

Best Practice –GIFT City, Gandhinagar

Waste as potential for Energy

GIFT City, an ambitious financial and technological hub situated in Gandhinagar, the capital of Gujarat, India. Designed as a global financial centre, GIFT City offers state-of-the-art infrastructure, world-class amenities, and a conducive business environment. It has not only emerged as a financial and technological hub but also as a pioneer in solid waste management. It showcases circular economy in practice, how waste generated in cities can be used to produce energy and compost material for green spaces.

GIFT city sets a state-of-the-art technology in Solid Waste Management, the first city in the country to execute integrated Solid Waste Management system where collection, transportation and disposal occurs under one roof. A vacuum based waste collection technology and a mechanised waste segregation system that require minimal human intervention – Automated Waste Collection and Transport System of the city. With its advanced waste management systems, including segregation, recycling, and efficient disposal methods, it sets a benchmark for sustainable practices in urban development.

Procedure of waste management

The Automated Waste Collection System (AWS) in GIFT City, Gandhinagar follows a streamlined process that revolutionizes waste management. This system utilizes advanced technology and infrastructure to ensure efficient and sustainable waste collection. Following is an overview of the four-step process involved in the AWS in GIFT City.



Image Source: [Automated Waste Collection System \(AWCS\) \(aifsez.com\)](https://www.aifsez.com/)

Photograph 1: Process of waste collection and transport

Step 01: The waste is thrown into disposal chute

The first step in the process is waste segregation. At the source, waste is separated into different categories such as organic waste, recyclable materials, and non-recyclable waste. The segregated waste is collected through different disposal chutes placed in very floor of the

buildings and in public spaces as shown in photograph 02. These chutes shall be automated and citizen may use their electronic cards to open and access these disposal chutes.



Photograph 2 Disposal chutes in buildings and in Public Places for waste collection

Step 02: Automated Waste Collection Units

GIFT City is equipped with strategically placed automated waste collection units. These units are designed to handle specific waste streams and are connected to an underground waste collection network. Each unit has separate inlets for different waste categories, ensuring proper disposal and minimizing contamination.



Photograph 3 Underground utility Tunnel (7.6m x 6.2 m) for transport

Step 3: Underground Waste Collection Network

The automated waste collection units are connected to an extensive Underground utility Tunnel (7.6m x 6.2 m) for transport. This network consists of a series of pipes that transport the waste from the collection units to a centralized waste management facility. The waste is transported through the network using a pneumatic pressure difference created by a vacuum system where the waste sucked through pipes at a speed of 90 km/hr.

Step 4: Centralized Waste Management Facility

At the centralized waste management facility, the waste received from the underground network undergoes further processing and disposal through the Bunker conveyer. The waste is segregated as Dry waste and Wet waste. The dry waste goes to the ballistic separator deck which separates it into 2D waste and 3D waste while the wet waste is passed through a compactor machine, that is the Bioneer compost system – Fertilizer control order. This

produces 100kg of compost per day which is used for the maintenance of the green spaces in the city.

Waste to Energy Plant

Burning of waste is one of the major contributions to for the emission of Carcinogenic gases as well as GHG emissions. The waste to energy plant not only produces energy from the waste but also avoids this emission from incineration of waste and saves land cost of landfills.

Plasma Pyrolysis Plant

This plant caters to the Polymeric Waste of the city. This included the Bio-medical Waste and other Hazardous Waste. The post processing emissions of this plant are well under CPCB norms.

Advantages of the automated waste collection and transport system

- Introduction of State-of-the-art technology
- The Automated system needs only 3 people to handle the waste of the entire city hence minimises human interventions and error
- Energy potential while the high-rise buildings help reduce the vertical transportation cost of the system
- For other cities, the design of the system can be customised to suit their needs.
- The project provides consultancy to other Municipals such as Amravati
- Eliminates incineration of waste to reduce emissions and minimize the negative impact on air quality as well as health
- Minimises the carbon footprint
- Utilises waste to produce energy, Circular economy in practice

Conclusion

The automated waste collection system not only enhances the cleanliness and aesthetics of the city but also reduces the reliance on manual labour and minimizes the carbon footprint associated with traditional waste management methods. This innovative system in GIFT City serves as a model for other cities, demonstrating the potential for advanced technology to transform waste management and create a more sustainable future.