its value as a complementary solution alongside other sanitation options.

This is both in the short-term, where CBS can provide interim services in locations where sewers will take many years to reach, as well as in the medium-term, where CBS has proven that it can be a 'step on the journey' to other forms of sanitation coverage.

A surprising finding in a 2022 study examining customer churn in **SOIL**'s CBS operations in Haiti was that customers who stopped using SOIL's services were more likely to have done so because they had invested in a different form of improved sanitation (such as a flush toilet with a septic tank) instead of reverting back to public options or open defecation.

The takeaway is twofold: first, many people were happy to pay for CBS as an improvement on their existing situation; and second, that being a CBS customer was part of a journey, for them, to different modes and means of meeting their sanitation needs. This has sparked the interest of development banks who like to view CBS as a way of developing demand for infrastructure, which is a challenge they experience in those projects (see [Results-based financing in Haiti with SOIL and IDB Lab on p46](#)).

**“As such, CBS can be seen as a rapid intervention for demand creation and behaviour change. This has sparked the interest of development banks who like it as a way of developing demand for infrastructure, which is a challenge they experience in those projects.”**

Sasha Kramer, SOIL, 2024

### iii. CBS is good value sanitation

As well as its value as a complementary solution, CBS benefits from key financial and operational advantages. As we have seen, recent research has shown that no single urban sanitation model is truly "low cost," but that CBS is a cost-effective approach and stands out with its lower upfront capital requirements and greater flexibility, especially in dense, informal areas. These strengths make CBS a smart, adaptable option for tackling urban sanitation challenges head-on.

CBS sidesteps the hefty capital expenses tied to large sewer networks, making it a smart choice for urban areas where infrastructure investment is too costly. Notably, CBS compares well to other on-site sanitation options due to its relatively low operational costs and reduced water usage – a critical advantage in water-scarce regions. Recent evidence on this aligns and build on the findings of EY's 2021 CBS cost-effectiveness study looking at five CBSA members, which revealed that CBS models are lower cost than other traditional forms of provision.<sup>34</sup>

The recent African Sanitation Policy Guidelines note that if the cities of Kisumu, Nakuru, and Malindi address their sanitation needs by constructing sewerage, their costs would range from USD\$67-137 million. If these cities instead invest in onsite sanitation or CBS, the required municipal expenditures would only amount to USD\$4-17 million.<sup>35</sup>

CBS providers also introduce new efficiencies and revenue streams that utilities can tap into through public contracting. As such, CBS can offer both great value and may be a smart investment for long-term sustainability. CBS can be viewed not just as a stopgap solution but a long-term, affordable option with significant public health and environmental benefits.

**“Taking lifespan and total costs into account, CBS with well-managed emptying and treatment may be highly cost-efficient compared to other comparable services that do not convey stormwater.”**

Does "low cost" urban sanitation exist? Lessons from a global data set,  
Igarashi et al., 2023

## 4.4 Conclusion

Flipping the script on common beliefs about the financial sustainability of CBS reveals its true potential as a cost-effective, complementary solution in urban sanitation. While the approach requires subsidies, just like all safely managed systems, CBS offers flexibility and financial advantages that make it an attractive choice for underserved areas. By supporting CBS, decision-makers can strengthen the sanitation market, drive infrastructure demand, and ensure long-term public health and environmental benefits.

## 5. FROM NICHE TO NORM: HOW TO MAINSTREAM CBS

### KEY TAKE AWAYS

Key pathways for getting started with CBS include:

**Approach CBS as part of a sanitation continuum:** Adopt CBS as a steppingstone rather than an end goal to encourage adoption and integration of CBS into broader sanitation strategies to facilitate institutional buy-in and donor support.

**Be creative and harness the experience of CBS providers:** CBS providers have valuable experience to share, much of which is well documented or can be tapped into through consultants or the CBSA.

**Ensure services are co-created with communities:** Engagement with communities helps to foster acceptance, design culturally acceptable and user-friendly CBS models and increases uptake, satisfaction, and sustainability.

