PowerTech Energy Solutions
Conserve to Consume

Energy, Green & Environment Audit Report of Arts, Science and Commerce College Campus, Rahata, Tal- Rahata, Dist.- A.Nagar For the Year AY 2022-23 & 2023-24

Submitted By

PowerTech Energy Solutions

Submitted By,

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Our Certificates

BEE Certified Energy Auditor Certificate

Regn. No. EA-20121

Certificate No. 8299

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Mrs./ Ms. Swapnil Sanjay Gaikwad

son / daughter of Mr. Sanjay J. Gaikwad

has passed the National Certification Examination for Energy Auditors held in August - 2014, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India

Date : 9th January, 2015

Controller of Examination

Lead Auditor Certificate – ISO 50001: Energy Management System

TÜV NORD

PR366: ISO 50001:2018 Lead Auditor (Energy Management System) Training Course

Certificate of Achievement

Atul Kakad

has successfully completed the above mentioned course and examination.

26th - 30th November 2019

PUNE, INDIA

Certificate No. 35258395 07

Delegate No. 222777

for TÜV NORD CERT GmbH

Essen, 2020-01-08

The course is certified by CQI and IRCA (Certification No. 2088). The learner meets the training requirements for those seeking certification under the IRCA EnMS Auditor certification scheme.

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.com

CQI | IRCA

CERTIFIED COURSE

MEDA Registration Certificate

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)
Aundh Road, Opposite Spicer College,
Near Commissionerate of Animal Husbandry, Aundh, Pune – 411 067
Ph No: 020-26614393/266144403
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-44/3803

4th October, 2022

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

We hereby certify that, the firm having following particulars is registered with ***MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)*** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm	:	M/s PowerTech Energy Solutions Office No. 10, B-wing, 3rd floor, Phuge Prima, Bhosari Dighi Road Bhosari, Pimpri Chinchwad- 411, 039.
Registration Category	:	*Empanelled Consultant for Energy Conservation Programme for Class 'A'*
Registration Number	:	***MEDA/ECN/2022-23/Class - A/EA-31***

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **3rd October, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

1 Executive Summary – Energy Audit

ECM	Area	Observations	Proposed Action	Estimated Monthly Energy Savings	Estimated Monthly CO2 Emission Reduction	Estimated Monthly Monetary Savings	Estimated Investment	Payback Period
				kWh	Tones	Rs. Lakh	Rs. Lakh	Months
ECM-1	Ceiling Fan	At present, conventional ceiling fans of 75 W are installed in Class room, office, conference hall, labs.	It is recommended to replace existing 60 W ceiling fans with new energy efficient 40W BLDC fan	887	0.7	0.08	2.52	32
SUM				887.04	0.7	0.07805952	2.52	32
Monthly Energy Consumption of the Arts, Science and Commerce College Campus, Rahata.				2302				
% Saving on Energy Usage				38.53%				
Monthly Energy Bill of the Arts, Science and Commerce College Campus, Rahata. (Rs. Lakh)				0.20				

2 Executive Summary – Green Audit

Sr.No	Area	Observations	Remark
1	Solid Waste Management	Vermicomposting plant is installed in college campus to make the use of solid waste	Good initiative taken by college towards use compost of solid waste and its effective use for fertilizer and biogas
2	Rain Water Harvesting	Rain water harvesting plant is installed in college to utilize rain water efficiently. Ground water is being recharged through rain water	Good initiative by college toward water conservation
3	Plastic and Paper free campus	College is taking imitative by displaying posters/banners about awareness of plastic and paper free campus	Good initiative by college towards to implement plastic free campus
4	E waste Management	Waste management policy is prepared by college management	Good initiative College management must ensure that policy is implemented in effective way and there should not be any harmful impact on environment due to any type of wastages
5	Awareness on Energy Conservation	Training program or seminars on Energy Conservation has not been conducted in college	Seminars and training shall be carried out frequently for awareness of Energy saving in college campus and at home
6	Renewable Energy	At present, there is no any renewable source of energy used for power generation	It is recommended to install solar PV system which will reduce the CO2 emission and benefit the college in reduction in electricity bill
7	Waste Management Policy	College management issues waste management policy which shows the commitment of college towards sustainable use of natural resources and reduction or proper disposal of waste as per Rules and regulations by state/central bodies	Good initiative by college for waste disposal of hazardous waste/material

2.1 Scope for Improvements

It is recommended that below initiatives can be taken by college management toward energy conservation and sustainable environment

1. Use of renewable energy source (Solar PV system with net metering facility)
2. Solid waste management – Proper functioning and maintenance of vermicompost which is available in college campus
3. Training & Seminars on " Energy Conservation" , " Climate Change", Benefits of Renewable energy by external faculty

Table of Contents

3 About College

Rahata is a tahasil in the Ahmednagar District, Maharashtra. It is 70 k.m. away from Ahmednagar by road, 90 k.m. from Nashik & 188 k.m. from Pune & 120 k.m. from Aurangabad. It is just 5 k.m. south to the Holy Shrine of Lord Saibaba of Shirdi. Rahata is becoming a model city in the district.

Padmashri Dr. Vitthalrao Vikhe Patil was a man of vision who recognized the poor state of farming and the indebtedness of farmers. This persuaded him to uplift the farmers through an establishment of co-operative sugar factory at Loni, a first of its kind in Asia. To educate the masses is the only solution to uplift them; with this thought in mind, he started Pravara Rural Education Society, Pravaranagar in 1964.

An art, Science and Commerce College, Rahata was a part of PRES till 2011. It is joined to Shirdi Sai Rural Institute, Pravaranagar from June, 2011. Rahata Educational Complex has Arts, Science and Commerce College, Rahata, Industrial Training Centre, Rahata & SSRI's Institute of Engineering and Allied Sciences, Rahata. This complex has played a crucial role in the education of Women. Otherwise, it would have deprived the girls from Higher Education.

