

Solid Waste Management

CLEAN UP AND FLUORISH, ELSE PILE UP AND PERISH

5.1 SOURCES OF SOLID WASTE GENERATED IN THE CAMPUS

15. Does your institute generate any waste? If so, what are they?

Yes the Institute generates following types of wastes are generated in the RIE, Bhubaneswar campus from different sources.

Table 13. Details of Waste Generated in RIE, Bhubaneswar campus

Sl.No	Type of Waste	Description
1.	<i>Solid waste</i>	Waste paper, pens, refills, Rejected clothes, bags, and unused houseware, glass wastes, Online parcels received via cardboard packagings, food packets, used paper cups, plates,gunny bags
2.	<i>Food waste</i>	Leftover food from hostels and staff quarters
3.	<i>Canteen waste</i>	Food waste and other wastes inclusive of paper and plastic waste
4.	<i>Plastic waste</i>	Plastic wrappers, cans, Pens, Polythenesetc.
5.	<i>Construction & Demolition waste</i>	The waste is generated due to expansion of buildings, Construction of hostels etc. Coloring of the Institute
6.	<i>Toiletry waste</i>	Sanitary napkins and Tissues
7.	<i>Horticultural waste</i>	Dead leaves, twigs, branches etc.
8.	<i>Chemical waste</i>	From laboratories
9.	<i>E-waste</i>	Outdated Desktops, Phones, Charging cables etc.
10.	<i>Medical Waste</i>	Used needles, blades, saline bottles, medicine strips, Used Bandage



Fig. 15a & b - Food and dry waste generated from hostels

16. Is there any waste treatment system in the Institute?

Currently we don't have a waste treatment plant in the Institute.

17. What is the approximate amount of waste generated per day? (in kg/month)

Table 14- Details of Wet and Dry Waste Generated in the Institute on Monthly Basis

Waste collected from	Wet waste collected	Dry waste collected
Hostel	180 kg	100 kg
Quarters	30 kg	20 kg

5.2 WASTE MANAGEMENT CYCLE OF THE INSTITUTE

18. How is the waste generated in the Institute managed?

- Wastes from all the departments of Institute along with the administrative offices are collected in respective color segregated dustbins which are then collected by the housekeeping staffs regularly. It is collected by waste collecting vehicles deputed by Bhubaneswar Municipal Corporation (BMC) on regular basis.



Fig. 16a & b - Collection of Food and Dry Waste Generated from Hostels by BMC workers



Fig. 16c & d - Collection of Food and Dry Waste Generated from Canteen and Hostels by BMC workers

