



**Omkar Shikshan Prasarak Mandals**  
**Arts, Commerce and Science College, Gadhinglaj, Dist.**  
**Kolhapur**

**GREEN INITIATIVE REPORT**

**2020-21 And 2021-22**



**Prepared and Certified By**

**Ms. Pooja S. Sarolkar (Lead Auditor)**

**Mr. Anand Gholap (Internal Auditor)**

**June, 2023**



# Green Audit Certificate

Is awarded for 2020-21 and 2021-22 to the Esteemed Institution

**Omkar Shikshan Prasarak Mandals**  
**Arts, Commerce and Science College, Gadhinglaj, Dist. Kolhapur**

As part of Institutions initiatives for a Healthy and Sustainable Institute the audit was conducted.

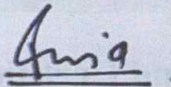
We appreciate the immense efforts taken by staff and students towards the Efficient Management of Premise. And the report has been prepared by us based on the document submitted by college.

**Prepared by**



**Mr. Anand Gholap**  
Internal Auditor (EMS)  
IMS (ISO 14001:2015 & ISO 9001:2015)  
International Register of Certificated Auditor (CQI-IRCA)  
Certificated No-IMS/015/22/907/A/12

**Certified by**



**Ms. Pooja Sarolkar**  
Lead Auditor  
EMS (ISO 14001:2015)  
International Register of Certificated Auditor (CQI-IRCA)  
Certificated No-22/IN/1023876/8088



## INDEX

CONTENTS		
Sr. No.	Description	Page
1	Introduction	6
2	Environmental policy of the College	7
2.1	College profile	8-11
3	Scope of the Environment Initiative report	12
3.1	Geographical Location of the Campus	12
3.2	Environmental Aspects of the Campus	13-14
3.2.1	Energy Consumption	14
3.2.2	Energy Requirement	14
3.2.3	Efforts for Carbon neutrality	17-20
3.2.4	Plantation	20-23
3.2.5	Water Audit	24
3.2.5.1	Water consumption	24
3.2.5.2	Quality of water	24-26
3.2.5.3	Water conservation	27
3.2.5.4	Efficient use of water	27
3.2.5.5	Water management	27-28
3.2.6	Rain water harvesting	28-29
3.2.7	Waste management	30
3.2.7.1	Waste water disposal methods	30
3.2.7.2	Hazardous Waste management	30-31
3.2.7.3	Solid Waste Management	31-32
3.2.7.4	e-waste management	33
4.0	Green initiatives programme	34-36
5.0	Environmental awareness tags	37
6.0	Findings and Suggestions	38



## LIST OF TABLES

<b>Table No.</b>	<b>Description</b>	<b>Page No.</b>
1	Number of students enrolled during the years	10
2	Total strength of students and staff on campus during the last five years	10
3	Area of college	12
4	Land use pattern	12
5	Geographical details of the college area	12
6	Sources of Energy Consumption	14
7	Energy consumption during the years	15
8	Electricity produced from different sources	17
9	Carbon foot prints	19
10	Details of CO <sub>2</sub> emitted due to bulbs	19
11	Plant Diversity on the college campus	20
12	List of recommended medicinal Plants	22-23
13	Population strength on campus	27
14	Water demand Analysis	28
15	Number of toilets	30
16	List of dustbins	31
17	Green initiatives activities	34



## LIST OF FIGURES

Figure No.	Description	Page No.
1	College Organogram	11
2	Location of the college area based on Google image	13
3	Graphical representation of energy consumption during 2021-22	15-16

## LIST OF PHOTOGRAPHS

Plate No.	Description	Page No.
1	Plant species in campus area	21
2	Water quality report	26
3	Rain water harvesting	29
4	Dust bin	32
5	e-waste certification	33
6	Green activities	34-35
7	Environment awareness tags	37



## GREEN INITIATIVE REPORT

### PREAMBLE:

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of institute. It aims to analyse environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO<sub>2</sub> from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

### OBJECTIVES:

In recent time, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the present environmental problems. The college has been putting efforts to keep our environment clean since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize



framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

**The main objectives of carrying out Green Audit are:**

To map the Geographical Location of the college

- To document the floral and faunal diversity of the college
- To document the ambient environmental condition of weather, air, water and noise of the college
- To document the waste disposal system
- To estimate the Energy requirements of the college
- To report the expenditure on green initiatives of the college

**2.0 GREEN POLICY:**

**“GO GREEN FOR NEXT GEN...”**

**Green Policy Document**

**Motto:** “Go green for Next Gen” The whole world is actually aware of the need to protect the environment. Protecting the environment has become a collective responsibility. So we believe our institution is also an integral part of environment protection. It is our duty to bestow protected environment to next generation. We believe in environment protection with industrial growth. So with this aim our institution envisaged “Go Green for Next Gen.” as motto to implement Green policy.

**Context:** Environment plays an important role in healthy living and the existence of life on earth. Humans need to interact with the environment with perfect balance. But we are directly or indirectly damaging the environment, creating problems like air pollution, water pollution, global warming,



reducing ozone layers and indiscriminate use of natural resources for our benefit. Green Audit has become necessary as it is most efficient and ecological way to assess and solve environmental problems. It is a way to save our planet Earth and go for greenery. Even in corporate sector conscious efforts are made to preserve and protect environment through various programs. The educational institutions are expected to undertake various initiatives and measures towards environment preservation and protection by organizing various activities like Green campus, plantation of trees, plant and save trees, proper use of natural resources, waste management, renewable energy etc. Green Audit is to monitor for our green status.

**Objectives:** The main objective is to attain sustainable environment with friendly practices on the campus by incorporating all aspects of environment concerns, preservation, protection, orientation and awareness.

- To train the community members regarding environment issues, necessary measures for preservation and sustenance through various initiatives and different activities.
- To initiate “Go Green for Next Gen.” campaign through awareness programs in campus and take it to outreach community.
- Green audits to be conducted monitor our green journey.

**Environment friendly initiatives:**

- Optimal use of all natural resources and avoid wastage.
- Maintain the quality of the resources for better health.
- Inculcate environment consciousness among the stakeholders to avoid pollution and abuse of resources.
- Adoption of green environmental practices like use of biodiversity, improve greenery in and around the campus.
- Encourage all stakeholder of the college to use bicycles and electrical vehicles.
- Reuse of waste water to trees.
- Observance of No Vehicle Day on 1<sup>st</sup> day of every month to control carbon emission, air pollution and noise pollution.
- Adopting to paperless activities.
- Reuse of waste paper (one side of used paper for academic work)
- E-waste management, repairs, reuse.





- Plantation of plants as air purifiers.
- Prohibition of plastic bags.
- Proper dry and wet waste management.
- Organize workshop, seminars etc.
- Research projects, etc.

**Action Plan:** To create awareness among the stakeholders for implementing the environmentally sustainable green practices like tree plantation, plastic free campus, use of renewable resources, waste management, water conservation, rain harvesting, health, sustainable development, research etc.

The institution has formed Audit committee to initiate all types of audits and get done final Green Audit and certification from professional auditing agency.

## **COLLEGE PROFILE:**

### **About College:**

The Institute named 'Omkar Shikshan Prasarak Mandal' come into existence in 1996 in Gadhinglaj Kolhapur district in southern Maharashtra (India). Our aim is to provide higher education at affordable price to Socio-Economically backward students in the city area and surrounding villages this was our motto behind the establishment of the institute.

Our institute established Arts, Commerce and Science College in June, 1998 and our first batch of B.A. passed out in April 2001. Initially we had three full time departments viz. Political Science, Economics and Marathi, after taking into consideration the need of students English and History departments were started from June 2011 and June 2012 respectively. We acquired our salary grant from government of Maharashtra from June 2004 for the degree college.

In 2004 management decided to start Junior college and sought the permission for the same immediately in June 2004 and hence institution started Rajarshree Shahu Junior College.

In 2008 the institution constructed an independent building to run these two with Co-Operation of community it has recruited quality teaching and non-teaching staff for betterment of the institution.

Shri. Rajan J. Pednekar is the founder president of the institute, and Shri.Gajanan Gijavanekar is the founder seceratry of the institute. Smt. Anuya Kiran Gune also served as the president of the institute. We are going with able leadership of Honorable president Shri. Rajan Pednekar right now. Our institution



is making progress with his all trustees including Vice President Dr. Rutuja Pednekar-Bandivadekar and Secretary Advt. Vijayalaxmi Kadane and Treasurer Shri. Uddhavrao Ingavale.