**Harness the benefits of a modular approach:** Specialisation in specific elements of the sanitation service chain can reduce cost and encourage scale. Modular CBS systems are easier for utilities to integrate into existing operations and can foster local competition, helping with public procurement.

## 5.1 Pathways to mainstreaming

Mainstreaming CBS represents a transformative shift in how sanitation solutions are perceived and implemented. This chapter explores key strategies for integrating CBS into broader sanitation frameworks, emphasising the need to transition from viewing CBS as a niche solution to recognising it as a valuable component within diverse sanitation strategies. By approaching CBS as an incremental step in the sanitation journey, leveraging existing expertise, engaging communities in co-creation, and harnessing its modular potential, stakeholders can enhance its acceptance and integration. This approach not only facilitates the broader adoption of CBS but also enriches the overall sanitation sector with innovative, adaptable, and community-focused solutions.



SOIL's CBS service in Haiti captures and safely treats over 500 metric tons of waste from these containers every year. Credit: SOIL

## i. Approach CBS as one step in the sanitation journey

Several of the pioneering CBS providers set out with the vision that CBS was a superior sanitation option and an end in itself. This conviction was often fueled by a strong commitment to circular economy principles as well as the potential to make significant water savings. Indeed, many emerging service providers have been drawn to CBS as a solution to water scarcity pressures.

For some stakeholders, this commitment has come across as somewhat evangelical. The CBS sector has generally shifted to seeing CBS as one component in a diverse range of sanitation solutions,<sup>36</sup> each with its own strengths and applications, an approach which is also more likely to lead to the conversations that can help to mainstream CBS down the line.

Furthermore, reframing CBS as a steppingstone is more likely to shift perceptions among institutional stakeholders and open doors for integration into broader sanitation strategies with two significant consequences.

Firstly, by viewing CBS as a steppingstone to more familiar forms of sanitation, institutions become more open to adopting it. This perspective was a key reason behind IDB's support for SOIL's first outcomes-based project, which was a major breakthrough for the sector (see [A paradigm shift in sanitation: results-based financing in Haiti with SOIL and IDB Lab, p46](#)). Water and sanitation providers no longer need to see CBS as a niche, permanent solution, but rather as a step that helps citizens and customers transition toward more traditional sanitation systems they are accustomed to.

Secondly, this can position CBS well for the types of institutions – such as utilities and government departments – that have influence over sanitation planning, budgets, policies and regulations. Importantly, donor agencies and philanthropists are more likely to provide support for pilots – or to help scale a promising approach – where they see evidence of institutional buy-in. To harness the energy of CWIS or similar approaches, CBS will need to demonstrate it complements the roll out of sewer networks or management of other on-site systems.

## RESULTS-BASED FINANCING IN HAITI WITH SOIL AND IDB LAB

**In early 2024, SOIL announced its groundbreaking partnership with IDB Lab's Outcomes for Change Fund (OCF) in Haiti – the first large-scale outcomes fund to be implemented in a fragile country context and small island developing state.**

The collaboration allowed SOIL to quickly expand the EkoLakay service into some of the most impoverished neighbourhoods in Cap-Haitien, increasing impact and setting a precedent for a new way to leverage development aid in a strategic and catalytic way. The project installed an unprecedented 1,301 toilets between October 2023 and August 2024 against an original target of 900, growing at three times the rate of the previous year.

Project partners include IDB Lab, Levoca Impact Labs and key government stakeholders including the Haitian Government Sanitation Authority (DINEPA) and the Ministry of Public Health.

IDB Lab's OCF funding focuses on outcomes rather than inputs, ensuring that funding is directly tied to tangible results. The partnership agreement also provides for a premium bonus payment linked to a 10-15% increase in improved sanitation access in the target communities. The goal of the partnership is to demonstrate a mechanism for increasing aid effectiveness by paying only for results achieved, while simultaneously creating a model for how development banks and philanthropic partners can support the scaling up of public service provision in a way that builds a bridge to future public sector financing and leadership.