3.1 Our Vision

To act as planning resource, support and monitoring center for rural education activities.

3.2 Our Mission

Developing capabilities for wide spread and inclusive rural development and closing the rural-urban gap.

4 Energy Audit

An energy audit is an inspection, survey and analysis of energy flows, for energy conservation in a building, process or system to reduce the amount of energy input into the system without negatively affecting the output(s). In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprints.

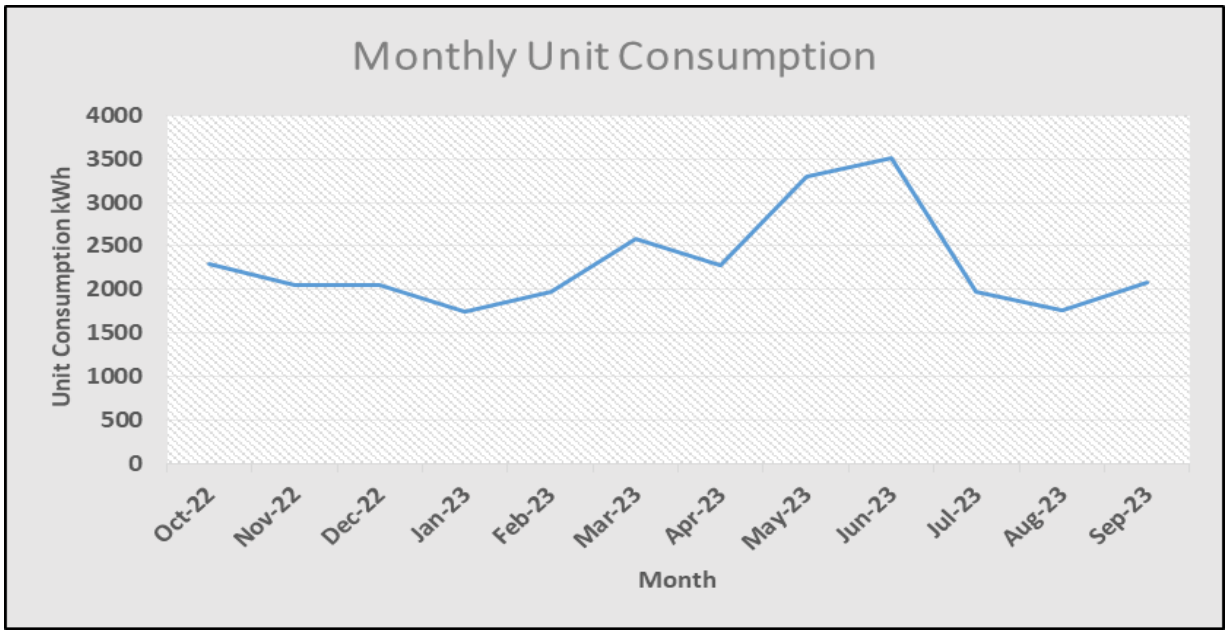
4.1 Electricity Bill Analysis

Consumer Name	THE DIRECTOR SHIRDI SAI RURAL INSTITUTE RAHATA
Consumer Number	164940004198
Sanctioned load (KW)	12
Contract Demand (KVA)	15
Connected Load (KW)	12
Tariff	73 LT-VII B I

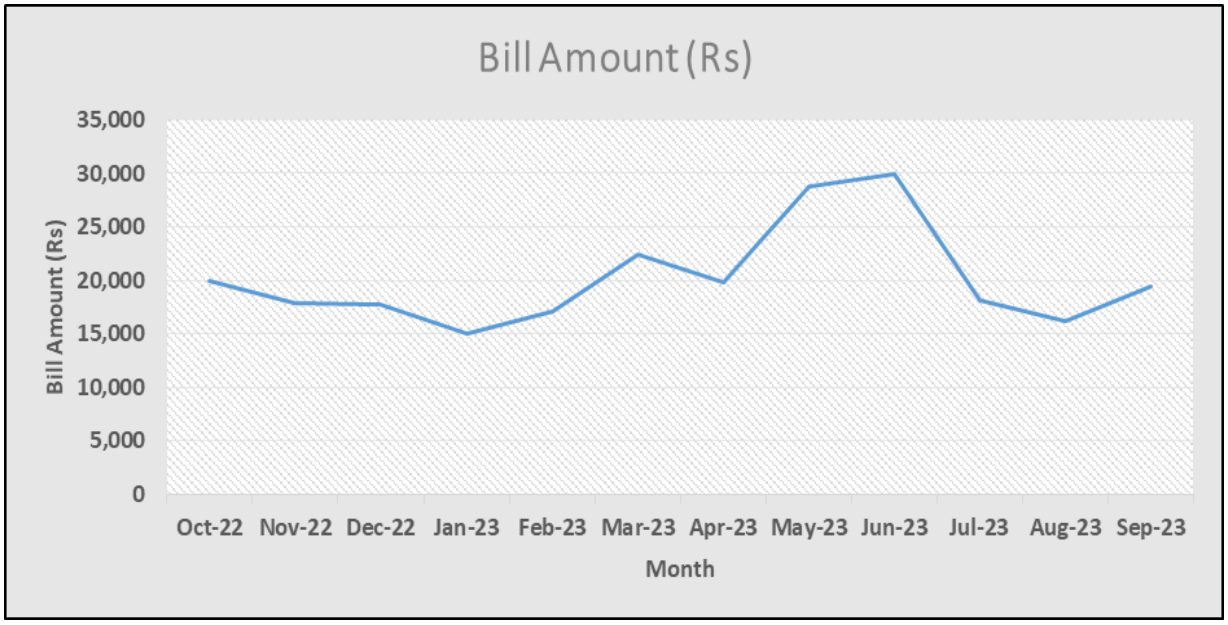
Below table shows the monthly energy consumption.