**Vision**

“Education for deprived sections of society and promoting the values of Liberty, Equality, Fraternity and justice”

**Mission:**

“Producing youths for nation building”

**Goals:**

- Providing quality education to students residing in rural and hilly area.
- Developing scientific attitude among students.
- Mental, cultural, psychological and physical developments of the students through curricular and co-curricular activities.
- Promoting the values incorporated in the constitution of India.
- Inculcating the value of ‘Health in Wealth.’
- Promoting the use of ICT in higher education.

**NAME AND ADDRESS OF COLLEGE:**

<b>Name of college:</b>	ARTS, COMMERCE & SCIENCE COLLEGE GADHINGLAJ
<b>Address</b>	132/12, Sarswati Nagar, Gadhinglaj,
<b>Pin:</b>	416502
<b>Website:</b>	www.acsc.ac.in
<b>Status of the institution:</b>	Permanent Affiliation
<b>Type of institution:</b>	Co-Education
<b>a. By gender</b>	Co-Education
<b>b. By shift</b>	Day Time
<b>Sources of funding:</b>	Grant in Aid
<b>a. Date of establishment of the college:</b>	June 1998
<b>b. University to which the college is affiliated:</b>	Shivaji University, Kolhapur
<b>Details of UGC recognition:</b>	
<b>Under section</b>	
<b>a. 2 (f)</b>	8-7/2016 (CPP-I/C), 7 <sup>th</sup> November 2016
<b>b. 12 (B)</b>	8-7/2016 (CPP-I/C), 7 <sup>th</sup> November 2016



**COURSE OFFERED BY COLLEGE:**

Sr. No.	Programme level	Name of programme
1.	U.G.	B.A.
2.	U.G.	B.Com.
3.	P.G. (Distance Education)	M.A.

**Table No. 1: Number of students enrolled during last two years**

Year	Male	Female	Total admissions
2020-2021	251	83	334
2021-2022	293	113	406
<b>Total average</b>			<b>740</b>

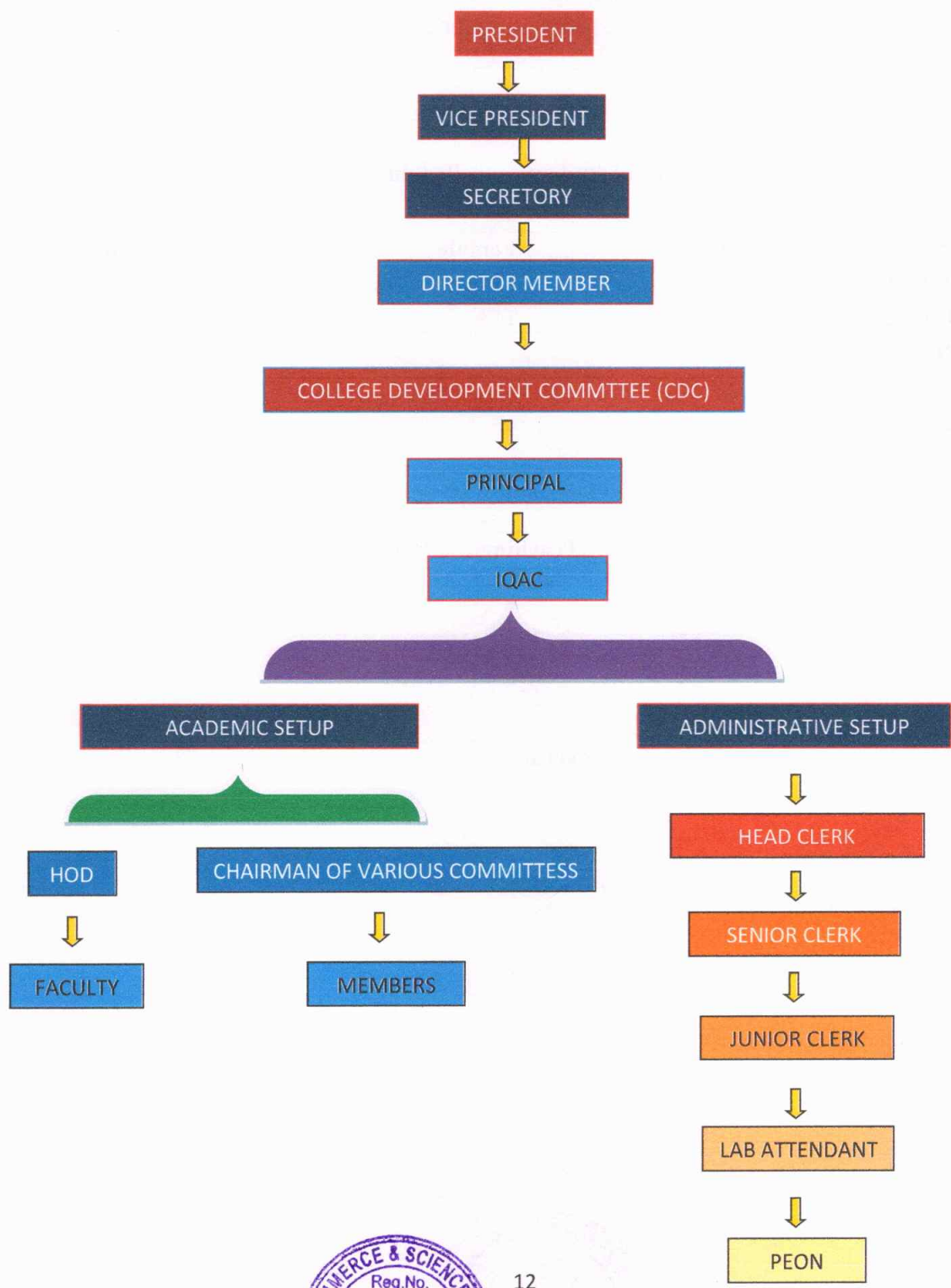
**Table No. 2: Total strength of students and staff on campus during the last years**

Year	Students	Teaching staff	Non – Teaching Staff	Total
2020 – 2021	334	17	7	358
2021 – 2022	406	17	7	430
<b>Total average</b>				<b>788</b>



**COLLEGE ORGANOGRAM:**

Organogram of the college is given in below : Figure 1



### **3.0 THE SCOPE OF THE GREEN INITIATIVE IS DEFINED IN TERMS OF:**

3.1. Geographical Location of the College Campus

3.2. Its Environmental Aspects.

### **3.1. GEOGRAPHICAL LOCATION OF THE COLLEGE CAMPUS**

#### **3.1.2. DETAILS OF AREA:**

Table no. 3: Location of the campus and area in sq. mts.is given below:

Location	Rural
Area	1141.48 Sq. Mt

#### **3.1.3 LAND USE PATTERN OF COLLEGE:**

Table No.4: land use pattern of college

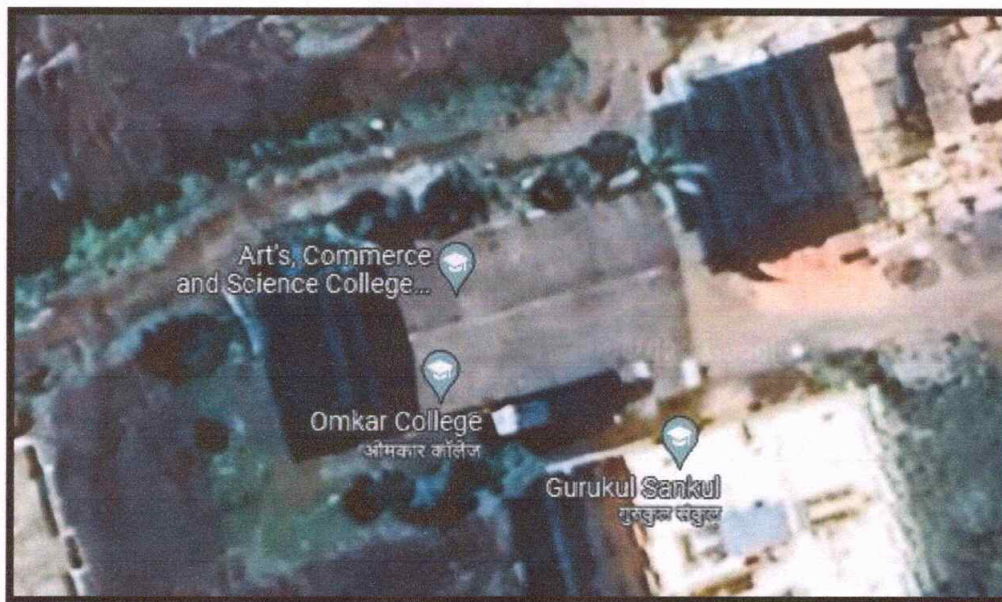
Land use pattern	Area (m <sup>2</sup> )
Total area	1141.28 Sq. Mt
Area occupied by buildings	348.33 Sq. Mt
Ground	307.5 Sq. Mt
Open space	485.45 Sq. Mt