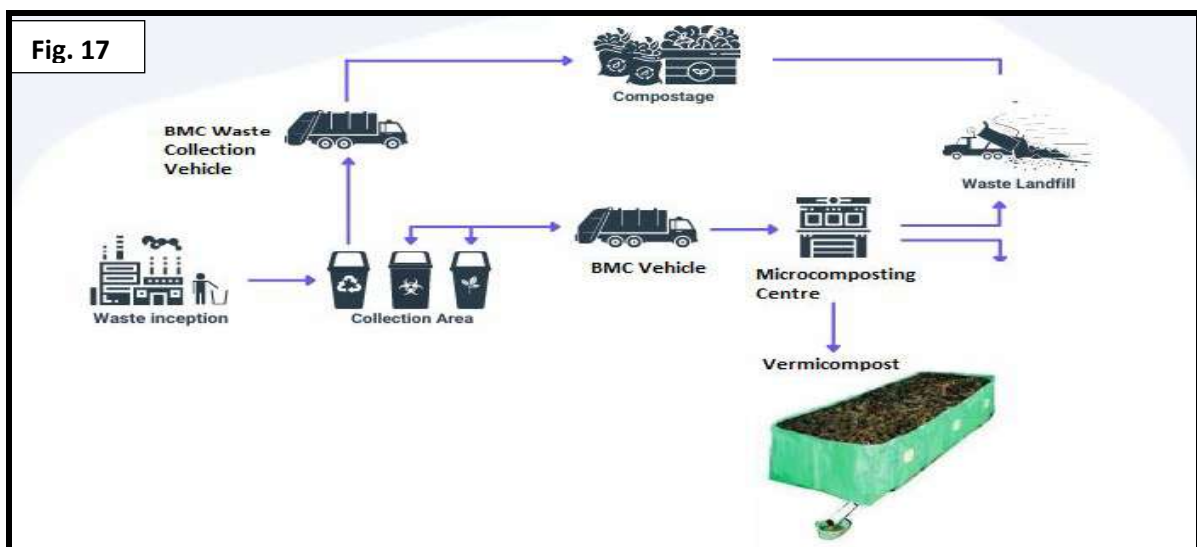


Fig.17- Waste Collection and Disposal Diagram of the Institute

- The electronic wastes of the campus are collected by the BMC vehicles on Saturdays.
- Wood waste is used by the training teachers and students to develop various models which are displayed in the wood workshop of the Institute.
- Kitchen wastes (e.g. vegetable peels etc.) are used to maintain the kitchen garden of the hostels
- **Student Initiative:** The students initiated an innovative process to collect the plastics/polypacks in the plastic bottles to capture the macro-sized plastics to micro-sized plastics. This process will avoid spreading of plastics, choking of the drains by those plastics. These bottles can be further given to BMC or it can be creatively used for decorative purposes.

Additionally, the waste generated in the Institute is managed by Institute's Waste Management Policy





Fig. 18(a – f) -Kitchen Gardens from Kitchen Wastes Maintained by the Hostels in the Backyard and Frontyard of Different Hostels of RIE, Bhubaneswar.



Fig. 19 (a –b) - The non-biodegradable plastics and single use plastics are carefully collected in bottles and are handed over to BMC.



Fig. 19 (c – d) – Paintings Made out of Paper Wastes by the Students of the Institute to Spread Awareness Regarding Recycling of Paper Wastes

19. Do you use reused paper in the institute?

Yes, we reuse the newspapers for developing teaching resource models, Blank pages of discarded printed documents are reused by the faculties and office works for notices etc.

20. Do you use recycled paper in the institute?

No, however, we have proposals for the use of recycled paper

21. How would you spread the message of recycling to others in the community? Specify the initiatives taken?

- Cleanliness drives are organized in the campus for cleaning of campus as well as hostels where the students, teachers and non-teaching staffs participate to clean each and every corner of the campus.



Fig. 20 (a – d) – Cleanliness Drives Organized in the Institute in Different Occasions Involving Faculty Members, Staff Members and Students.

- Student led initiatives like collection of plastic wastes in bottles, developing crafts from the trash etc. are encouraged in the campus.
- Developing different teaching models from the plastic waste, paper waste is greatly encouraged which spreads a message of environmental sustainability as well as educational resource.
- As partial fulfillment of the courses, “Working with Community” is made compulsory for all the final year students. Through this program they spread the message of recycling to others in the community.



Fig. 21 – Cleanliness of the Surroundings Maintained by the Institute Staffs on Daily Basis

22. Can you achieve zero garbage in the Institute?

Yes. For this purpose we need to work on minimal waste generation and different management practices for waste disposal based on expert advices.

5.3 BIOGAS

FOOD & KITCHEN WASTE BASED BIO-GAS DIGESTER

- ❖ The bio-gas produced from food waste, decomposable Organic materials and kitchen waste consisting of methane & a little amount of Carbon dioxide is an alternative fuel

for cooking gas (LPG). Also the waste materials can be disposed of efficiently without any odour or flies and the digested slurry from the bio-gas unit can be used as Organic manure in the garden.

- ❖ The major components of the bio-gas plant are a digester tank, food crusher, an inlet for feeding the kitchen waste, gas holder tank, an outlet for the digested slurry, bio-gas purification system & the gas delivery system for taking out and utilizing the produced gas.
- ❖ The project is also useful to have a hands-on learning experiences in Bio-Gas plant construction and operation.
- ❖ This is a basic prototype of a Bio-Gas system using the food waste, decomposable organic materials and kitchen waste to produce gas. The medium size biogas plant can be installed for the waste generated from different hostels Dairy farm and agricultural residues in the campus.