Month	Consumption (Unit)	Bill Amount (Rs)	Unit Rate
Sep-23	2077	19,380	9.3
Aug-23	1767	16,256	9.2
Jul-23	1975	18,078	9.2
Jun-23	3511	29,978	8.5
May-23	3303	28,736	8.7
Apr-23	2281	19,845	8.7
Mar-23	2579	22,414	8.7
Feb-23	1978	17,162	8.7
Jan-23	1749	15,000	8.6
Dec-22	2052	17,776	8.7
Nov-22	2054	17,818	8.7
Oct-22	2300	19,926	8.7
Avg	**2302**	**20197**	**8.8**
Total	**27626**	**242368**	

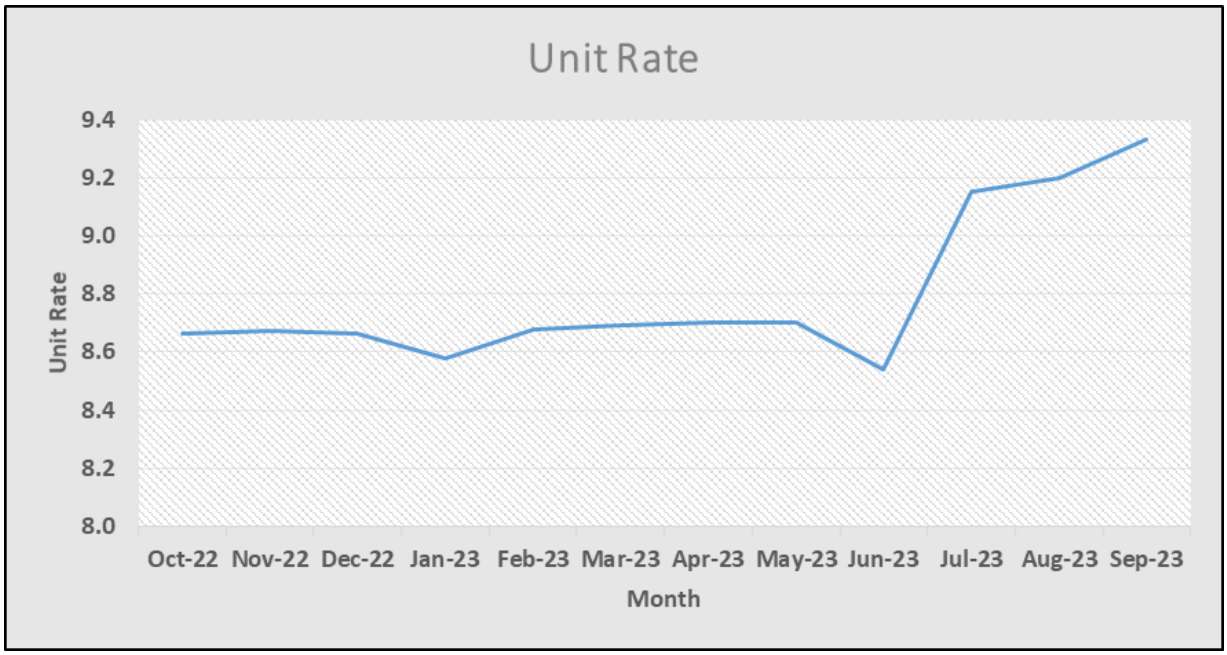
Below graph shows the monthly energy consumption.



Below graph shows the monthly energy bill in Rs.



Below graph shows the monthly unit rate



4.2 Observations

Sr.No.	Parameter	Observation	Remark
1	Connected Load	Connected load of the College is 12KW	No action required
2	Unit consumption	Minimum unit consumption recorded is 1749 kWh in the month of Jan 23	No action required
		Avg. unit consumption recorded is 2302 kWh	No action required
		Max. unit consumption recorded is 3511 kWh in the month of Jun 2023	No action required
3	Total bill	Avg. monthly electricity bill is 20197 Rs.	No action required
		Total annual electricity bill is 2.42 Rs.Lakh	No action required

5 Connected Load

Below table given the connected load list of college

Sr. No.	Name of Department	Computer	Printer	Xerox Machine	CCTV Camera	Inverter	battery	Projector	Projector Screen	Projector Stand	UPS	Barcode Scanner	Bell	Sound/Speaker	Fire Extinguisher	Blor Drill	Auto Bell	Rack	Switch	Wifi/Router	DVR	Biometrics
1	Principal Office	1	1						1	1	1											
2	Waiting Room																					
3	Administrative Office	4	2		1						3											
4	Store Room	1																2			2	
5	Computer Lab	18	1	1	1	2	3	2	1		1			1				1	1	2		1
6	Ground Floor Passage				1										1							
7	Porch				3																	
8	NAAC Room	2	0					1	1	1	2											
9	Power House															1						
10	Student Section	4	1		1	1	2				3								1			
11	Chemistry Lab	1			1										2							
12	Canteen																					
13	VLC Hall				1			1	1	1				3								
14	Geography							1	0											1		
15	Botany Lab	1			1																	
16	Library	8	1		2	1	2					2			1		1	1			1	
17	Zoology Lab	1																				