Table No. 5: Geographical details of the college area

Latitude (N)	Longitude (E)	Elevation (m) MSL
16.221692	24.341112	623 mt



Location of the college area is shown on Google Earth map (Figure No. 2)



**3.2 SCOPE OF GREEN INITIATIVE IN TERMS OF ENVIRONMENTAL ASPECTS:**

- 3.2.1. Energy Conservation: Energy conservation is the effort made to reduce the consumption of energy by using less of an energy service. This can be achieved either by using energy more efficiently (using less energy for a constant service) or by reducing the amount of service used
- 3.2.2. Use of Renewable Energy: Renewable energy is useful energy that is collected from renewable resources, which are naturally replenished on a human timescale, including carbon neutral sources like sunlight, wind, rain, tides, waves, and geothermal heat.
- 3.2.3 Efforts for Carbon Neutrality: carbon-neutral (or carbon neutrality) is the balance between emitting carbon and absorbing carbon emissions from carbon sinks.
- 3.2.4 Plantation: It is usually large group of plants and especially trees under cultivation
- 3.2.5 Water Management: Water management is the control and movement of water resources to minimize damage to life and property and to maximize efficient beneficial use.
- 3.2.6 Hazardous Waste management: Hazardous waste management involves reducing the number of hazardous substances produced, treating hazardous wastes to reduce their toxicity, and applying sound engineering controls to reduce or eliminate exposures to these wastes.
- 3.2.7 E-Waste Management: E-waste or Waste Electrical and Electronic Equipment are loosely discarded, surplus, obsolete, broken, electrical or electronic devices



**3.2.8** Quality of water, air and noise: Water quality describes the condition of the water, including chemical, physical, and biological characteristics, usually with respect to its suitability for a particular purpose such as drinking or swimming.

### **3.2.1. ENERGY CONSUMPTION:**

Electricity is used for illuminating the rooms, fans, computers, Laboratory equipment, and pumps and for cooling rooms (AC).

**Number of rooms under use in college: 21**

Details of various sources of energy consumption units are given in table No.4.

**Table No.6: Sources of Energy Consumption**

Sr.No.	Energy sources	Electricity/generator/solar lamps
a.	No. of Computers	11
b.	No. of tube lights	12
c.	Number of LED bulbs	32
d.	No. of UPS	02
e.	No. of fans	13
f.	No. of fridge	01
g.	No. of CCTV	08
h.	Electric pumps of 1 HP	01
i.	No. of smart T.V.	01
j.	No.of printers and Xerox machine	03
k.	Mixer	01
l.	Oven	01
m.	Bell	01
n.	Bio-metric Machine	01
o.	LCD Projector	01

### **3.2.2 ENERGY REQUIREMENT: sanctioned load (6.6 kw)**

Electricity supplied from the Maharashtra State Electricity Board is the main source energy for the activities on the campus. In addition to the regular supply, energy consumed (KW) during the last year is shown in tabular as well as graphical form.

Electricity supplied from the Maharashtra State Electricity Board is the main source energy for the activities on the campus. In addition to the regular supply, energy consumed (KW) during the last year is shown in tabular as well as graphical form.

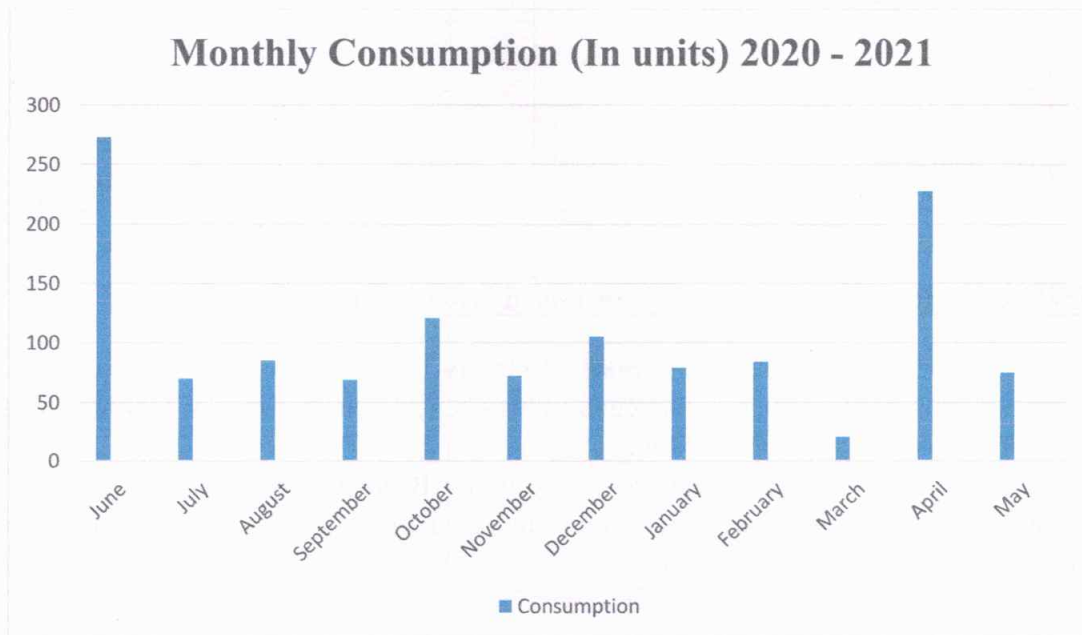


**Table No. 7: Energy consumption during the Year 2020-21 and 2021-22**

**Consumer No - 253510096211**

Sr. No.	Months	Consumption (In units) 2020 - 2021	Consumption (In units) 2021 - 2022
1	June	273	95
2	July	70	101
3	August	85	103
4	September	69	90
5	October	121	189
6	November	72	118
7	December	105	114
8	January	79	99
9	February	84	111
10	March	21	107
11	April	228	139
12	May	75	121
	Average	106.83	115.58

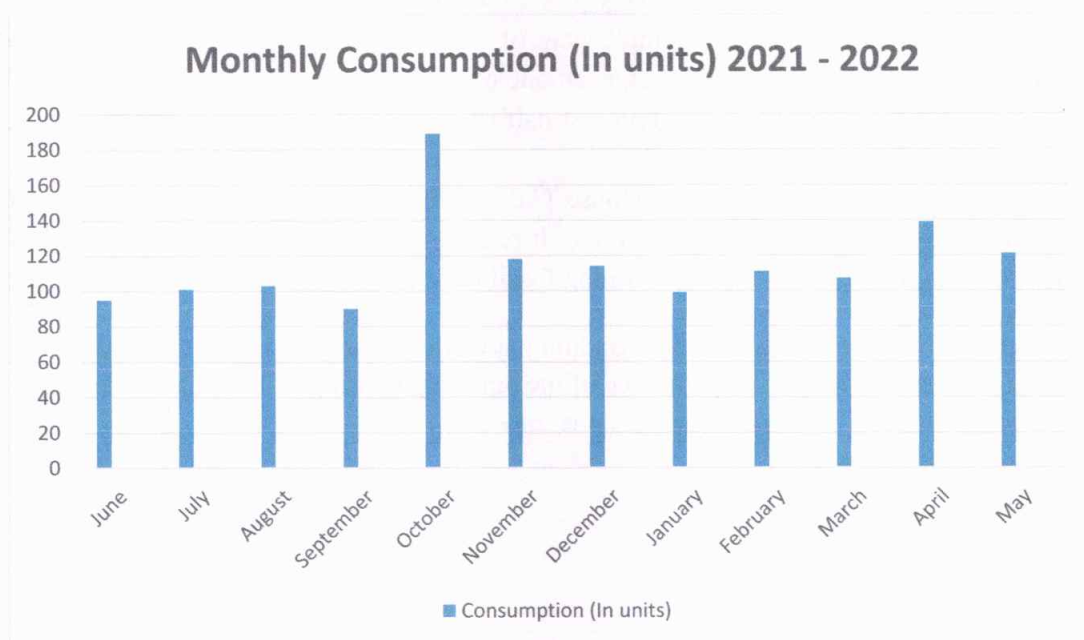
**Figure 4: Graphical representation of energy consumption during 2020-21**



**Figure 5: Graphical representation of energy consumption during 2021-22**







#### **Energy conservation measures taken up by the College:**

From the energy consumption pattern of the year 2020 - 21, it is found that there was increase of energy consumption in the month of April and June as compared other months. Thereafter, the energy consumption is gradually decreasing in January to March. Maximum energy requirement was 273 units during month of June and minimum 21 was in March.

