SUSTAINABLE SOLUTIONS OF WASTE MANAGEMENT FOR ORGANIZATION – A CASE STUDY OF TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

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ABSTRACT

Waste generation in India has been increasing, and there are no adequate ground implemented policies for the safe disposal of waste. It increases land and water pollution. Some industries execute zero waste management at their level, but that is not enough to reduce the load on the city's main landfill and disposal site. It is the need of the hour to implement the micromanagement of waste. There are large numbers of schools and colleges in India which generate the same type of waste. These campuses can demonstrate and influence the students, faculties, and other staff and visitors to adopt and successfully implement sustainable practices. Schools and colleges can play an essential role in changing society by teaching students about the new waste management technologies. There are numerous opportunities to introduce new technologies into waste management. The challenge is to encourage the development of technologies that are most conservative of natural resources and that are cost-effective. This paper shows the zero waste management policy in Campus of Techno India NJR Institute of Technology, Udaipur. Separation of waste at source is a vital and essential part of zero waste management. Biodegradable waste is used for composting, and plastic is used for brick manufacturing, a college start-up project. E-waste and hazardous waste are handed over separately to authorized recycling firms.

Keywords: Waste Management, Recycling, Reuse, Sustainable, Campus.

INTRODUCTION

Techno India NJR Institute of Technology is located on a beautiful campus of 10 acres in Udaipur. The college has also adopted the Green Campus System for environmental conservation and sustainability. Following sustainable techniques have been adopted by this Institute:

1. Road sidelights in Campus and water heating in hostel building by solar panels
2. Vermicomposting and Composting machine (proposed) for kitchen waste
3. Plastic recycling through a start-up project of the Institute
4. Use of treated wastewater from bathrooms in gardening

5. Wastewater from toilets is being disposed of utilizing septic tanks
6. Separate sections in Campus for e-waste and hazardous waste collection for authorized vendors are available for waste recycling.
7. Rainwater harvesting system

The whole Campus is divided into the following blocks.

This Institute has to ensure that all the campus wastes are disposed of responsibly by using proper waste segregation mechanism at the source and, if possible, converting it into a value-added environmentally friendly product. As per the guidelines provided by the Indian Ministry of Urban Development ((MoUD) in the form policies of SWM rules

2016, all gated societies and campuses have been advised to develop the treatment and segregation of waste within their premise.

The Campus has adopted the principles of the 'best practicable environmental option' to deliver its waste

management services. The Campus applies a 'waste hierarchical approach' to reduce, reuse, recycle, and recover waste products in preference to waste disposal to landfill.

S. No.	Block Name	Ground Coverage (Sq. M.)
1	Academic Block	3377.01
2	WorkShop	606.3
3	Hostel Building	597.9064
4	I 3 lab	275.394
5	Road	2668.166
6	Area of Covered by Tiles	1613.306
	Total Area	9138.824Sq. M

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The Campus has adopted the principles of the 'best practicable environmental option' to deliver its waste management services (3) (4). The Campus applies a 'waste hierarchical approach' to reduce, reuse, recycle, and recover waste products in preference to waste disposal to landfill (5) (6). Figure 1 shows a schematic diagram of solid waste management of the Campus.

Figure 1: Interrelationships between the functional elements in Solid Waste Management in Campus.

- Waste Segregation: Source segregation via separate bins as per the waste. Following color code is used for different types of wastage.
- Dimensions and 3d views of the collection and processing center on the college campus are shown in Figures 3 and 4.

Figure 2: Color code of bins for different types of waste in Campus.

Figure 3: Area and Dimensions of Processing Center (Outer Dimensions in meter).

Figure 4: Processing Center for Waste at the Campus.

Management Staff

- **Supervisor for the supervision of supporting staff.**
- **Supporting staffs will be responsible for**
 - i) Cleaning and separate the waste from each facility
 - ii) Collection of separated waste from different colored bins
 - iii) Transport all waste to the collection center of Campus

- iv) Support all recycling processing activities

Resources for Waste management

There are three sets of four colored bins of 120 liter capacity for each location on Campus. Locations of bins are mentioned in figure 6. One collection center and one processing center are also located on Campus as mentioned in figure 6. The location of black colored dustbin is inside the Campus in a particular room.

Figure 5: Locations of Resources for Waste Management in Campus.

Three sets (60 Liter) of blue and green bins are kept in each wing of each floor. Red bins of 60-liter capacity are kept in each washroom of the Campus. There are two trolleys on Campus for the collection of waste from dustbins of 60-liter capacity.

Liquid Waste Management

Wastewater management options and technologies can be functionally divided into two segments. Firstly, septic tanks are used for sewage waste water. Secondly, wastewater from bathrooms is treated through coagulants for the separation of soap and other suspended particles, and this treated water is used for gardening (7) (8).

Rain Water harvesting system

A rainwater harvesting system has been made for Techno India NJR campus through visual inspection, total station, theodolite, and GIS survey. Visual inspection has been done. Rainwater can be harvested through roofs of the academic block, workshop, hostel building, and I3 lab of the college (9) (10). Some more area which is occupied by tiles and road was also considered for rainwater harvesting. The total built-up area for collecting rainwater is 9138.824 m². Average rainfall in Udaipur is 689 mm/year, and 6296.138 m³ volume of water can be saved through recharge in bore well. Two points have been selected based on the survey of the Campus (11).

Solar Energy

To minimize the cost of energy and settle for a sustainable alternative, Institute is choosing to go green (12). It has installed solar panels to generate electricity outside the building blocks at the sides of roads on Campus and rooftop of the hostel building.

CONCLUSION

Sustainable solutions for waste management for institutes are the demand of the situation where generations of waste are increasing. It is required to implement new technologies and systems to improve waste management. This initiative will enhance the knowledge of students about benefits of these sustainable solution and energy saving. This paper is a case study of college campus who adopting the systems of Solid waste management, Waste water reuse, Rainwater harvesting and use of solar energy.

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