Sr. No.	Name of Department	Computer	Printer	Xerox Machine	CCTV Camera	Inverter	battery	Projector	Projector Screen	Projector Stand	UPS	Barcode Scanner	Bell	Sound/Speaker	Fire Extinguisher	Blor Drill	Auto Bell	Rack	Switch	Wifi/Router	DVR	Biometrics
18	Physics Lab	1			1																	
19	Block No. 9 & 10	0			1								1									
20	NSS Office													1								
21	Second Floor				1																	
22	Commerce Dept	1	1		1																	
23	Exam Section	2	1	1	2						1								1			
24	Staff Room		1		1																	
25	English Dept.		2					1	1	1								1	1	1		
26	Block No. 1 & 2				1																	
27	Block No. 3				1																	
28	Third Floor Passage				1																	
29	Block No. 4				1																	
30	Block No. 5				1																	
31	Block No. 06				1																	
32	Block No. 7 & 8				1																	
33	Tower																					
34	Security Dept.				2																	
35	Gymkhana				1																1	
36	Ladies Hostel																					
37	Open space				3																	
38	Women Emp. Cell																					
39	Economics		1																			

Sr. No.	Name of Department	Computer	Printer	Xerox Machine	CCTV Camera	Inverter	battery	Projector	Projector Screen	Projector Stand	UPS	Barcode Scanner	Bell	Sound/Speaker	Fire Extinguisher	Blor Drill	Auto Bell	Rack	Switch	Wifi/Router	DVR	Biometrics
	Dept																					
	Total	45	12	2	32	4	7	6	5	4	11	2	1	5	4	1	1	5	4	4	4	1

6 Performance Assessment of Lighting System

Lighting system analysis is taking the data from college building areas. Most of the system is in energy efficient LED system. There are total 233 lights installed in the college building at different location and for different purposes. Out of 233 lights, 182 lights are of LED type and currently use. Remaining lights are low amount of use.

Building - Location	Light/Lumen	Used Qty	Load KW	Hours of usage	No of Days in a month	Hrs/M	Daily consumption(kWh)	Monthly consumption(kWh)
First Floor-Principle cabin	FTL-1X40W	6	0.240	8.00	24.0	192	1.9	46
First Floor-Staff room	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
First Floor-Lab Chemistry 16	LED -1X20W	4	0.080	8.00	24.0	192	0.6	15
First Floor-class room 1	LED -1X20W	6	0.120	8.00	24.0	192	1.0	23
First Floor-class room 2	LED -1X20W	4	0.080	8.00	24.0	192	0.6	15
First Floor-computer lab	LED -1X20W	8	0.160	8.00	24.0	192	1.3	31
First Floor-Lab Chemistry 5	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
First Floor-Lab Chemistry 4	LED -1X20W	3	0.060	8.00	24.0	192	0.5	12
First Floor-Lab Chemistry 3	LED -1X20W	6	0.120	8.00	24.0	192	1.0	23
First Floor-Department	LED -1X20W	6	0.120	8.00	24.0	192	1.0	23
First Floor-Store	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
First Floor-Analytical Chemistry lab	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
First Floor-History Department	LED -1X20W	7	0.140	8.00	24.0	192	1.1	27
First Floor-Director Office	LED -1X20W	7	0.140	8.00	24.0	192	1.1	27
First Floor-Offices	LED -1X20W	11	0.220	8.00	24.0	192	1.7	40
First Floor-Board room	LED -1X20W	10	0.200	8.00	24.0	192	1.6	38
First Floor-S.S.R.I. Office	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
First Floor-Porch	LED -1X20W	11	0.220	8.00	24.0	192	1.7	40
Second Floor-Botany Lab	LED -1X20W	4	0.080	8.00	24.0	192	0.6	15
Second Floor-class room 1	LED -1X20W	4	0.080	8.00	24.0	192	0.6	15
Second Floor-class room 2	LED -1X20W	4	0.080	8.00	24.0	192	0.6	15
Second Floor-Botany lab 2	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Class Room 15	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Class Room 16	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Class Room F-11	LED -1X20W	1	0.020	8.00	24.0	192	0.2	4

Building - Location	Light/Lumen	Used Qty	Load KW	Hours of usage	No of Days in a month	Hrs/M	Daily consumption(kWh)	Monthly consumption(kWh)
Second Floor-Class Room F-12	LED -1X20W	3	0.060	8.00	24.0	192	0.5	12
Second Floor-Class Room F-13	LED -1X20W	1	0.020	8.00	24.0	192	0.2	4
Second Floor-Physics Lab.1	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Physics Lab.2	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Physics Lab.f-15	LED -1X20W	1	0.020	8.00	24.0	192	0.2	4
Second Floor-Class Room -1	LED -1X20W	1	0.020	8.00	24.0	192	0.2	4
Second Floor-Physics Department	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Class Room 12	LED -1X20W	3	0.060	8.00	24.0	192	0.5	12
Second Floor-Class Room 13	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Zoology Department	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Zoology Lab. 1	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Second Floor-Zoology Lab. 2	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Third Floor-Old Store Room	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-N.S.S. Office	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Class Room	FTL-1X40W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Class Room No.4	FTL-1X40W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Class Room No.5	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Class Room No.7	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Class Room No.8	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Geography Office	LED -1X20W	1	0.020	8.00	24.0	192	0.2	4
Third Floor-Class Room S-21	FTL-1X40W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Hindi department	FTL-1X40W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-S-28	FTL-1X40W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Department All	LED -1X120W	0	0.000	8.00	24.0	192	0.0	0
Third Floor-Library	FTL-1X40W	8	0.320	8.00	24.0	192	2.6	61
Third Floor-Library	LED -1X20W	13	0.260	8.00	24.0	192	2.1	50
Fourth Floor-Class Room No.2	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Fourth Floor-Class Room No.3	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Fourth Floor-Class Room No.4	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Fourth Floor-Class Room No.6	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Fourth Floor-Class Room No.7	LED -1X20W	0	0.000	8.00	24.0	192	0.0	0
Fourth Floor-Class Room No.9	LED -1X20W	2	0.040	8.00	24.0	192	0.3	8
Fourth Floor-Class Room No.14 T-26	FTL-1X40W	2	0.080	8.00	24.0	192	0.6	15

Building - Location	Light/Lumen	Used Qty	Load KW	Hours of usage	No of Days in a month	Hrs/M	Daily consumption(kWh)	Monthly consumption(kWh)
Fourth Floor-Class Room No.16T-28	FTL-1X40W	3	0.120	8.00	24.0	192	1.0	23
Fourth Floor-Commerce Department	LED -1X20W	6	0.120	8.00	24.0	192	1.0	23
Fourth Floor-Seminar Hall	LED -1X20W	6	0.120	8.00	24.0	192	1.0	23
Total		**182**	**4**				**32**	**768**

6.1 Observation & Remark

Sr. No.	Area	Observation	Remark
1	Arts, Science and Commerce College Campus, Rahata.	There are 233 lights in college campus out of this 182 lights are used. Almost all lights are LED type.	Its good practice to used energy efficient LED lights. Recommendation use motion sensor in college porch and washroom for energy saving purpose.