## ii. Tap into the know-how of CBS providers

Utilities, donors and others interested in CBS do not have to dive straight in to advance their understanding of what CBS and how it can support their operations.

Not only is there an existing body of research on CBS – there is a growing set of practical implementation and learning tools available. Many of these can be accessed through the website of the CBSA, which also [stands ready to support partners interested in CBS](#).

The Alliance is developing its offering to new entrants and utility partners, recently working with the NGO GreenCape to develop [guidelines and best practices for CBS](#) to support services in South Africa. It has also published [a guide on getting started with CBS](#) and is currently working with WSUP on guidelines for contracting services in informal settlements.

Some organisations, such as [Citywise](#) and [Sanivation](#), also offer consultancy services – and engaging with these organisations on a consultancy basis is a great way to tap their expertise. These organisations can be essential knowledge partners and can open the door to conversations and on-the-ground contextual change that can enable CBS approaches down the line. Such engagements can also, in and as of themselves, lead to significant improvements in local sanitation systems, ultimately benefiting utilities, governments and communities alike.

**“This unusual sanitation system was created out of necessity. Environmental conditions in Wajir County, located in Kenya’s arid and semi-arid northeastern region, make conventional sanitation options like pit latrines or piped sewerage difficult to implement. The area’s high water table causes frequent flooding, making construction of pit latrines infeasible. For sewerage, large quantities of water are needed for a wastewater treatment – a tall order in water-scarce Wajir – and the capital costs would be immense.”**

How do we reduce waste woes in Wajir? Revamping existing on-site sanitation systems to achieve universal and safe sanitation,  
World Bank, 2023<sup>37</sup>

## **HOW A KENYAN MUNICIPALITY IS BENEFITTING FROM LEARNING ON NON-SEWERED SANITATION**

In Kenya's arid and semi-arid northeastern region, water scarcity combines with constrained budgets to make waterborne sanitation and networked sewers a near impossibility at scale. In Wajir County, this contributed to the development of municipal waste collection system – known as the bucket or nightsoil system – that was organised in zones, with each zone receiving weekly collection services.

However, over time, the service became unreliable, leading families to dispose of their waste haphazardly into the urban environment. The waste collection team often lacked adequate safety protocols, engaging in unsafe practices such as manually dumping overflowing waste buckets into exhauster trucks without using personal protective equipment.

Sanivation – having broadened their service offering to include consultancy work – has been supporting the County and the utility WAJIWASCO to address this situation. In doing so, Sanivation is leaning on its own CBS experience to introduce health and safety protocols, establish standard operating procedures, and train WAJIWASCO's and County Officials. The County has committed to investing in hygienic containers, vehicles for waste transport, personal protective equipment and a faecal sludge treatment facility.

### iii. Co-create services with communities

This pathway centres on reframing CBS as a collaborative, community-driven initiative, addressing cultural barriers and fostering local ownership. Lessons from this can also inform other types of sanitation approach, some of which tend to be more top-down (such as the rollout of new sewer networks, which can then struggle to have people connect).

By leveraging insights CBS has generated on community engagement we can strengthen the case for mainstreaming CBS too. Key learnings from CBS' track record of co-creating the service with communities include:

- **THE BENEFITS OF AN ITERATIVE DESIGN PROCESS:** CBS providers often employ rapid prototyping and iterative design, continuously refining their solutions based on user feedback. This agile approach can be adopted by traditional sanitation projects to improve responsiveness to community needs.
- **DEMAND CREATION THROUGH EDUCATION:** CBS initiatives frequently build in strategies for creating demand and changing behaviour. This includes hygiene education programmes but goes beyond this to focus on other benefits that are of direct value to communities. Lessons from these can benefit other sanitation approaches, even as they drive home some of the specific value of CBS.
- **OVERCOMING STIGMA:** CBS providers have developed effective strategies for addressing sanitation taboos and stigma. These communication and engagement techniques can benefit the wider sanitation sector, particularly in challenging cultural contexts.
- **INNOVATIVE AND FLEXIBLE PAYMENT:** CBS services often pioneer innovative payment structures tailored to low-income communities. These models can inform financing approaches for other sanitation interventions, as well as provide insights on how to create demand and link this to willingness to pay.
- **LOCAL JOB CREATION:** Many CBS services create local jobs and stimulate small-scale entrepreneurship. They offer dignified, formal employment and training that protects worker health to create a professional sanitation workforce for future infrastructure.

