

Converting Block A Building (Bapu GKV Campus) into Zero Waste Campus

Shadabkhan Pathan

BE Student

*Department of Civil Engineering
SVBIT, Vasan, Gandhinagar, India*

Dhaval M. Patel

Assistant Professor

*Department of Civil Engineering
SVBIT, Vasan, Gandhinagar, India*

Abhijitsinh Parmar

Head of Department

*Department of Civil Engineering
SVBIT, Vasan, Gandhinagar, India*

Abstract

Our project is about zero waste campus, a feasibility study. Zero Waste means that all unwanted products and materials will be treated as resources that can be used again, resulting in virtually zero garbage generated on campus. This project focusses on reducing overall waste disposal as part of zero waste action plan. Waste reduction in the campus and reuse of waste like using anaerobic digester to generate biogas from campus waste are the key goals of the present study. Our aim is to achieve campus area that is clean and hygienic, and reduce the burden of solid waste in dump yards. Zero Waste Management should include discard management through recycling and composting, and also must incorporate waste reduction and environmentally preferred purchasing practices. Zero Waste means designing and managing products and processes to systematically to avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.

Keywords: Environmentally, Feasibility, Zero Waste, Disposal

I. INTRODUCTION

A. Zero Waste

Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.

B. Basic Introduction about Zero Waste Campus

Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.

C. Study Area

The aim of this study is to convert the Bapu GKV Campus into a zero waste campus by suggesting effective methods of waste management which is done by conducting a detailed study of the solid and liquid waste generated in the campus.

There are eight blocks A, C, D, E, F, CIVIL, Canteen, Boy's hostel, girl's hostel, workshop and animal house, that we conduct an audit. There are three floors and basement in A, C, D, E, F, CIVIL, Boy's hostel, girl's hostel. I have conducted waste collection data for block and carried out research for the same. The plan of the blocks is stated below.

(https://www.google.co.in/search?q=paper+waste&rlz=1C1EJFB_enIN710IN710&espv=2&biw=1280&bih=662&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiwpICzicnPAhXHG18KHaqwAlIQ_AUIBigB#imgrc=w-ydbxwdRWQG-M%3A)

B. Plastic Waste

Maximum amount of plastic waste is generated in the canteen area of the campus. It includes different types of materials like waffers packet ,plastic bottles, tea cups etc. These all are recyclable except silver coated plastic.



Fig. 3: Plastic Waste



Fig. 4: Plastic Waste

C. Food Waste

Food waste is generated in canteen area of the campus. Leftover food from canteen and vegetable cuttings are collected by local cowherds to feed their livestock.



Fig. 5: Food Waste



Fig. 6: Food Waste

D. E Waste

E waste means waste of electrical and electronic devices. In e waste include computers, LCD screen, cooling appliances, mobile phones etc.



Fig. 7: E Waste

Source of image

(https://www.google.co.in/search?q=e+waste&rlz=1C1EJFB_enIN710IN710&espv=2&biw=1280&bih=662&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiclpOAisnPAhXJuI8KHVQECMsQ_AUIBigB&dpr=1#imgrc=ID114ueqTavu3M%3A)

E. Audit Forecasting Data

Table – 1

Date	Result	Date	Result	Date	Result	Date	Result	Date	Result
19-9-16	1.27	26-9-16	3.893	2-10-16	4.077	7-10-16	1.18	12-10-16	1.13
20-9-16	3.31	27-9-16	6.705	3-10-16	2.03	8-10-16	2.33	13-10-16	2.31
21-9-16	1.282	28-9-16	1.88	4-10-16	4.63	9-10-16	1.21		
22-9-16	1.66	29-9-16	2.35	5-10-16	1.76	10-10-16	0.11		
23-9-16	1.22	1-10-16	2.06	6-10-16	2.32	11-10-16	1.32		
Average	2.3222								

IV. POSSIBLE SOLUTIONS

A. Khambha Composter

Ideal for individual homes to compost in flats, apartments and tight spaces. Every installed 3 T Kambha keeps about 15 kgs of waste from landfill / month (360 kgs / year). Layer your kitchen waste with Remix Powder daily for smell free and fool proof composting. For outdoor use only. For use on a balcony, terrace or garden. Requires a sheltered area away from direct rain (or use our Kambha raincoat large). Holes in the surface and porosity of terracotta regulates moisture and airflow optimally. Harvest compost every time the base unit is full (about every 6 weeks). Rodent proof. Handcrafted terracotta, made by artisan communities. Its modular design makes replacement of parts simple and cost effective.