7 Performance Assessment of Fan System

ECM-2 Replacement of conventional ceiling fans with energy efficient ceiling fans

It has been observed that conventional ceilings fans are used at different areas in college building offices, conference hall class room, labs, etc. It is recommended to replace existing 75W ceiling fans with 40W energy efficient fans. Below table shows the estimated energy and monetary saving along with payback period.

Location	Fan	Used Qty	Load in Kw	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Wattage	New kW	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Payback period in months
Principle cabin	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Staff room	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Lab Chemistry 16	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
class room 1	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
class room 2	Ceiling fan-75w	3	0.23	24	1.8	43.2	40	0.12	23	20.2	177	30
computer lab	Ceiling fan-75w	3	0.23	24	1.8	43.2	40	0.12	23	20.2	177	30
Lab Chemistry 5	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Lab Chemistry 4	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Lab Chemistry 3	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Department	Ceiling fan-75w	3	0.23	24	1.8	43.2	40	0.12	23	20.2	177	30
Store	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Analytical Chemistry lab	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
History Department	Ceiling	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30

Location	Fan	Used Qty	Load in Kw	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Wattage	New kW	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Payback period in months
	fan-75w											
Director Office	Ceiling fan-75w	4	0.30	24	2.4	57.6	40	0.16	31	26.9	237	30
Offices	Ceiling fan-75w	3	0.23	24	1.8	43.2	40	0.12	23	20.2	177	30
Board room	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
S.S.R.I. Office	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Botany Lab	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room 1	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Class Room 2	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room 15	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room 16	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Computer Lab	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Class Room 11	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room 12	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room 13	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Physics Lab 1	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Physics Lab 2	Ceiling fan-75w	3	0.19	24	1.5	36.0	40	0.10	19	16.8	148	36
Physics class room	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room 12	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Class Room 13	Ceiling	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30

Location	Fan	Used Qty	Load in Kw	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Wattage	New kW	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Payback period in months
	fan-75w											
Zoology Offices	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Zoology Lab.2	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Zoology Lab 1	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Old Store Room	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
N.S.S. Office	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Class Room	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Class Room No.4	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Class Room No.5	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Class Room No.7	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Class Room No.8	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Geography Office	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Class Room S-20	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Class Room S-21	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Hindi department	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
S-28	Ceiling fan-75w	3	0.19	24	1.5	36.0	40	0.10	19	16.8	148	36
Department	Ceiling fan-75w	3	0.19	24	1.5	36.0	40	0.10	19	16.8	148	36
Library	Ceiling fan-75w	13	0.94	24	7.5	180.0	40	0.50	96	84.0	739	31
Class Room No.1	Ceiling	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30

Location	Fan	Used Qty	Load in Kw	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Wattage	New kW	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Payback period in months
	fan-75w											
Class Room No.2	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Class Room No.3	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room No.4	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Class Room No.6	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room No.7	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Class Room No.8	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room No.9	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Class Room No.10	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Class Room No.12	Ceiling fan-75w	2	0.15	24	1.2	28.8	40	0.08	15	13.4	118	30
Class Room No.13	Ceiling fan-75w	1	0.04	24	0.3	7.2	40	0.02	4	3.4	30	59
Class Room No.14 T-26	Ceiling fan-75w	3	0.19	24	1.5	36.0	40	0.10	19	16.8	148	36
Class Room No.16T-28	Ceiling fan-75w	20	1.50	24	12.0	288.0	40	0.80	154	134.4	1183	30
Class Room No.17T-29	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Class Room No.18T-30	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Class Room No.19T-31	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Class Room No.20T-32	Ceiling fan-75w	1	0.08	24	0.6	14.4	40	0.04	8	6.7	59	30
Class Room No.21T-33	Ceiling fan-75w	2	0.11	24	0.9	21.6	40	0.06	12	10.1	89	39
Commerce Department	Ceiling	4	0.30	24	2.4	57.6	40	0.16	31	26.9	237	30

Location	Fan	Used Qty	Load in Kw	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Wattage	New kW	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Payback period in months
	fan-75w											
Seminar Hall	Ceiling fan-75w	3	0.23	24	1.8	43.2	40	0.12	23	20.2	177	30
	-10	**144**	**10**	**1632**	**79**	**1901**	**2720**	**5**	**1014**	**887**	**7806**	**32**

7.1 Observation & Remark

Sr.No	Area	Observation	Remark
1	Ceiling Fans	At present, conventional ceiling fans of 75 W are installed in Class room, office, conference hall, labs. There are total 144 no. of ceilings fans are installed Total ceiling fan load is 9.9 kW	New energy efficient fans are available in the market which deliver same air volume at less power consumption It is recommended to replace existing 75 W ceiling fans with new energy efficient 40W BLDC fan Estimated new load of fan is 5.3 kW Estimated monthly energy saving is 887 units Estimated monetary carbon emission reduction is 0.7 Tones Estimated monthly monetary saving is Rs.0.08 Lakh Estimated investment is Rs.2.52 Lakh Payback period is 32 months