From the energy consumption pattern of the year 2021 - 22, it is found that there was increase of energy consumption in the month of October. Other than that the energy consumption is on the regular basis close to the average consumption of 115.58 units. Maximum energy requirement was 189 units during month of October and minimum 90 units was in September, The energy consumption decrease during the last two years is mainly due to switching over the use of LED bulbs in place of high energy consuming 40-Watt tube lights.

The requirement is met from the Maharashtra Electricity Board. College is aware of environmental impacts of consumption of conventional energy supplied by MSEB. Hence, college has adopted following measures to minimize the energy consumption.

1. Switching over to the use of LED bulbs as a replacement to conventional high energy consumption bulbs
2. College has encouraged use of e-mail instead of sending notices and faxing documents.
3. Most of the fans carry three stars rating of electrical appliances.
4. Increased use of flat-screen LCD monitors rather than CRT monitors
5. Awareness amongst students was carried out and accordingly sign boards are displayed at strategic locations for conservation of energy and students positively responding.



### **3.2.3: EFFORTS FOR CARBON NEUTRALITY:**

Thinking about carbon footprints is a simple way of thinking about ways to reduce environmental pollution. By reducing our carbon footprints, each one of us can contribute to making the earth a safer, better place to live. Estimates suggest that almost half of our carbon footprint is due to electricity and 17% is due to lighting alone.

Carbon footprint is the amount of Green House Gases like carbon dioxide, methane, nitrous oxide emissions emitted by a building, organization etc. It relates to the amount of greenhouse gases we are producing in our day-to-day lives through burning fossil fuels for electricity, heating, transportation etc.

Arts, Commerce & Science, Mahavidyalaya Gadhinglaj College, carbon footprint for indoor lighting in office building is considered. The performance of the building by using LED lights reduces the building carbon foot print. The carbon foot print is for –

1. Incandescent Light
2. CFL
3. LED Lights

#### **Electricity:**

By and large, half of our carbon footprint is due to electricity and 17 % is due to lighting alone. Electricity in turn can be produced by coal, natural gas, petroleum, and other. Electricity is produced from different sources and how much GHG released is shown is shown in table no. 6.

**Table No. 8: Electricity produced from different sources**

<b>Source</b>	<b>Million metric tons of CO<sub>2</sub> emission for 1 year</b>	<b>Electricity generation (Billion kWh) for 1 year</b>
Coal	1788	1882
Petroleum	106	119
Natural gas	337	562
Other	14	22
Non fossil fuels	None	1106
<b>Total</b>	<b>2245</b>	<b>3621</b>

Since close to 2245 million metric tons of CO<sub>2</sub> emitted by total electricity generation per year. A single kilowatt-hour of electricity will generate 619 grams of CO<sub>2</sub> emissions.

#### **1. Incandescent Light**



Incandescent lamp is a source of light which produce light when the filament is being heated. It can release 80% electrical energy converted into heat energy. We can calculate how much CO<sub>2</sub> will be emitted by 40-watt incandescent bulb.

Power Consumption- 40 watts

- Operation per day- 10 hours
- Power Consumption per annum-146000 watt
- Electricity per hour (kwh) - 0.04 (1 kWh=619g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp (146\*619g) -90.3 kg.

A single 40 watts incandescent bulb will generate 90.3 kilograms of CO<sub>2</sub> for every year. The reduction of carbon footprint is none for this lamp.

## 2. Compact Fluorescent Light

CFL produce less heat and more visible light compare than incandescent lamp. We can calculate how much CO<sub>2</sub> will be emitted by 14-watt incandescent bulb.

Power Consumption- 14 watts

- Operation per day- 10 hours
- Power Consumption per annum-51100 watt
- Electricity per hour (kwh) – 0.014 (1 kWh=619 g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp- (51.1\*619g) - 31.6 kg.

A single 14 watts CFL lamp will generate 31.6 kilograms of CO<sub>2</sub> for every year. The reduction of carbon footprint is none for this lamp. CFL contains harmful mercury which creates mercury emission. Estimated suggestion led lights only will reduce our carbon foot print over than other lights.

## 3. LED Lights

LED lights consumes low power and energy efficient over than other lights. Not even a single point we can't compare led lights with other lighting. We can calculate how much CO<sub>2</sub> will be emitted by 8-watt LED lamp -

- Power Consumption- 8 watts
- Operation per day- 10 hours
- Power Consumption per annum-29200 watt
- Electricity per hour (kwh) – 0.008 (1 kWh=619 g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp (29.2 \*619g) - 18 kg.

**A building's carbon footprint from led lighting can be reduced by 68%.**

- Reduction in Carbon Footprint (tons)-0.122(12.28 kg)

The 8-watt LED equivalent will only be responsible 18 kilograms of CO<sub>2</sub> over the same time span.

**Table No. 9: Carbon foot prints**



	Incandescent Bulb	LED light
Power Consumption(watt)	40	8
Electricity(kwh)	0.04	0.008
Hours of Operation Per Day	10	10
Carbon Emissions (tons) per year/lamp	0.903	0.18
Reduction in Carbon Footprint (tons) / lamp	--	0.12

- LED light can reduce our carbon footprint by 0.12 tons per year.
- Led light does not contain mercury; it is a big benefit for this lamp.
- Incandescent, it is 5.8 mg from power plant.

The 8-watt LED equivalent will only be responsible 18 kilograms of CO<sub>2</sub> over the same time span.

Based on above comparisons, LED emerges as the BEST option to reduce carbon footprint.

At ARTS, COMMERCE & SCIENCE, MAHAVIDYALAYA GADHINGLAJ, all together there are 21 rooms (including, class rooms, offices, labs etc.) 29 LED lights and 13 tube lights

Details of CO<sub>2</sub>emitted from these lights is given in table 10.

**Table No. 10: Details of CO<sub>2</sub> emitted due to bulbs**

Light	No. of bulbs	CO <sub>2</sub> emitted per lamp / year	Total CO <sub>2</sub> emitted kg per year
LED	9 (8 watt)	18 kg.	162
	23 (9 watt)	25.55 kg	587.65
CFL	02 (12 watt)	27.08 kg	55.6
CFL	01 (18watt)	38.93 kg	38.93
Tubes	11 (36watt)	77.86 kg	856.46
<b>Total</b>			<b>1700.7</b>

CO<sub>2</sub> emitted from utilizing all types of bulbs per year is 738 kg/yr. Presently, College has taken initiative to replace Incandescent bulbs and CFL bulbs by LED. During the last year energy consumption of LED bulbs against the total energy requirement has been decreased. This has shown substantial reduction in the C02 emission per year. If all 46 bulbs and tubes are replaced by 8-Watt LED bulbs, CO<sub>2</sub> emitted per



year would be  $46 \times 18 \text{ kg} = 828 \text{ kg} / \text{year}$ . This means college can reduce CO<sub>2</sub> by 872.7 kg / year (1700.7-828 kg). It is suggested to replace all bulbs by LED bulbs in a phase manner. Further, all the fans should be replaced in phased manner energy efficient five-star rating fans.

### **3.2.4: PLANTATION:**

The college campus area is 0.281 acers. Total number of plants as on 2021-22 is about 28. Details of plantation with respect to Botanical name, local name and quantity is given table no. 11.