Table 15 – Specifications of Biogas Plant Installed in the Institute

Sl No.	Description	Unit	Capacity of Bio gas Digester
1	Capacity of bio-gas Digester	cum	4
2	Availability of kitchen waste /Day	kg	40
3	Waste Requirement/Day	L	40
4	Bio-Gas Generation /Day	cum	4.13
5	Bio-Gas Generation/Month	cum	110.35
6	Bio-Gas Generation/Day	kg	2.41
7	Slurry Generation /Day	L	50
8	Equivalent Bio Manure Production /Day	kg	12
9	Equivalent Liquid Fertilizer Production /Day	L	46
10	Cost of Bio-gas /kg	kg	Rs. 2953
11	Cost of Bio manure /kg	kg	Rs. 2025

12	Cost of Liquid fertilizer /Day	kg	Rs, 1148
13	Area Required	Sq.ft	04ft × 7ft
14	Revenue Generated from Bio-Gas/Month	kg	Rs. 2953
15	Revenue Generated from Bio manure /Month	kg	Rs.2025
16	Revenue Generated from Liquid fertilizer/Month	kg	Rs.1148
17	Total Revenue Generated /month	kg	Rs.6126

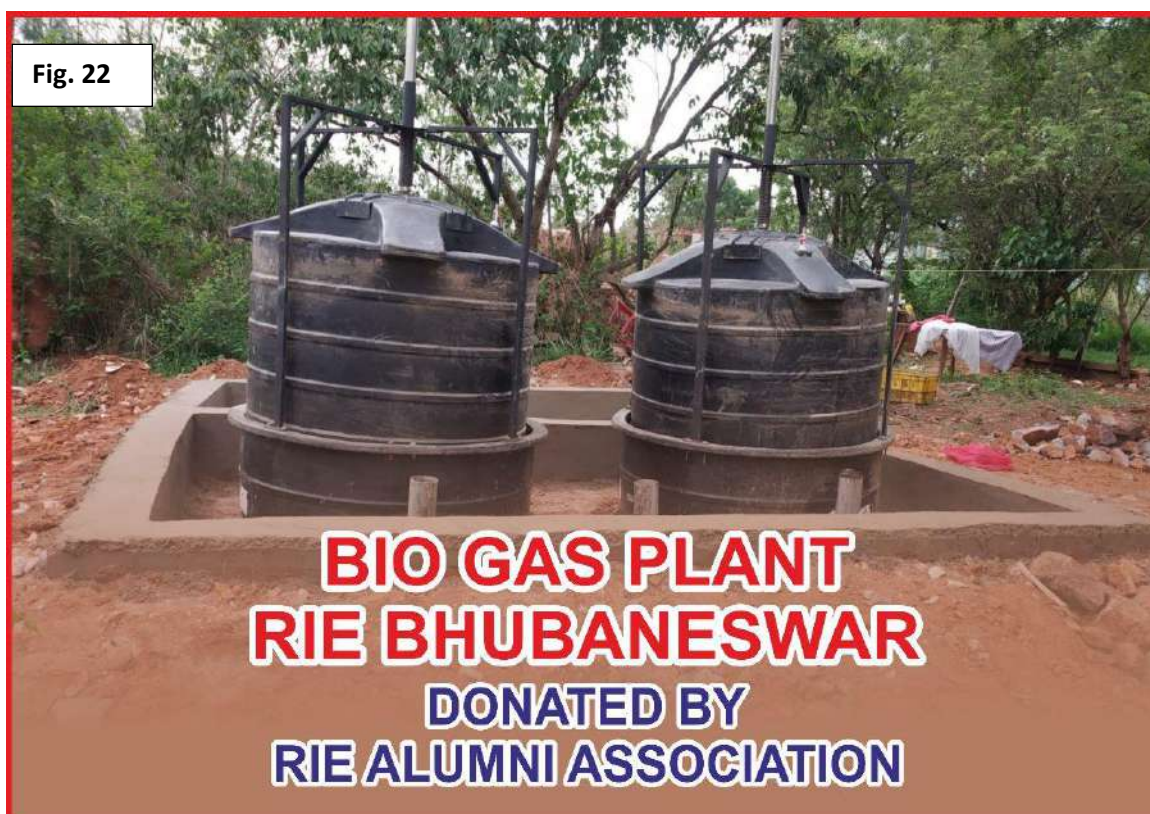


Fig.22- Biogas Plant Installed in the Institute Behind the Canteen