8 Requirement of NAAC

8.1 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources

= (Power requirement met by renewable energy sources / Total power requirement) X 100

= (0/2302) X 100

= 0%

8.2 Percentage of lighting power requirement met through LED bulbs

Percentage of lighting power requirement met through LED bulbs

= (Lighting power requirement met through LED bulbs / Total lighting power requirement) X 100

= (28/233) X 100

= **12%**

9 Green Audit

Green audit was initiated with the beginning of 1970s with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It exposes the authenticity of the proclamations made by multinational companies, armies and national governments with the concern of health issues as the consequences of environmental pollution. It is theduty of organizations to carry out the Green Audits of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve theprocedures and ability of materials, to analyze the potential duties and to determine a way which can lower the cost and add to the revenue. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Some of the incidents like Bhopal Gas Tragedy (Bhopal; 1984), Chernobyl Catastrophe (Ukraine; 1986) and Exxon-Valdez Oil Spill (Alaska; 1989) have cautioned the industries that setting corporate strategies for environmental security elements have no meaning until they are implemented.

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade a, Grade B or Grade C according to the scores assigned at the time of accreditation.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly institute.

9.1 Goals of Green & Environment Audit

- The objective of carrying out Green Audit is securing the environment and cut down the threatsposed to human health.
- To make sure that rules and regulations are taken care of
- To avoid the interruptions in environment that are more difficult to handle and their correctionrequires high cost.
- To suggest the best protocols for adding to sustainable development

9.2 Benefits of Green & Environment Audit

- It would help to shield the environment
- Recognize the cost saving methods through waste minimizing and managing
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- It portrays a good image of a company which helps building better relationships with the group ofstakeholders
- Enhance the alertness for environmental guidelines and duties

10 Initiatives by College towards Sustainable Environment

10.1 Solid Waste Management

Vermicompost Plant

College has taken initiative to compost the daily solid waste by means of vermicmpost plant. It generatesthe valuable compost which has been utilized in college campus garden area and some is distributed to nearer farmers

Following is the details of vermicomposting plant

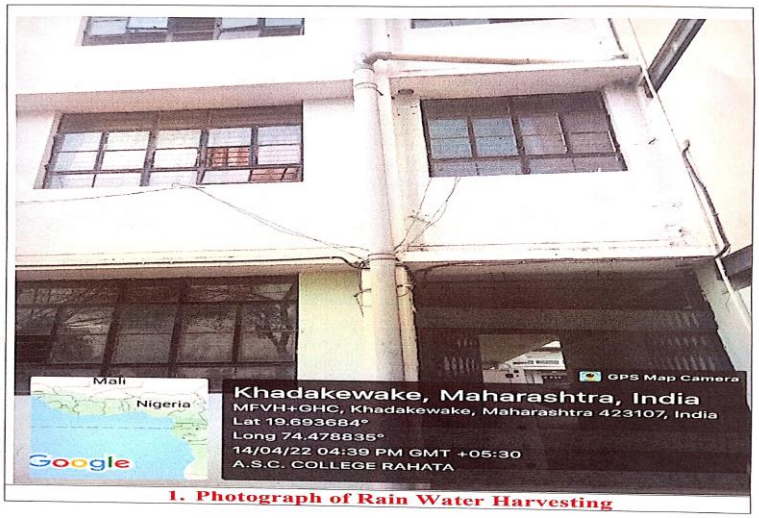
10.2 Liquid Waste Management

Rain Water Harvesting

Rain water which is accumulated on terrace of different building is getting utiliesed by means of rain waterharvesting system. Water from the various buildings is transferred to the storage. Rain water is utilized to recharge the ground water (bore well)

Following are the same images of actual system

Groundwater Recharge	
	



1. Photograph of Rain Water Harvesting

IQAC, Co-ordinator
ASC College, Rahata

I/C PRINCIPAL
Art's, Science & Commerce College
Rahata, Dist. Ahmednagar

2. Photograph of Water Recycling

IQAC, Co-ordinator
ASC College, Rahata

I/C PRINCIPAL
Art's, Science & Commerce College
Rahata, Dist. Ahmednagar

10.3 Plastic and Paper Free campus

Initiative has been taken by college administrative to make the campus plastic and paper free. Most of theinformation is now shared to the faculty and students by email and social media applications rather than paper notice.