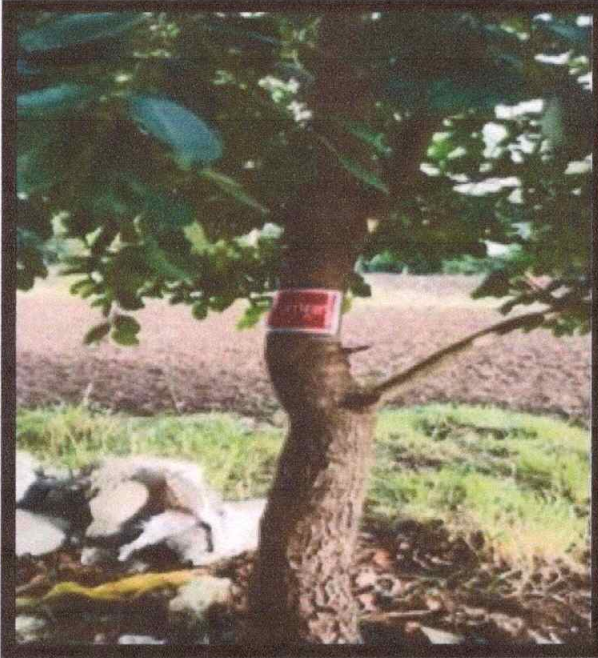
### **DETAILS OF PLANTATION IN COLLEGE:**

**Table no. 11: List of Plants in campus area**

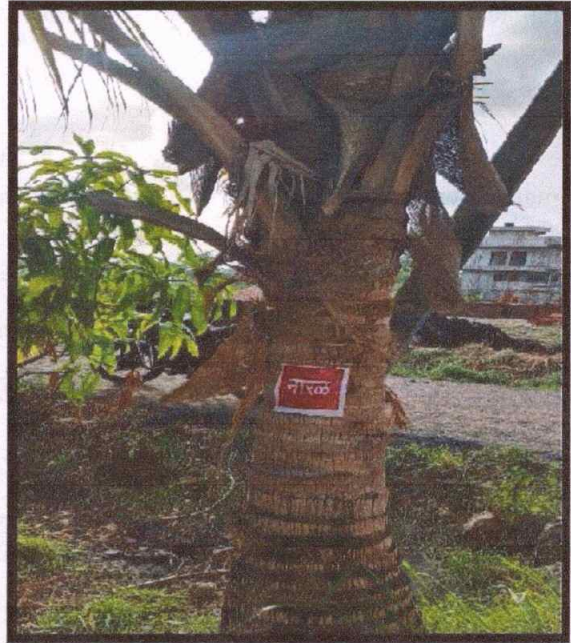
<b>Sr. No.</b>	<b>Family</b>	<b>Botanical Name</b>	<b>Local Name</b>
1.	Anacardiaceae	Mangifera indica L.	Mango
2.	Myrtaceae	Syzygium cumini	Jambhool
3.	Lamiaceae	Ocimum tuiflorum	Tulsi
4.	Meliaceae	Azadirachta indica	Nim
5.	Myrtaceae	Psidium	Guava
6.	Arecaceae	Cocos Nucifera	Coconut
7.	Fabaceae	Millettia pinnata	Karanja



**Plate No. 1. Plant Species in college campus**



**Syzygium cumini**



**Cocos Nucifera**



**Mangifera indica L**



Considering the rich plant diversity of the Gadhinglaj area with lots of medicinal plants in the local area, it is advised to go for plantation of same medicinal plants on campus which is widely available in the region. Some of the recommended plants are given in table no.12.

**Table no. 12: List of recommended medicinal Plants**

**Medicinal plants and their uses**

Sr. No.	Scientific name	Common Name	Family	Medicinal Uses
1.	<i>Asparagus racemosus</i>	Shatavari	Liliaceae	Refrigerant, antiseptic, appetite, leprosy, beneficial for intelligence as well as on memory modulatory
2.	<i>Adhatodavasica/ Justicia adhatoda</i>	Adulsa	Acanthaceae	Useful in all sorts of cough and cold, bronchitis, gonorrhoea, fever, jaundice.
3.	<i>Azadirachta indica</i>	Kadu limb	Meliaceae	Antiseptic, astringent, anthelmintic, leprosy, piles, toothache
4.	<i>Bauhinia purpurea</i>	Apata	Caesalpinaceae	Griping pains from the stomach and bowels, diarrhea, laxative, flatulence
5.	<i>Emblica officinalis</i>	Amala or Awala	Euphorbiaceae	Laxative, anemia, diabetes, diarrhea, dysentery, diuretic, antioxidant
6.	<i>Anacardium occidentale</i>	Kaju	Anacardiaceae	Mild purgative, diarrhoea, mouth ulcer, diuretic, palpitation of heart, rheumatic pericarditis, toothache
7.	<i>Aegle marmelos</i>	Bel	Rutaceae	Laxative, asthma, antidote-snake poison, chronic diarrhea, astringent, carminative, Jaundice
8.	<i>Bombax ceiba / B. malabaricum</i>	Katesavar	Bombacaceae	Menorrhagia, aphrodisiac, haemostatic, astringent, diarrhea, dysentery, demulcent, pimples
9.	<i>Butea monosperma</i>	Palas	Fabaceae	Analgesic, aphrodisiac, anthelmintic, piles, anti-inplantation, leprosy, diarrhea
10.	<i>Calotropis gigantea</i>	Rui	Asclepiadaceae	Intermittent fever, dysentery, diaphoretic, cold, cough, anthelmintic, expectorant
11.	<i>Centella asiatica</i>	Brahmi	Apiaceae	Diuretic, tonic for improving memory, good for hair growth and check hair fall, blood



				purifier, rheumatism, piles, laxative
12.	<i>Clitoria termatea</i>	Gokharna	Fabaceae	Diuretic, catharatch, laxative, purgative, ulcer, gonorrhoea, piles
13.	<i>Dioscorea bulbifera</i>	Kadu karanda	Dioscoreaceae	Boils, sores, jaundice, piles, abdominal pains, syphilis, ulcer
14.	<i>Eclipta alba</i>	Maka	Asteraceae	Tonic, emetic, cathartic, hair tonic, skin diseases, antiviral spasmogenic
15.	<i>Helicteres isora</i>	Murad sheng	Sterculiaceae	Demulcent, astringent, griping of bowels and flatulence of children, stomach infections, dysentery
16.	<i>Hemidesmus indicus</i>	Anantmul	Asclepiadaceae	Fever, rheumatism, urinary disease, leprosy, leucoderma, piles, epileptic fits in children
17.	<i>Leucas aspera</i>	Shankroba	Lamiaceae	Laxative, anthelmintic, bronchitis, jaundice, paralysis, scabies, cough and cold.
18.	<i>Nothapodytes nimmoniana</i>	Amrita or Narkya	Olacaceae	Anticancer
19.	<i>Plumbago zeylanica</i>	Chitrak	Plumbaginaceae	Appetizer, dyspepsia, leprosy, rheumatism, carminative, tonic, scabis
20.	<i>Semecarpus anacardium</i>	Bibba	Anacardiaceae	Epilepsy, nervous debility, rheumatism, skin diseases, piles, abortifacient, antifertility, sprain
21.	<i>Terminalia bellerica</i>	Behada	Combretaceae	Laxative, antipyretic, narcotic, astringent, bronchitis, tonic
22.	<i>Terminalia chebula</i>	Hirda	Combretaceae	Diuretic, cardiotoxic, expectorant, asthma, ulcer, dental caries
23.	<i>Tinospora cordifolia</i>	Gulvel	Menispermaceae	General debility, urinary disorders, cough, stomachic, chronic diarrhea, dysentery, anodyne, cardiotoxic.
24.	<i>Vitex negundo</i>	Nirgudi, ningad	Verbenaceae	Headache, rheumatism, mosquito repellent, vermifuge, catarrh, toothache, eye diseases
25.	<i>Woodfordia floribunda</i>	Dhayati	Lythraceae	Leucorrhoea, toothache, astringent, vermifuge, leprosy





### **3.2.5: WATER AUDIT:**

Water plays a key role in every environmental system. Water is an amazing material with unique properties that affect life on earth. The earth holds the same water in the same quantity as it did when it was formed. The earth's water continuously circulates from the ocean to the atmosphere, then to the land and back. The atmospheric water cycle helps us to get a regular supply of fresh water every year. Thus, fortunately the world's freshwater supply is continually collected, purified, recycled and distributed in the earth's hydrological cycle. Water is so integral to life that we frequently take it for granted. Freshwater is an irreplaceable resource that we are managing poorly. Despite its importance, water is one of our most poorly managed resources. Even if the CSIBER Institute gets assured good amount of rainfall, the water is not retained in the ground due to the limitations like topographical features and seasonal rains. Hence regulation of water cycle by nature is proper. In the area covered by built structures and roads, the rainwater does not percolate into the ground. Hence water conservation measures should be adopted.

