



# ENVIRONMENT AND ENERGY AUDIT

September 2022



▶ Prepared by

**MALNAD GREEN TECH INDUSTRIES, SHIVAMOGGA**

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**Report of**

**J N N College of Engineering  
Shivamogga-Karnataka State**

**September -2022**



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**ENVIRONMENT AND ENERGY AUDIT CERTIFICATE**

**This is to certify that, green auditing of JNN COLLEGE OF ENGINEERING, SHIMOGA has been carried out successfully from 19-08-2022 to 20-09-2022. All the provided data pertaining to Energy, Water, Waste and Greenery are analyzed and the observations are listed. The suggestions to improve the green campus status are also given in the report.**

**Date: 20-09-2022**

  
**For MALNAD GREENTECH INDUSTRIES**



## 7. Solid and Liquid Waste Management Audit

Waste management is an important feature of green campus. Both the solid and liquid waste generated inside the campus should be disposed off in a safe and eco friendly way. The health and hygiene of the campus inmates and also the surrounding localities depend on how best the waste generated inside the campus is disposed off. Reducing, reusing and recycling of waste reduces the carbon foot print of the campus. JNNCE has well maintained solid waste and liquid waste management systems.

### 7.1 Solid Waste Management System at JNNCE, Shimoga

Solid Waste Management(SWM) means, managing the generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economics, aesthetic, engineering and other environmental considerations. In its scope, solid waste management includes planning, administrative, financial, and engineering functions in the process of solving problems arising from waste materials.

In accordance with green policy of the institute, JNN College of Engineering has installed one ton per day capacity solid waste management system in the year 2017 to handle the organic waste being generated in the institution campus in an environmentally benign manner. The whole project can be viewed from two different angles one is “**Pollution Prevention**” and the other is **recovery and reuse** of waste i.e. reuse of organic waste as valuable organic manure.

#### **Organic Waste:**

Following are the typically generated organic waste in an educational campus.

- a. Food waste and vegetable waste from Hostels and Canteen.
- b. Waste from garden due to periodical cutting of lawn grass etc.
- c. Fallen leaves and flowers from trees and other items of vegetation.

All the above are biologically degradable which can be utilized to produce organic manure.



**Dry inorganic waste:**

These include Plastic bottles, waste plastic, waste rubber material, e-waste and other scrap materials are termed as dry inorganic waste. They can be segregated from the organic waste and sold to recycling centres.

**Benefits of SWM System:**

Waste is not something that should be discarded or disposed of with no regard for future use. It can be a valuable resource if addressed correctly, through policy and practice. With rational and consistent waste management practices there is an opportunity to reap a range of benefits. Those benefits include:

1. **Economic** – Manure production from organic waste leads to income generation. Good quality manure may be sold at Rs.4.00 per kg.
2. **Social** - By reducing adverse impacts on health by proper waste management practices, institution campus looks clean and better placed socially.
3. **Environmental** - Reducing or eliminating adverse impacts on the environmental through reducing, reusing and recycling, and minimizing resource extraction can provide improved air and water quality and help in the reduction of greenhouse gas emissions.
4. **Educative:** The SWM system adds to the list of green technologies already in operation at the campus. These systems may used to give demonstration to inmates as well as students and general public from outside.

The SWM system requires a minimum of a Chopper Machine to cut the stick like big size organic waste into small pieces and a Shredder Machine to powder the organic material. The waste is allowed to decay in open or semi closed enclosure. In order to increase the rate of decay waste is added with compost culture. Typically it requires two months for the biodegradable waste to get converted into compost. The produced compost is utilized either internally for garden or sold to farmers for agriculture purpose. Fig. 1 show the chopper and shredder machines installed in the campus. Fig.2. shows the segregation of non biodegradable waste and composting the waste in beds. Fig.3 show the screening the compost and packing



it for marketing. The manure is mainly utilised internally for gardening and a small quantity is sold to farmers also.



**Chopper machine**

**Shredding machine**

**Fig. 1 Machines used for solid waste management at JNNCE**



**Fig. 2 Segregation and composting**



**Fig. 3 Screening and packing of compost manure**

**Table 12. Data on Liquid and Solid Waste Generation at JNNCE**

Type of waste	Source/Type	Quantity	Unit
Liquid waste	Mess, hostels and academic area	54500	kl/Y
Bio degradable solid waste	Tree pruning's, leaves, paper	20	T/Y
Non bio degradable solid waste	Plastic, rubber, glass etc.	3.5	T/Y
E- Waste	discarded electrical and electronic items	No data	

Table 12 gives the data on both the liquid and solid waste generated in the campus. Separate degradable and non degradable waste collection bins are provided in all the buildings. But the segregation at the source is not done properly. Non biodegradable waste is not properly segregated and recycled. Bio degradable waste is converted into manure and utilized. It is observed that, the E-waste generation data is not available

### 7.2 Liquid Waste Management;

It is appreciable to note that, the institution has a well maintained liquid waste treatment plant(STP) of capacity 200 kld per day(Fig. 4). However, it is observed in Table 2 that, the STP alone consumes 55 kWh daily. There are many technologies available for sewage water treatment which consumes lesser amount of electrical energy. Phyto-remediation is one such technology. The institute has installed a 5kldphyto- remediation plant on trial basis (Fig.5).







**Fig. 4 Sewage Treatment Plant**



**Fig. 5 5kld Phyto-remediation system**

### 7.3 Observation and Recommendations on Waste Management

- Solid waste is not properly segregated into degradable and non degradable waste at the source. Degradable waste is being converted to compost and utilized. Non degradable waste is not properly disposed. No data on E-waste is available.
- E-waste collection and recycling unit can be installed in the campus
- Kitchen waste gas plant should be installed to handle mess wet waste.
- Phyto-remediation technology may be used for treating the liquid waste to reduce the energy consumption.