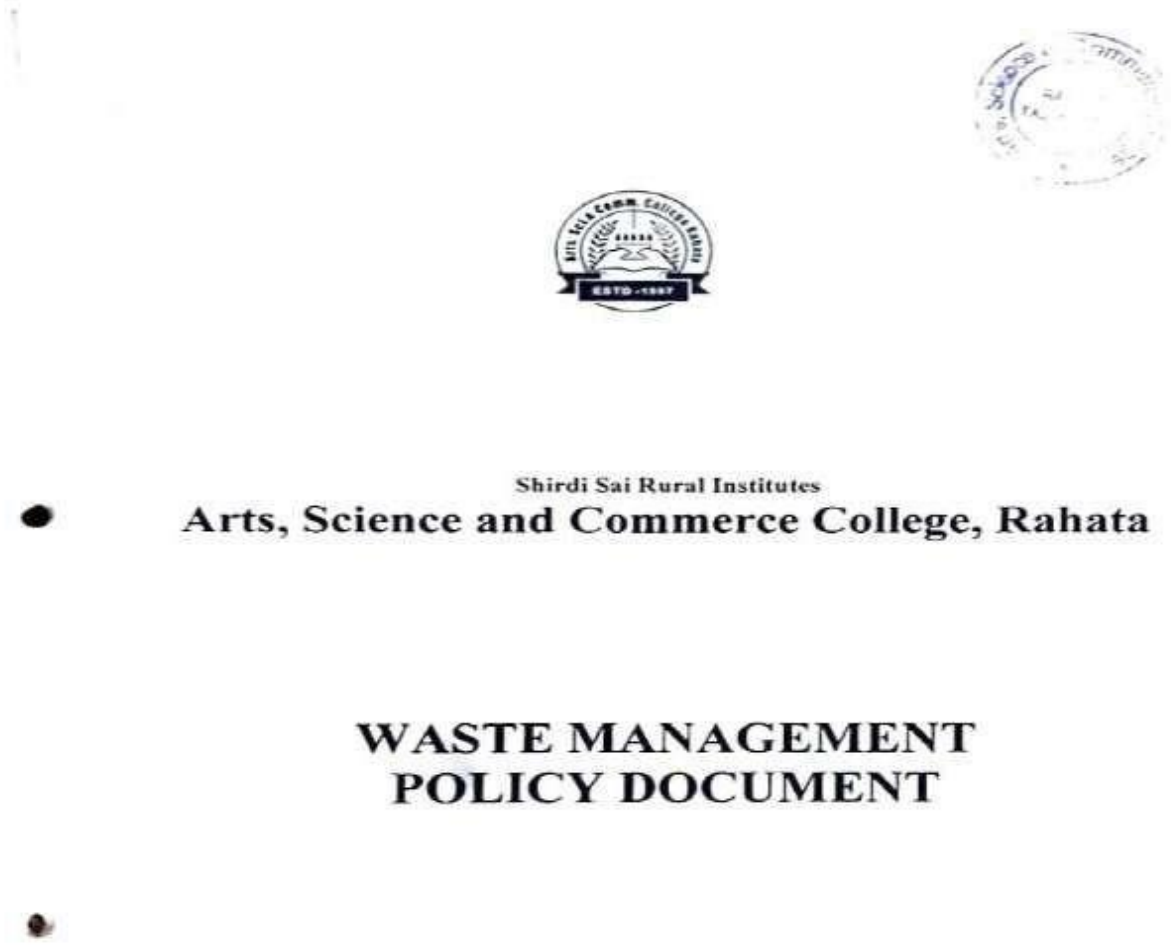
Also, college has organized awareness program for students on above topic. It has been decided that 1 dayin a month will be celebrate as bicycle day which will avoid the use of motor vehicles

Below is the image of awareness program conducted in college

10.4 Waste Management Policy

College management is committed towards sustainable environment and issued a Waste Management Policy. It shows honest efforts taken by college towards environment friendly projects

Below are the snapshots of waste management policy



Shirdi Sai Rural Institutes

Arts, Science and Commerce College, Rahata

WASTE MANAGEMENT
POLICY DOCUMENT

Shirdi Sai Rural Institute's
ARTS, SCIENCE AND COMMERCE COLLEGE, RAHATA
A/P- PIMPLAS, TAL-RAHATA DIST-AHMEDNAGAR

TEL.: 02423242488

FAX: 02423242488

E - MAIL: rahatacollege@rediffmail.com
WEBSITE: www.ascrahata.org

VISION

To act as planning resource, support and monitoring Centre for rural education activities.

MISSION

Developing capabilities for wide spread and inclusive rural development and closing the rural-urban gap.

Objectives of Policy Document

- **Conservation of the Environmental – The College strives to ensure environmental conservation through waste management and protect it from the side effects of various types of waste.**
- **Safe Disposal – The College identifies the need to dispose waste in a manner that is safe and sound with respect to its staff, students, institutional operations and stakeholders.**
- **Stakeholder awareness – The College aware the importance of waste management to the stake holders by means of degradable and non-degradable waste.**
- **Policy framework – The College knows the need to establish clear guidelines on waste management.**

Waste Management Policy

Table of Content Contents

Introduction

Shirdi Sai Rural Institutes Arts, Science and Commerce College, Rahata is the leading college in the rural area of Rahata Tehsil. It is a leader in Education, curricular and extracurricular activities through NSS, NCC, Student welfare Board, Earn and Learn Scheme, Research and Innovation etc. The Institute is committed to Society through lifelong learning, cultural enrichment and outreach services. The college was started in 1997 for the rural masses, with an objective to promote higher education and research in the fields of Arts, Science and Commerce.

The Arts, Science and Commerce College, Rahata, is situated in clean and green campus of 21 acres and it also realizes sustainable and holistic waste management essential in reducing its environmental footprint and providing a safe and healthy work environmentfor teaching and non-teaching faculties, students and all stake holders.

The College has a responsibility to ensure that all the campus wastes are disposed by means of proper waste segregation mechanism at the source and if possible, converting it into environment friendly product. Furthermore, the Solid, liquid and electronic waste should be disposed or managed by government approved, registered waste contractors. The purpose of the policy is to facilitate implementation of the action plan brought available in "National Environment Policy 2006" on management aspects of hazardous waste including their minimization, environmentally sound management and active promotion of transfer and use of cleaner technologies.

Policy Statement

The College has an approach to reduce, reuse, recycle and recover the waste, wherever and whenever possible in preference to the disposal of waste to landfill. It recognizes the importance of meeting these legal requirements and to manage its waste responsibly, reduce the volume of waste sent to landfill and maximize reuse and recycling where possible.

The college requires all the teaching and non-teaching staff, students, guests and anyone else making use of the premises to comply with this Policy. Any solid waste generated in the campus shall be managed and handled in accordance with the compliance criteria and the procedure laid down in Municipal Solid Wastes (Management and Handling) Rules, 1999, published under the notification of the Government of India in the Ministry of

Environment and Forests number S.O. 783(E), dated, the 27th September, 1999 in the Gazette of India, Part II, Section 3, Sub-section (ii).

The Policy is defined for the Solid, Liquid, Hazardous Chemicals as well as for the e-waste.