#### **3.2.5.1: WATER CONSUMPTION:**

The institute has one water connection of Gadhinglaj Municipal Corporation. The water is used for domestic consumption and for drinking purpose after filtration. The Institute have 1 tank of 2000 liters capacity used for domestic consumption in laboratories and washrooms. Along with that, 1500 liters 1 tank is there to fulfill the requirement of drinking water. For gardening purpose efficient irrigation system are in use such as rain water harvesting system. These systems help to reduce the water consumption with proper growth of vegetation.

#### **3.2.5.2: QUALITY OF WATER:**

College is committed to provide good quality of water by installing water filter system. Water supplied by the corporation is tested for various physico-chemical and microbiological parameters from the filter system. Water supplied by the to the students after filter/ RO system is moderately hard (Hardness is 120 mg/l) whereas, the highest desirable limit is 100 mg/l. Most Probable Number (MPN) is 0 / 100 ml. as against the recommended W.H.O standard of 0 / 100ml. Hence, filtered water is suitable for drinking. Copy of the analysis report is displayed on the filter as information to the students.








In Institute water is used for domestic and drinking purpose. The students which utilize water for drinking purpose must be monitored frequently to avoid the spread of waterborne diseases like Dysentery, Typhoid, Gastro etc. In the Institute the water is supplied by corporation is treated in water filters and then filled in the water storage tanks for drinking purpose. Water quality of drinking water from cooler and mixed water is periodically monitored by staffs and routine water analysis is done from laboratory for necessary parameters. It is evident from the reports of water analysis for portability study that the required parameters are within the limits of BIS standards. The water quality report of the drinking water has been attached here with:



## Plate No. 2 Water Quality Report

Government of Maharashtra  
Water Supply And Sanitation Department  
Ground Water Surveys and Development Agency, Subdivisional Water  
Testing Laboratory, Gadhinglaj,  
Quarter No 11, PWD Quarters Near Sukt District Hospital, Tal - Gadhinglaj,  
Dist-Kolhapur, Pin code- 416002

Phone No -(02327)222454 E-Mail-Id -hdgadhinglaj@gmail.com

---

**Report on Chemical Examination of Water For Drinking Purpose**

Report No	16/2023 - Dated - 16-06-2023	Report Issue Date:-	30-06-2023
Name of Customer	Hou. Pr. In. Pr. ad. A/P, Goma, Ne. r. on. S. r. on. & M. ad. Pr. S. r. on. Pr. ad. Pr. ad. Pr. ad.		
Address of Customer	A/P - Gadhinglaj Tal. Gadhinglaj, Dist. Kolhapur.		
Order / Reference	Dated - 06/06/2023		
Sample Declaration As Provided By Customer			
Nature of sample	Groundwater	Source	RO Water
Location / Address	A/P - Gadhinglaj	Village	Gadhinglaj
Taluka	Gadhinglaj	District	Kolhapur
State	Maharashtra	Purpose / Use	For Drinking Purpose
Sample drawn & collected by	By Applicant	Date of collection	16/06/2023

Lab Sample ID	Sample Received in Container	Sample Quantity	Date of Sample Received to Lab	Date of Analysis
SDWTI.GAD100623	Plastic Can	1 Liter	16/06/2023	22/06/2023



  

**Detailed Analysis Report**

SN	Parameter	Unit	Test Method	SDWTI.GAD100623	Desirable limit	Permissible limit
1	Colour	-	Physically Tested	01	Colourless	
2	Odour	-	Physically Tested	Agreeable	Agreeable	
3	Taste	-	Physically Tested	Agreeable	Agreeable	
4	pH	-	APHA, 23 <sup>rd</sup> Edition, 2017-4500-H <sup>+</sup> B	7.1	6.5-8.5	
5	Turbidity	NTU	APHA, 23 <sup>rd</sup> Edition, 2017-2100 B	00	5	5
6	Total Dissolved Solids	mg/l	APHA, 23 <sup>rd</sup> Edition, 2017-2540 C	161	500	500
7	Total Alkalinity	mg/l	APHA, 23 <sup>rd</sup> Edition, 2017-2320 B	44	200	500
8	Total Hardness	mg/l	APHA, 23 <sup>rd</sup> Edition, 2017-2340 C	52	300	500
9	Chloride	mg/l	APHA, 23 <sup>rd</sup> Edition, 2017-4500-Cl B	15	250	250
10	Calcium	mg/l	APHA, 23 <sup>rd</sup> Edition, 2017-3500-Ca B	25	75	200
11	Magnesium	mg/l	APHA, 23 <sup>rd</sup> Edition, 2017-3500-Mg B	6.64	30	100

BIS 10500:2012

Statement - 1. The results relate only to the samples tested and fully depend on the samples as collected and submitted by customer.  
 2. The report shall not be reproduced except in full, without the written approval of the laboratory.  
 3. The observed results are for the sample submitted in lab & recommended regular check of source frequently.

Analyst  ( K. U. Suryawanshi ) Bacteriologist SOWTI, G. S. D. A. Gadhinglaj.	Authorized Signatory for  ( R. S. Goski ) Senior Geologist, GroundWater Surveys and Development Agency, Kolhapur.
---	---



### **3.2.5.3: WATER CONSERVATION:**

Clean, fresh water is a limited resource. With all the severe droughts happening in the world, the limited supply of fresh water is becoming one of our most precious resources. Every person on earth needs water to survive. Without it, many of us would get sick and even result in death. While almost 70% of the Earth is made up of water, many parts of the world suffer from clean water shortage. Conserving water is important because it keeps water pure and clean while protecting the environment. Conserving water means using our water supply wisely and be responsible. As every individual depends on water for livelihood, we must learn how to keep our limited supply of water pure and away from pollution. Keeping our water supply safe and pure will protect the water for the generations to come.

Many believe that our water supply infinite. However, our supply is quite the opposite. It is important that we must not pollute your water as many do not realize just how important and scarce water is. Humans are not the only species on Earth that requires water for survival. In fact, every species on this planet needs water to live and survive. Without water, the aquatic life will stand no chance of survival. It is highly important that we save water that is essential to our sustainability.

### **3.2.5.4: EFFICIENT USE OF WATER:**

Enormous amounts of water is wasted, without reason, through leaking taps and open taps waste. In many cities, more than half the available supply is lost through these leakages and rotting of pipelines. In Institute campus instruction boards are displayed at every washroom to avoid wastage of water. Students are instructed to close the taps when they are not in use. Taps and pipelines are regularly checked for leakages and repaired if needed. Leaking taps are immediately replaced by new handy taps.

### **3.2.5.5: WATER MANAGEMENT:**

Demand Analysis of water requirement: Residential based population on the campus and off the campus is given table No.13.

**Table No. 13: Population strength on campus**

<b>Year</b>	<b>Students</b>	<b>Teaching staff</b>	<b>Non – Teaching Staff</b>	<b>Total</b>
2020-2021	334	17	7	358
2021-2022	406	17	7	430
<b>Total</b>	<b>740</b>	<b>37</b>	<b>14</b>	<b>791</b>

During the year 2020-21 maximum strength of population on college campus was 358 and during the year 2021-22 maximum strength of population on college campus was 430.



College is by and large non-residential based. Water requirement for drinking and other purposes (Wash room, Plantation etc.) is calculated at the rate of 10 lit per person per day. Based on this assumption water demand analysis is given in table No. 14.

**Table No. 14: Water demand Analysis**

Year	Type	Total Number of People	Requirement of water	Total Requirement of water
2020 - 2021	Non-Residential	358	@ 10 lit / day	3580 lit / day
2021 - 2022	Non-Residential	430	@ 10 lit / day	4300 lit / day

On an average requirement of water per day is about 3940 lit / day. This demand is met through supply of water from municipal cooperation throughout the year. However, One RO water purifier is placed in college campus, for the students and staff.