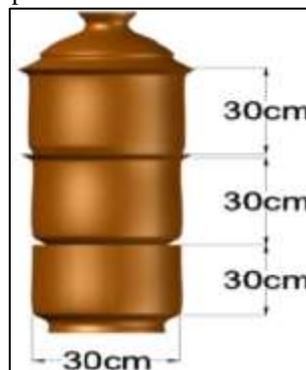


Fig. 8: Khambha Composter

B. Leaf Composter

Leaf composters are a great place to begin composting, if you haven't already, because they don't need much maintenance. Just add all your leaves and garden litter into the composter and water it daily. If you add accelerator daily, you will get your first

harvest in 4 months. (Diluted cowdung, microbes, EM are all great accelerators). The design of the product allows for easy harvesting. A large landscape with many types of trees will need many of these to ensure that no garden clippings and leaves leave the site. Yes you can add branches and palms, make sure you cut them down to size. Gardeners value leaf compost highly for use in lawns. It can reduce the landfilling of garden waste.



Fig. 9: Leaf Composter

C. Biogas Plant

1) Plastic Tank Biogas Plant

a) Materials Used

– Plastic Tank, Feedstock Inlet, Residue Outlet, Floating Tank, Rubber for Sealing

b) Tools List

– Jigsaw, Welding Machine, Hammer, Chisel, Tap Measure, Marker Pen.

– According to Sintex industrial Ltd probable Cost of 4 cubic meter Capacity plant around 70,000 rs, without the excavation work.

2) RCC Biogas Plant

a) Design Criteria for RCC Biogas Plant Volume of Tank

– Food Waste 45kg + Water 45kg = 90kg

– Input for six Week = $90 \times 42 = 3990\text{kg}$

1000kg = 1 cubic meter

Therefore 3780kg = 3.780 cubic meter

Hence, Minimum capacity of tank is 3.7 cubic meter.

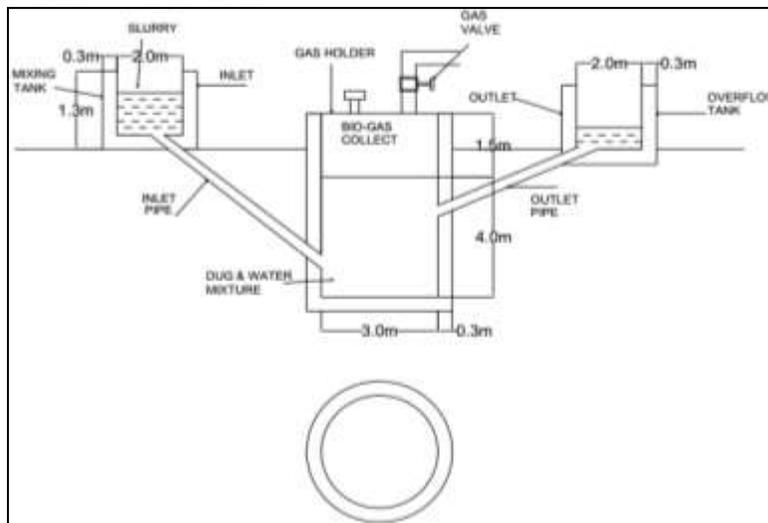


Fig. 10: RCC Biogas Plant

D. Paper Recycling Unit

Paper is one of the most important products ever invented by man. The primary raw material for the paper production is pulps fibres obtaining by a complicated chemical process from natural materials, mainly from wood. This fibres production is very

energy demanding and at the manufacturing process there are used many of the chemical matters which are very problematic from view point of the environment protection. The paper recycling, simplified, means the repeated deferring, grinding and drying, when there are altered the mechanical properties of the secondary stock, the chemical properties of fibres, the polymerization degree of pulp polysaccharide components, mainly of cellulose, their supramolecular structure, the morphological structure of fibres, range and level of inter fibres bonds. Paper recycling saves the natural wood raw stock, decreases the operation and capital costs to paper unit, decrease water consumption and last but not least this paper processing gives rise to the environment preservation. In campus annually paper waste is generated around 7 tones.

V. CONCLUSION

A. Waste Generated in the Campus

After the present study it was found that the amount of waste generated in the Bapu GKV campus is as mentioned below

Table – 2

Type of Waste	Amount of Waste
Unsegregated solid Waste	2.322 tone/year
Wet Waste	0.004 tone/day

B. Current Waste Disposal Practices

At present the Paper waste is directly sold in market every six months. Garden waste like dry leaves is accumulated in the area behind the girl's hostel and is burnt on a regular basis. Wet waste generated in the canteen is given to the local cattle herds on a daily basis. Other waste like dry waste from different buildings is burnt off. It is found that it is possible to convert Bapu GKV campus to a zero waste campus.