By mainstreaming these community-centric approaches pioneered by CBS providers, the wider sanitation sector can benefit from increased user acceptance, improved sustainability, and more effective solutions across various contexts. This cross-pollination of ideas not only enhances overall sanitation outcomes but also positions CBS as a valuable source of innovation within the broader sanitation landscape. It assists with reframing, by reinforcing the idea that an investment in CBS is an investment in the wider sanitation market.

## GENERATING KEY INSIGHTS THROUGH USER ENGAGEMENT

In 2013, shortly after CBS provider **Clean Team** was incorporated as a company, the organisation was being pulled in different directions. Its mission aimed to provide an affordable service for low-income households and recover costs from user fees. As a startup, economies of scale were limited, making operational costs relatively high. At the same time, there was also a need for continued investment to keep the service reliable and frequent (that revenue from user fees alone could not cover).

However, increasing user fees to recover full-service costs and cater for the needed investment would likely make the service too expensive. Pricing had to remain affordable for Clean Team's target market. There was limited runway for the subsidies the social enterprise was receiving.

To address these challenges, Clean Team conducted in-depth community research, gaining crucial insights into the specific needs and preferences of their target users. It revealed that a low-maintenance and odour-free toilet was a priority for customers, who were not too worried about how this was achieved. Initially, Clean Team piloted an off-the-shelf CBS system that used chemicals. However, the chemicals were not effective enough at masking smell and came at a cost. To address this, Clean Team adopted a dry toilet model. This model did not require chemicals, had little smell and would allow Clean Team to significantly reduce the frequency of waste collection. As a result, Clean Team was able to reduce collections from three times a week to between once and twice a week, significantly increasing its gross margin.

Clean Team also looked at how it billed customers and collected payments. Many customers had mobile phones and mobile money services were becoming commonplace in the communities it targeted. Many preferred the convenience of digital transactions. Clean Team thus changed its payment collection methods, bringing in a mobile payment platform. This reduced the need for door-to-door collections and boosted collections from around 34% to 60%.

In exploring customer satisfaction further, Clean Team had another revelation. Surveys confirmed that reliability and promptness in waste collection were crucial for customer retention (partly because inconsistent collection led to odour problems). Clean Team doubled down on consistent and reliable waste collection, significantly improving customer satisfaction and retention.

The success of Clean Team in Ghana in understanding and addressing what was driving customer satisfaction – for both attracting new customers and reducing churn – is an example of the value of close community engagement. Their approach can inspire others facing similar challenges.

## iv. Harness the modular benefits of CBS

Many CBS providers are moving away from managing the entire sanitation service chain. Instead, they're specialising in specific elements of the chain. This shift mirrors the concept of unbundling in service organisations, where a vertically integrated service chain is broken down into distinct components.

The specialisation inherent in unbundling can advance the mainstreaming of CBS in a few ways:

