



ISWA 2024

WASTE TO WEALTH: SOLUTIONS FOR A SUSTAINABLE FUTURE

15 - 18 Sept | CTICC, CAPE TOWN



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD



forestry, fisheries
& the environment
Department of Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA



REGIONAL CHAPTER



AFRICA



How India's Cleanest City Reduces Methane Emissions from Municipal Solid Waste

*A case study on Indore's waste management
keys to success*

Klara Zimmerman
Climate Change Division
U.S. Environmental Protection Agency
United States

Global Methane Initiative (GMI)

- International public-private partnership focused on advancing:
 - Cost-effective, near-term methane abatement
 - Recovery and use of methane as a valuable energy source
- Provides in-kind technical support to deploy methane mitigation and methane-to-energy projects around the world
- Supports methane mitigation in three key sectors:
 - **Biogas (municipal solid waste, agriculture, wastewater)**
 - Coal mines
 - Oil & gas



- 49 Partner Countries
- 100s of Project Network members
- Alliances with international organizations focused on methane recovery and use

GMI Partner Countries represent approximately 75% of methane emissions from human activities.



Background on Indore

- Indore has consistently ranked the “**cleanest city in India**” since 2017, according to the Swachh Survekshan cleanliness survey conducted by the Government of India as part of the **Swachh Bharat Mission**
- **Key parameters assessed** include:
 - ✓ Waste collection and transportation
 - ✓ Processing and disposal
 - ✓ Open defecation
 - ✓ Information, education, and communication
 - ✓ Capacity building
- Indore’s top ranking is due to advancements in **sustainable waste management practices**, which:
 - ✓ Improve public health
 - ✓ Protect the environment
 - ✓ Mitigate methane
 - Universal source separation of waste
 - Largest bio-compressed natural gas plant in India, reducing up to 130,000 tons CO₂e/year
- Indore’s success provides valuable insights and serves as a **model for cities globally**



🔍 Indore at a Glance

| | |
|-------------------------------|---|
| Population | 3.2 million people |
| Total Waste Generation | 1,115 metric tons (MT) of waste per day |
| Waste Composition | Wet: 58.25% |
| | Dry: 41.75% |
| | Hazardous: 0.5% |

But it wasn't always this way

The "BEFORE": Indore Waste Management System Pre-2016

- Indore faced many challenges to waste management prior to 2016, including:
 - No source segregation implementation
 - Infrequent waste collection
 - Lack of waste management infrastructure
 - Open dumping of waste
- State government nearly took control of Indore's waste management system



How did Indore achieve its “Cleanest City” status?



What were the keys to Indore's successful transformation of its waste management system?

- 1) Leadership buy-in
- 2) Active engagement and participation of citizens
- 3) Successful pilot testing
- 4) Modern and efficient infrastructure
- 5) Public and private financing

Key to Success #1: Leadership Buy-In

- Newly elected mayor and newly appointed commissioner of the Indore Municipal Corporation (IMC) set a goal to achieve **100 percent door-to-door collection and segregation at the source**
- To achieve this goal, IMC:
 - Increased enforcement of waste separation policy
 - Increased public awareness and participation
 - Invested in modern waste management infrastructure



Key to Success #2: Active Engagement and Participation of Citizens

- IMC launched the **311 application**, which allowed citizens to provide feedback on city services or report problems such as overflowing garbage
- IMC launched multiple **information, education, and communication campaigns** to educate the public on waste segregation and household composting



Key to Success #3: Successful Pilot Testing

- IMC began door-to-door collection pilot project in 2016
- Started in 2 wards out of 85 total
- IMC learned door-to-door collection is a viable method for eliminating open dumping and built trust in citizens
- IMC achieved 100 percent door-to-door collection, covering all 85 wards by the end of 2016



Key to Success #4: Modern and Efficient Infrastructure



Collection vehicles with separate chambers for different waste materials



Integrated command and control center



Transfer stations



Biogas facility



Material recovery facilities

Source: SmartCityIndore.org

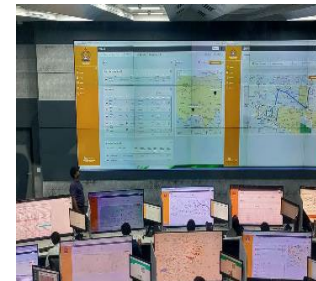
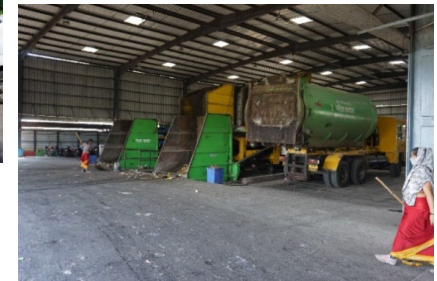