Policy Objectives

The objectives of this policy are:

- To ensure that waste management is performed in accordance with all waste legislative requirements, including the duty of care, and to plan for future legislative changes and to mitigate their effects.
- To minimize waste generation at source and facilitate repair, reuse and recycling over the disposal of wastes in a cost effective manner.
- To provide clearly defined roles and responsibilities to identify and co-ordinate each activity of the waste management.
- To promote environmental awareness in order to increase and encourage waste minimisation, reuse and recycling.
- To invest into the expansion of recycling opportunities on the college campus and transform waste into value added products.
- To ensure the safe handling and storage of wastes in college campus.
- To provide appropriate training for teacher, staff, students and other stakeholders on waste management issues.
- To provide guidance on the standards of electronic equipment's.
- To promote holistic approach of waste management in the campus.

Organisation and Management

The responsibilities and organizational arrangements for this Waste Management Policy lie with a variety of personnel in the College.

- **Advisory Board**
  a. Principal- Chairman
  b. Campus Development and Welfare Committee- Coordinator
  c. Head of the Departments
  d. IQAC
  e. Student Representatives
  f. Administrative Representative
  g. Two outside expert (nominated by the Principal)

Resource Mobilisation

The College shall provide resources for waste management as follows:

1) Increase the budgetary allocation to the initiative targeted at reducing waste risks;
2) Provide the buildings, equipment and devices and other support systems for effective and efficient management of waste.

Function of Advisory Board

i). Coordinating the provision of a waste and recycling contract service for use by all facilities on the campus.

ii). Ensuring that all stake holders are advised that they must act in accordance with with the College Waste Management Policy.

Co-ordinator, Campus Development and Welfare Committee is responsible for:

- Provision of advice and guidance to the College on waste management.
- Setting Environmental Performance Indicators for waste management.
- Monitoring the management systems for all wastes, to ensure reuse and recycle.
- Provision of appropriate training for all personnel who have responsibilities for waste management.
- Investigation of any incidents or spillage relating to waste management.

Support staff is

Responsible for:

i). Overseeing the day to day delivery of general waste and their recycling services.

ii). Operational monitoring of waste management systems across the campus.

iii). Disposing of waste responsibly, through the appropriate waste disposal system (segregation of waste), in accordance with policy and procedures.

iv). Reporting any problems with waste collection schemes to **Campus Development and Welfare Committee**.

The IT Department shall:

- In liaison with the respective Faculty/ Department/ Section, identify e-waste.
- Ensure that e-waste is collected every year and kept in an appropriate storage pending the recommendations/approval of recommendations of the head of the department/ Principal.
- Execute the recommendations of the head of the department/ Principal and prepare a report to Head of the institution.

Students/Staff will be

Responsible for:

i). Disposing of waste responsibly, through the appropriate waste disposal system, in accordance with policy and procedures.

4

ii). Reporting any problems related department/laboratory waste or waste collection procedure to the 'Head of Department'.

Action Plan

It will be mandatory on the part of the Head of the department/ Principle Investigator(Project)/ in-charge, the waste could either be recycled /reused or disposed of in captive or common treatment, storage and disposed facilities available in the campus. Inventories of 'end of life' consumer products such as e-waste are also required to be made.

Waste avoidance and waste minimization at source

In the hierarchy of waste management, waste avoidance and waste minimization has to be attempted first, for which dissemination of information on technological options should be a continuing exercise. Promote implementation of recovery of resources such as solvents, other reagents and by-products as well as re-generation of spent catalysts in a time frame manner.

Reuse, recovery and recycling of waste

College will explore options/ opportunities of reusing, recovery and recycling of non-hazardous waste in an environmentally sustainable manner. Paper waste will be recycled to make paper board and packing material. Degradable and non-degradable waste are separated and used for vermicomposting. The toxic inks and dyes of the paper will be treated with enzyme technology, which is environmentally benign.

Setting up of common Treatment, Storage and Disposal Facilities

Common treatment plant for the departmental waste will be established and the degradable and non-biodegradable waste will be segregated and treated according to their physical nature.

MONITORING AND REVIEW STRATEGIES

Monitoring

Realisation of the output of this policy shall require consistent monitoring of the output indicators. The institute and other relevant stakeholders will carry out monitoring at different levels. The policy implementation shall be reviewed through the performance contracting execution and reporting structures. A policy implementation plan shall be developed every financial year including actions, time and resource plans.

Review of Policy

The policy shall be reviewed after every 5 years or earlier, as need arises.

Glossary

Recycling
The diversion of waste away from landfill or incineration and the reprocessing of those wastes either into the same product or a different one. This mainly includes non-hazardous wastes such as organic waste, wood, paper, glass, cardboard, plastic and scrap metal.

Responsible person
The person who oversees the wastes to be removed from the premises at which it was produced or is being held.

Waste
waste "materials are not prime products, it is generated during the treatment of raw materials, at intermediate or final stage.

Chemical waste is generated from the use of chemicals in laboratories for teaching and research

General waste includes paper, plastics, glass, liquids and organics.

E-waste, Electronic waste, is electronic products that have outlived their usefulness and are due for disposal. They have toxic components such as lead, mercury and cadmium. Improper disposal of electronic waste pollutes the environment with hazardous toxins, thereby causing widespread health problems and environmental degradation. (The e-waste includes, Ferrous Metals-Iron and Steel 36 2%. Non-ferrous metals -Aluminum, Copper, Lead, Cadmium, Mercury, Gold, Silver, Palladium, Indium, Arsenic, Selenium 19 3%. Plastics- Brominated and Non brominated Plastic 23 4%. Glass -Lead glass and normal glass 15 5%. Other – 7%)

I/C PRINCIPAL
Arts, Science & Commerce College
Rahata, Dist. Ahmednagar