- **BUILD ON COMPLEMENTARITY:** by clearly defining distinct roles within the sanitation service chain, unbundling encourages organisations to form partnerships. This allows them to combine their strengths rather than attempting to deliver complete solutions independently.
- **ENHANCED FINANCIAL VIABILITY:** specialisation can enable a provider to scale and rely less on densification. Specialising also makes it simpler to expand through partnerships and enter new geographic areas.
- **FACILITATES INTEGRATION WITH EXISTING SYSTEMS:** For utilities and government service providers, a modular CBS system makes it easier to identify where specific elements of CBS can add value to their existing operations. They do not have to implement the full chain, they can adapt and amend aspects of CBS provision that suit them.
- **SIMPLIFYING PROCUREMENT:** Unbundling can enable multiple options for utilities or municipalities that are looking to outsource specific elements of the service chain (as there is likely more competition within one part of the sanitation chain than for fully integrated solutions). This variety suits typical procurement processes that require multiple bidders for a service. Where sanitation chains are fully integrated it is harder to procure and harder to attract multiple bidders.
- **REDUCING RISK FOR UTILITY MANAGERS:** From a utility manager's perspective, outsourcing specific functions (such as emptying and cleaning services) or purchasing proven, off-the-shelf equipment is less risky than adopting an entirely new system.

There are other advantages to a modular approach. For instance, a modular service makes it easier to conceptualise how to integrate CBS components into existing services (allowing for more gradual adoption and integration, which can be less disruptive and more palatable to established institutions and ways of working).

## WHY SPECIALISATION MAKES SENSE

Managing multiple interlinked services across complex value chains has proven difficult for many emergent CBS providers and constrained their growth. Initially, providers looked to provide an A-to-Z service – on the one hand, they wanted to control and shape the user experience and, on the other, many were driven by an interest in circular economy approaches.

Yet mastering all elements of the sanitation chain is highly demanding. No existing provider has managed to be truly expert at scale across the entire chain. Over time, as in most sectors, financial pressures have driven specialisation, with economies of scale on offer to those who can pare down the range of their activities, concentrating resources and expertise in one or two areas.

Some CBS providers aim to concentrate solely on unit manufacturing (e.g. Loowatt), others have been putting more energy into designing, building and operating treatment facilities (e.g. Sanivation). In Ghana, Clean Team has taken the decision to specialise in providing customer-centric sanitation units and emptying services – simultaneously entering a long-term contractual relationship with Safisana to manage treatment and resource recovery.

The City of Cape Town, meanwhile, has gone further still. Not only does it buy its toilets from an established manufacturer, it contracts out the operation and maintenance of these units to the private sector. Treatment remains, for now, in house.

**“Due to the relatively nascent nature of CBS, operators have typically had to act as designers, developers and builders, all while trying to meet health and safety standards for the entire sanitation value chain. However, the individual modules of the CBS value chain could be plugged into existing CWIS systems to strengthen overall sanitation service delivery. For example, Sanivation treatment plants accept both CBS and pit latrine waste, Sanergy integrates organic solid waste into its treatment process, and Clean Team disposes of waste at government treatment facilities.”**

Taking Container-Based Sanitation to Scale: Opportunities and Challenges,  
Russel et al, 2019<sup>38</sup>

## 6. CONCLUSION

### 6.1 Embrace CBS to leave no one behind in sanitation

CBS systems can be deployed rapidly and reliably, acting as a stopgap measure as needs be. Yet CBS also holds a critical place in the fabric of long-term sanitation provision – as a versatile and scalable solution that can adapt to various urban contexts.

CBS can support authority ambitions as part of a mix of sanitation solutions by:

- **MAKING LEAVE NO ONE BEHIND A REALITY:** CBS can help to make Leave No One Behind a reality by providing sanitation to marginalised communities and vulnerable populations. It is particularly suited to providing services in difficult environments, including informal settlements, where over a billion people currently reside. The approach is particularly valued by women, children, older people and people with disabilities.
- **COMPLEMENTING EXISTING OPTIONS:** CBS can complement other sanitation approaches, making it an invaluable component of a comprehensive sanitation strategy. It can provide an interim solution while more extensive sanitation infrastructure is being developed, whether sewers or other forms of non-sewered sanitation, and its modular nature allows for quick deployment in dense urban areas and informal settlements.
- **ADDRESSING THE FUNDING GAP:** CBS offers cost efficiencies across the sanitation chain and has proven to be as cost effective as other approaches. Innovations by CBS providers have introduced new efficiencies in collection and transport, and revenue streams from treatment and reuse which utilities can leverage to address funding gaps.
- **SUPPORTING ACTION ON THE CLIMATE CRISIS:** CBS is capable of withstanding extreme weather events and reduces greenhouse gas emissions by quickly treating waste. It is also water-wise, using little or no water. Thanks to this, by integrating CBS into broader sanitation strategies, cities can enhance their resilience to climate impacts, contribute to global efforts to mitigate climate change and potentially access new sources of climate funding.