Sanitary landfills

Source: GettyImage (Image is not from Indore)

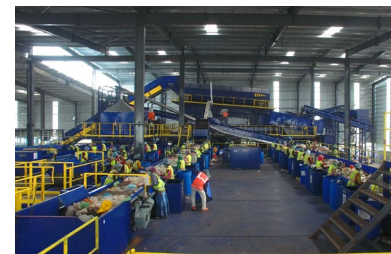
Key to Success #5: Public and Private Financing

- IMC financed capital costs through funding from **central, state, and local governments** and **corporate social responsibility funds**
- Bio-Compressed Natural Gas (Bio-CNG) and Material Recovery Facility (MRF) plants are operated on **public-private partnership model**
- Revenues from **waste collection fees, funds for non-compliance, and selling waste products** are used to cover labor, fuel, utilities, maintenance and other related costs



capital and operational costs

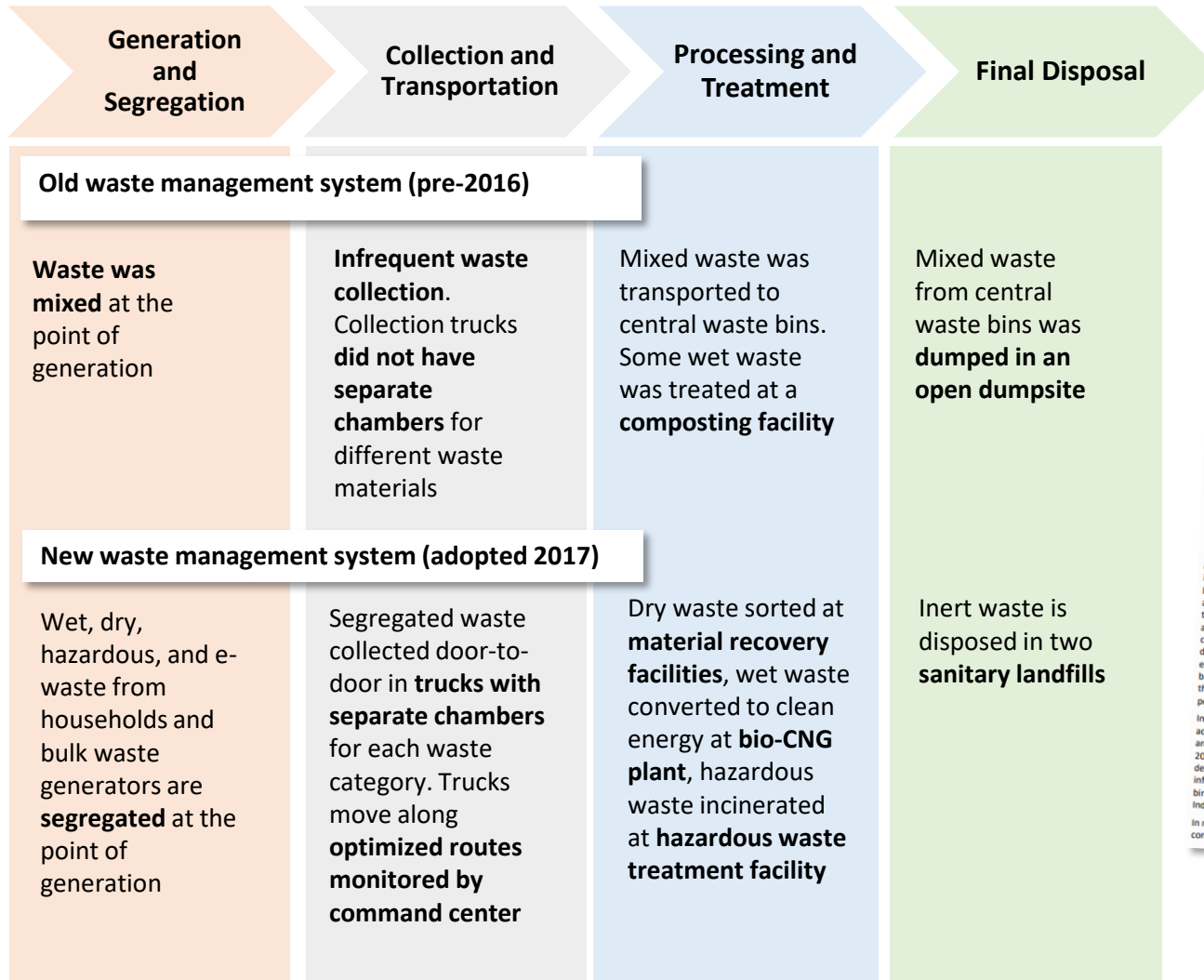
waste
recovery



Conclusions

- Indore completely transformed its waste management system from 2016-17 because of a combination of success factors.
- The first key to success, leadership buy-in, can be crucial because it's a combination of top-down leadership and bottom-up citizen participation that ties everything together.
- At its core, the system works due to source-separated collection, which enables proper treatment and diversion.
- Indore residents take pride in their “cleanest city” ranking and the national survey inspires other cities to continually improve their rankings.

New! GMI Case Study on Indore



Available at:

<https://globalmethane.org/resources/details.aspx?resourceid=5412>

How India's Cleanest City Reduces Methane Emissions from Municipal Solid Waste

A case study on Indore's waste management keys to success

Introduction

Indore, the largest city in the state of Madhya Pradesh (see Figure 1), has consistently ranked the "cleanest city in India" since 2017, according to the Swachh Survekshan, a cleanliness survey conducted by the Government of India as part of its Swachh Bharat Mission (Clean India Mission).

The Swachh Bharat Mission is a nationwide campaign launched by the Government of India in 2014.¹ Its primary goal is to eliminate open defecation and improve solid waste management across the country. To track the progress and impact of the mission, the Government of India began conducting Swachh Survekshan surveys across 73 cities in January 2016 and expanded it to over 4,400 cities in 2023.² The key parameters assessed in Swachh Survekshan include waste collection and transportation; processing and disposal; open defecation; information, education, and communication; and capacity building. The survey allows cities to understand their sanitation status and sparked a spirit of positive intercity competition.