### **3.2.6: RAIN WATER HARVESTING:**

Roof top rain water harvesting system has been installed for every establishment. The harvested water is collected in a tank and used for gardening purpose. Rain water harvesting is calculated based on the following figures and assumptions:

**Total Roof Top Area: 348 Sq.mt**

**Annual Average Precipitation: 1000 mm,**

**Effective Rainy Days: 69**

**Average Daily Precipitation: 14.49 mm / 0.014 m**

**Therefore, the volume of rainwater Harvested /Day:  $348 \text{ m}^2 \times 0.014 \text{ m} = 4.872 \text{ m}^3$ . On the basis of above assumption rain water harvested in 1 Day is  $4.872 \text{ m}^3 \times 1000 = 4872 \text{ Liters}$ .**

Rain water harvesting is done by collecting and storing rain water. This is very effective method for collection of pure water for many cities. The rain water that falls on the roof can be collected and stored. As Gadhinglaj is getting assured rainfall surprisingly large amount of water can be collected in this way.



### Plate No. 3 Rain Water Harvesting



Presently, roof top harvesting is done only on one building and water collected is utilized for Gardening purpose.



### **3.2.7: WASTE MANAGEMENT:**

#### **3.2.7.1: WASTE WATER DISPOSAL METHOD:**

Total water demand for domestic consumption on college campus is 3,940 lit / day. By and large, it is assumed that 30 % waste water is generated during college hours i.e.,  $3940 \text{ lit / day} \div 0.3 = 1,313 \text{ litre/day}$ . Out of 1,313 liters waste water generated, part of this domestic waste water is disposed off to septic tank.

**Table No. 15. No of Toilets Campus**

Sr. No	No of WCs + Urinals		Total
	Male	Female	
1	2+1+3	3+3	12

During the last two years average strength of student and staff on campus is 394. Ratio of number of people and WCs and urinals is 1: 32.83

Male: 272      Female students: 98  
Ratio of WCs+ Urinals for Male: 1: 45.33  
Ratio of WCs + urinals for Female – 1: 16.33

As per the WHO guidelines they should be 1: 30 for male and 1: 20 for female. However, for all practical purpose, minimum requirement should be at least 1: 30 for female and 1: 40 for male.

Therefore, it is suggested to construct another 9 for male and 5 toilets for female.

Waste water is disposed of through septic tanks.

#### **3.2.7.2: HAZARDOUS WASTE MANAGEMENT:**

Hazardous waste is a waste that make it potentially dangerous or harmful human health or environment. The universe of hazardous waste is large and diverse. Hazardous waste can be liquid, solids or contained gases. There is no such hazardous waste on the campus except LPG cylinder, fumes due to Home Science process in the laboratories. Some of the action taken for cleaning campus is given below:

- Safety valves and safe place for storing LPG cylinders
- The campus has been declared as plastic free zone
- The College aims to make the campus plastic-free by avoiding non-biodegradable products such as plastic glasses, cups, plates and straws in the Institute canteen and instructing students to avoid bringing plastic materials.
- Bins are placed in different parts of the campus for the segregation of plastic, paper and food waste.



- The college aims for an ecofriendly campus and to make this a reality, the use of ecofriendly bags and files are encouraged.
- The staff and students have taken the initiative to take up campus cleaning programme through extension activities.
- Students are trained to use paper bags and a promotion of the same is held.
- The campus is also declared tobacco free and smoking free zone.

### **3.2.7.3: SOLID WASTE MANAGEMENT:**

As a policy matter College has banned usage plastic bags on the campus. College has taken precautions to collect solid waste through dust bins. The dustbins are helpful to maintain clean atmosphere sanitation of college campus. Dustbins are placed on various places. Each classroom carries one recycled dustbin. The main aim of using dustbins is to clean the campus, to collect waste material and to create awareness of cleanliness among the students.

Solid waste collected is segregated into degradable and non-degradable

#### **Paper Waste:**

Major part of the solid waste generated at the college campus is a paper. Though paper is biodegradable material, it is having good potential of recycling thus will help in conserving the resources and trees indirectly. Institute follows the green practice like use of one-sided paper, paperless activities like e-mailing all notices instead of printing it of paper, putting the information on what's app groups are also practiced in the college to reduce the use of paper. Thus, Reduce, Reuse and Recycle, 3 R principles of solid waste management are followed in the Institute for waste management.

**Table No. 16 List of Dustbins**

<b>Sr. No.</b>	<b>Type of Waste</b>	<b>No. of Dustbins</b>
1	E-waste	01
2	Wet waste	08
3	Dry waste	12
<b>Total</b>		<b>21</b>





### 3.2.6.3: E-WASTE MANAGEMENT:

Computers and their peripherals are the only source of electronic waste on the campus. As on date there are about eleven computers, two printers and one Xerox machines. Piling up of e- waste is discouraged on the campus. College collects all e-waste and send it to e-waste depo of Gadhunglaj Municipal Corporation. The certificate of e-waste collection has been attached here with:

### Plate No. 5 e-waste Certificate


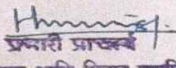
	<p>॥ ओंकार मुळ भेदी खडकाचे अंग, अभ्यासाची सांग कार्यक्षिती ॥ ओंकार शिक्षण प्रसारक मंडळ संचलित कला, वाणिज्य आणि विज्ञान महाविद्यालय, गडहिंग्लज, जि.कोल्हापूर. शासन मान्यता क्र.एनजीसी / ३५९७ / नमवि / (१६ / ९७)माशि-३दि.२६ सप्टेंबर १९९७ Accredited by NAAC 'B' Grade (CGPA - 2.22) Email : aaccolleged@yaho.com / aacsg45.cl@unishivaji.ac.in Website: www.omkarsacscollegedgadhinglaj.in (कार्यालय दुर्गवती - ०२३२७ २२४४०५)</p>	<p>स्थापना : जून १९९८</p>
<p>प्र.प्राचार्य डॉ.सुरेश मारुती चव्हाण(एम.ए.सेट.पीएच.डी.) मो.न.९९६०२४३८८२</p>	<p>अध्यक्ष मा.राजन जनार्दन पेडणेकर (माजी नगराध्यक्ष गडहिंग्लज)</p>	
<p>जावक क्र.:ACSG/755/2022-23</p>	<p>दिनांक : २३/६/२०२३</p>	
<p>प्रति, मा.मुख्याधिकारीसो गडहिंग्लज नगरपरिषद, गडहिंग्लज.</p>		
<p>विषय - ई-कचरा घेऊन जाणेबाबत ....</p>		
<p>महोदय, उपरोक्त विषयास अनुसरून आमच्या कला, वाणिज्य आणि विज्ञान महाविद्यालय व राजर्षी शाहू कनिष्ठ महाविद्यालयामध्ये साठवलेला ई-कचरा आपल्या नगरपालिकेच्या ई-कचरा डेपोमध्ये एकत्रित करण्यासाठी घेवून जावे ही नम्र विनंती. सहकार्याच्या अपेक्षेसह.....</p>		
	<p>आपला  प्रकाश प्रसाद कला, वाणिज्य आणि विज्ञान महाविद्यालय गडहिंग्लज, जि. कोल्हापूर</p>	
<p>3 JUN 2023 वीरनिशी लिपिक गडहिंग्लज नगरपरिषद</p>		



Plate No. 4 Dust Bins



#### **4.0: GREEN INITIATIVES PROGRAMME:**

College has initiated large number of Environmental awareness programme through college and NSS. Activities are given due publicity through local newspapers. Some of the high lights are given below:

**Table No. 17: List of NSS some activities during the year 2021-22**

Sr. No.	Activity	Date	Details of activity
1	Seed ball Preservation	21/05/2022	
2	Tree and seed ball Plantation Cleaning campaign	02/07/2022	Cleaning of gutters and road in N.S.S. Camp at Alave Village
3	River Cleanliness Camp	22/10/2021	Cleaning of river area at Kotoli Village
4	Celebration of National Pollution Prevention Day	02/12/2021	Wall paper display on the occasion of National Pollution Prevention Day
5	Guest Lecture on cleanliness campion	30/10/2021	A Guest lecture on Cleanliness campion by Shri. Atul Kadam (Forest Gard)
6	E-Waste Collection Camp	06-01-2022	E-Waste Camp is arranged for the collection of e-waste
7	Wall paper display	29/11/2021	Wall paper display on Biomedical Waste Management
8	Cleanliness Drive	19/04/2022	Cleanliness drive is organized at Jotiba temple area