## 6.2 How CBSA can support authorities to deploy CBS

The CBSA brings together leading operators of CBS to accelerate the adoption of CBS globally. It supports sanitation authorities and others to deploy CBS by:

- **WORKING TO UNLOCK FINANCE FOR CBS:** The Alliance emphasises the complementary role of CBS alongside sewers and other forms of non-sewered sanitation to increase coverage, deliver sanitation in areas where most options can't and narrow the funding gap. Moreover, it highlights that CBS can support the market for other options through its ability to **change behaviour and create demand**. This demonstrates that CBS can be a valuable transitional solution and an investment in the wider sanitation market – an approach which is unlocking funding for sanitation.
- **SHOWCASING BRIGHT SPOTS IN IMPLEMENTATION:** CBSA showcases diverse models and approaches of successful CBS implementation and provides tools and technical assistance for new entrants to lower barriers for replication. This includes highlighting the modular and versatile nature of CBS services and how they can slot well into diverse contexts and existing procurement processes for utilities and governments.
- **PROMOTING BENEFITS AND ADDRESSING MISCONCEPTIONS:** CBSA promotes the many **benefits of CBS**, including for reducing the funding gap, for communities, sanitation workers, public health, and for action on the climate crisis. It also works to address common misconceptions around risk and financial sustainability by pointing to **evidence of its comparable costs and lower capital needs** and questioning the expectation of full cost recovery without subsidies that other forms of safe and inclusive sanitation benefit from.

## 6.3 Key resources to deploy CBS

This publication is a key resource in CBSA's offering to sanitation authorities interested in CBS. It aims to inspire and situate CBS as a valuable tool for fulfilling your goals. Further resources are in the pipeline for next year, including a sector report, global standards and guidance for contracting in informal settlements.

Other existing resources include:



### **[CONTAINER-BASED SANITATION GUIDE TO IMPLEMENTATION \(CBSA, 2020\)](#)**

A starting point and reference guide for those interested in implementing a CBS service, which compiles resources and lessons learnt from across the members of the Alliance. It breaks down preferred implementation strategies and the reasoning behind them, including business models, technical specifications, health and safety, marketing and monitoring.



### **[CONTAINER-BASED SANITATION: GUIDELINES AND BEST PRACTICES \(GreenCape, CBSA, City of Cape Town, 2024\)](#)**

Guidelines and best practices developed specifically to accompany service improvements in Cape Town. The Alliance is now developing global guidelines to establish service quality standards to support the adoption of CBS globally.



### **[WHY IT'S TIME TO GET BEHIND CONTAINER-BASED SANITATION \(EY, 2021\)](#)**

Cost comparison analysis by EY looking at five CBS services in Haiti, Ghana, Kenya, Peru and Madagascar using the Climate and Cost in Urban Sanitation (CACTUS) methodology and field data as a baseline. The research revealed that CBS models are lower cost than other traditional forms of provision.

Find out the latest at: [cbsa.global/workwithus](https://cbsa.global/workwithus)

Or contact us to find out more: [contact@cbsa.global](mailto:contact@cbsa.global)

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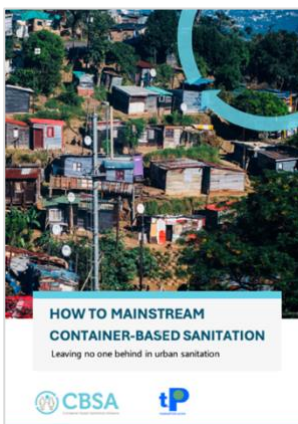
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