



**University of
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BIOGAS PLANT

UNIVERSITY OF TECHNOLOGY


IQAC- Coordinator
University of Technology
Vatika, Jaipur


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Executive Summary

The University of Technology, Jaipur has demonstrated its commitment to environmental sustainability and institutional social responsibility through the establishment of innovative green infrastructure facilities. As part of its institutional values and best practices under NAAC Criteria 7, the university has implemented two key sustainable waste management systems: a Bio Gas Plant and a Vermi Compost Facility. These facilities represent the university's dedication to converting organic waste into valuable resources while reducing environmental impact and promoting circular economy principles within the campus ecosystem.



Bio Gas Plant Facility

1.1 Introduction and Significance

The Bio Gas Plant at University of Technology, Jaipur serves as a cornerstone of the institution's sustainable energy initiative. This facility converts organic waste generated

from the campus into clean biogas, demonstrating practical application of renewable energy technologies while addressing waste management challenges. The plant aligns with the university's commitment to environmental stewardship and serves as a living laboratory for students studying environmental engineering and sustainable technologies.

1.2 Technical Specifications and Design

Plant Configuration

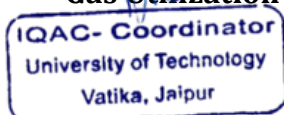
- Type: Anaerobic Digestion System
- Design: Fixed Dome or Floating Drum Configuration
- Primary Feedstock: Kitchen waste, cafeteria organic waste, garden trimmings
- Secondary Feedstock: Food processing waste from campus facilities
- Gas Production Capacity: Estimated 50-100 cubic meters per day (based on typical university installations)
- Retention Time: 15-25 days depending on feedstock composition

Infrastructure Components

- Digester Tank: Reinforced concrete structure with gas-tight sealing
- Gas Storage System: Integrated gas holder with pressure regulation
- Feeding System: Automated or semi-automated waste feeding mechanism
- Slurry Outlet: Continuous discharge system for liquid fertilizer
- Safety Systems: Gas leak detection, pressure relief valves, flame arrestors

1.3 Operational Process

- **Waste Collection and Pre-processing**
- **Anaerobic Digestion Process**
- **Gas Utilization**



1.4 Environmental and Educational Benefits

Environmental Impact

- Waste Reduction: Diverts 500-1000 kg of organic waste from landfills daily
- Carbon Footprint: Reduces greenhouse gas emissions through methane capture
- Energy Generation: Produces clean renewable energy equivalent to 50-75 LPG cylinders monthly
- Pollution Control: Eliminates methane emissions that would occur from decomposing organic waste

Educational Integration

The facility serves as a practical learning platform for students across multiple disciplines. Engineering students study biogas technology, environmental science students analyze waste-to-energy processes, and management students examine sustainable operations. Regular workshops and demonstrations enhance academic understanding of renewable energy systems.

1.5 Economic Viability

Cost-Benefit Analysis

Initial investment in biogas infrastructure generates long-term savings through reduced energy costs and waste management expenses. The university realizes monthly savings on LPG purchases while producing valuable liquid fertilizer as a byproduct. Return on investment typically occurs within 3-5 years for institutional biogas plants.

Revenue Generation

Surplus biogas can be bottled for external sale, while liquid slurry serves as premium organic fertilizer for campus landscaping and potential commercial distribution. These revenue streams enhance the facility's financial sustainability.

Conclusion



The Bio Gas Plant Facility at University of Technology, Jaipur exemplifies institutional commitment to environmental sustainability and social responsibility. This facility demonstrate practical application of green technologies while providing educational opportunities and contributing to campus sustainability goals. Through integrated waste management approach, the university creates a model for other institutions seeking to implement sustainable practices while generating valuable resources from waste materials.