Indore's top ranking is attributed to its advancements in sustainable solid waste management practices, which not only enhance public health and protect the environment, but also reduce emissions of methane, a powerful greenhouse gas. Before 2016, Indore struggled with waste management, a common issue in many rapidly growing cities in developing countries. Citizens were not required to separate their waste and waste collection was infrequent, disorganized, and unsystematic. The open dumping of waste, overflowing public garbage bins, and animals feeding on waste was a common sight. The state government nearly took control of Indore's waste management system in 2016 because of how poorly the city was managing its waste. In response to the potential takeover, the newly elected mayor of Indore and the newly appointed commissioner of the Indore Municipal Corporation (IMC) undertook a comprehensive process to

| Indore at a Glance | |
|------------------------|---|
| Population | 3.2 million people |
| Total Waste Generation | 1,115 metric tons (MT) of waste per day |
| Waste Composition | Wet: 58.25% Dry: 41.75% Hazardous: 0.5% |

Figure 1: Indore Background

GMI Tools and Resources to Support Methane Reductions from the Waste Sector

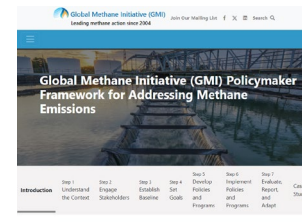
Tools

- Solid Waste Emissions Estimation Tool (SWEET)
- Anaerobic Digestion Screening Tool
- Organics Economics (OrganEcs)
- Landfill Gas Screening Tool



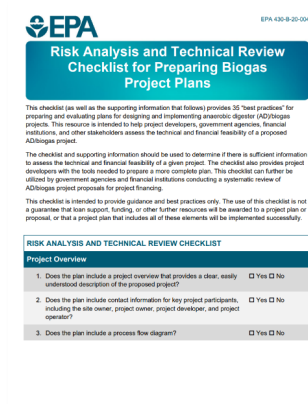
Resources

- Waste Characterization Handbook
- Policymaker's Framework for Addressing Methane Emissions
- Policy Maker's Handbook for Measurement, Reporting, and Verification (MRV) in the Biogas Sector
- Risk Analysis Checklist for Biogas Projects



Introduction: The Need for Action to Address Methane Emissions

Methane is a potent greenhouse gas derived from a variety of natural and anthropogenic sources. On a ton-for-ton basis over a 100-year time frame, methane, with a global warming potential 28 to 34 times greater than carbon dioxide, is the second most important climate driver. Methane emissions are more easily captured than other greenhouse gases, and their reduction can yield significant climate benefits at the local and national levels.



globalmethane.org

Thank You!

Klara Zimmerman

MSW Technical Lead supporting the
Global Methane Initiative
U.S. Environmental Protection Agency
zimmerman.klara@epa.gov