**Plate No. 6 Activities during 2020-21 and 2021-22**



### Lake Cleanliness

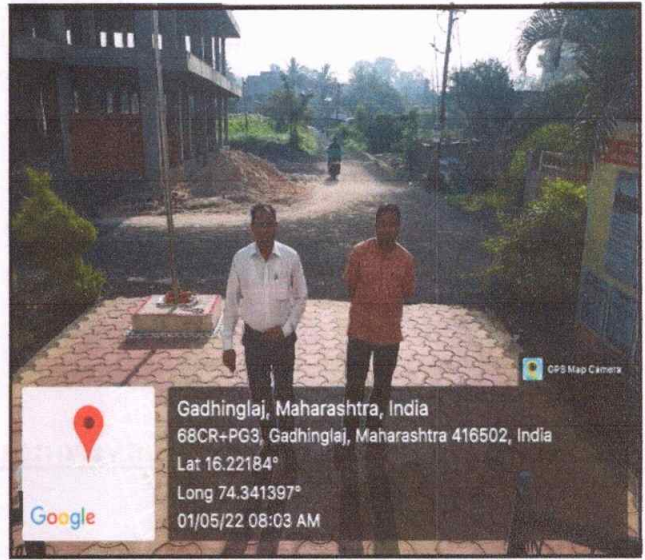
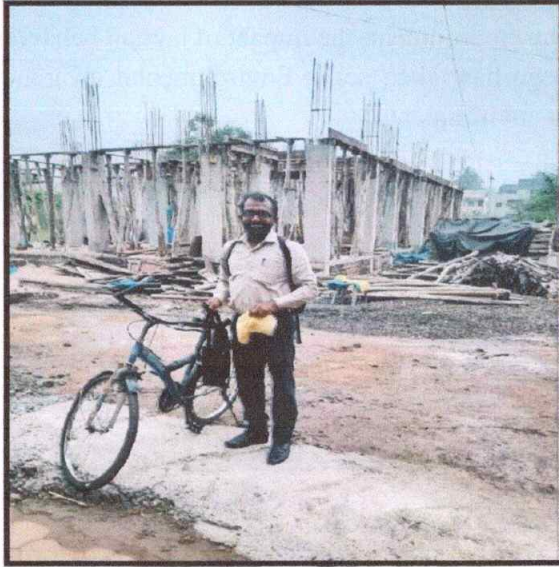


### Green Oath taken at college campus



### Tree plantation programs





### No Vehicle Day



### Lake Cleaning Activity



### **5.0:ENVIRONMENT AWARENESS TAGS:**

Environmental awareness is having an understanding of the environment, the impact of human behaviour on it and the importance of its protection. Hence, college has taken some Environmental awareness measures. College has prepared following tags related to environment:

1. Keep Calm and Save the Environment
2. Use of Plastic Bags Strictly Prohibited
3. Save the Trees
4. Do Not Waste the Water
5. No Smoking

### **Plate No. 7 Environment Awareness Tags**



## **5.0:ENVIRONMENT AWARENESS TAGS:**

Environmental awareness is having an understanding of the environment, the impact of human behaviour on it and the importance of its protection. Hence, college has taken some Environmental awareness measures. College has prepared following tags related to environment:

1. Keep Calm and Save the Environment
2. Use of Plastic Bags Strictly Prohibited
3. Save the Trees
4. Do Not Waste the Water
5. No Smoking

### **Plate No. 7 Environment Awareness Tags**



## **6.0: FINDINGS AND SUGGESTIONS:**

After a thorough analysis of green practices and environmental aspects of CSIBER Institute the audit team has come with following findings and suggestions.

### **FINDINGS:**

- The Institute campus strictly follows green practices. All students, staff and faculty members participate actively in keeping campus clean and green.
- Though the campus is small the Institute has tried to keep it green by planting trees and landscaping in the premises.
- Solid waste segregation and management is followed in the premises.
- Drinking water quality is maintained as per the standards by frequent water quality analysis at Environment laboratory.
- Rain water harvesting has been done in the Institute campus, harvested rain water is used for gardening purpose.
- Large windows provided for natural ventilation reducing power consumption.

### **SUGGESTIONS FOR IMPROVEMENT:**

College has taken good number of green initiatives for the protection of environment. However, for getting better results following suggestions may be considered by the college in phased manner.

1. Annual Power requirement met through LED bulbs 20.89 %. Further, all the fans should be replaced in phased manner energy efficient five-star rating fans.
2. Considering the present strength of the college, it is suggested to construct another 9 for male and 5 toilets for female.
3. Plant some medicinal trees.
4. As there is sufficient place for storage water and roof top area more efforts be made harvest rainwater so that water consumption can be reduced to save electrical energy.
5. It is recommended to construct underground storage tank for storing harvested water
6. A solar system should be installed to meet the entire energy requirement in a phased manner.
7. Representative plant species be appropriately labeled with botanical name/English name/local name.

**Overall, the performance of Institute is good in green initiative front and can take some more green initiatives for sustainable future.**



  
**I/C. PRINCIPAL**  
Arts, Commerce & Science College  
Gadhinglaj, Dist. Kolhapur.





**Omkar Shikshan Prasarak Mandals**  
**Arts, Commerce and Science College, Gadhinglaj,**  
**Dist. Kolhapur**

**ENERGY AUDIT REPORT**

**2020-21 And 2021-22**



**Prepared and Certified By**

**Ms. Pooja S. Sarolkar (Lead Auditor)**

**Mr. Anand Gholap (Internal Auditor)**

**June, 2023**



## Energy Audit Certificate

Is awarded for 2020-21 and 2021-22 to the Esteemed Institution

**Omkar Shikshan Prasarak Mandals  
Arts, Commerce and Science College, Gadhinglaj, Dist. Kolhapur**

As part of Institutions initiatives for a Healthy and Sustainable Institute the audit was conducted.

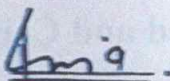
We appreciate the immense efforts taken by staff and students towards the Energy Management and Conservation. And the report has been prepared by us based on the document submitted by college.

Prepared by



**Mr. Anand Gholap**  
Internal Auditor (EMS)  
IMS (ISO 14001:2015 & ISO 9001:2015)  
International Register of Certificated Auditor (CQI-IRCA)  
Certificated No-IMS/015/22/907/A/12

Certified by



**Ms. Pooja Sarolkar**  
Lead Auditor  
EMS (ISO 14001:2015)  
International Register of Certificated Auditor (CQI-IRCA)  
Certificated No-22/IN/1023876/8088



## INDEX

Sr. No.	Description	Page No.
1	Preamble	4-5
2	College profile	6-7
3	Energy Policy	8
4	Geographical information	10
5	Scope of Energy Audit	11
5.1	Energy consumption	12
5.2	Energy requirements	12
5.4	Efforts for carbon neutrality	15-18
6	Suggestions	18



## LIST OF TABLES

Table No.	Description	Page No.
1	Details of area	10
2	Land use pattern	10
3	Geographical details of the college area	10
4	Sources of Energy Consumption	12
5	Energy consumption	13
6	Electricity produced from different sources	16
7	Carbon foot prints	17
	Details of CO <sub>2</sub> emitted due to bulbs	18

## LIST OF FIGURES

Table No.	Description	Page No.
1	College organogram	9
2	Google earth map	11
3	Energy consumption	14



# ENERGY AUDIT REPORT

## 1: PREAMBLE:

Energy sector has played a very important role in development of human race. Various forms of energy are used in industrial as well as domestic sector. Energy resources can be divided mainly into two types i.e., renewable resources and non-renewable resources. The renewable resources of energy mainly include solar energy, wind energy, water energy etc. The non-renewable resources include coal, petroleum, natural gas etc.

Now-a-days, 90 percent of our energy needs are fulfilled by non-renewable resources, which has led to increase in environmental pollution level. The burning of coal leads to release of Sulphur dioxide, which in turn causes acid rain. The carbon dioxide release from various industrial activities has caused significant increase in the level of greenhouse gases, which is main cause of global warming. Along with this, various other major and minor pollutants are environment friendly. More use of renewable energy resources ensures sustainability.

The energy audit mainly focuses on evaluating the use of energy in institutions generated through renewable and non-renewable means of energy and promoting the use of renewable resources for environmental sustainability.

## **Introduction**

Energy audit is an inspection, survey and analysis of energy flows for energy conservation in building or a system to reduce the amount of energy input into the system without adding a negative impact on the output. Energy audits are means to understand the flow of energy starting from the source to its final use.

As per the Energy Conservation Act, 2001, Energy auditing is the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption.

Green audits are assigned to criteria 7 of the National Assessment and Accreditation Council, which is a self-governing organization that provides various institutions with grades based on their criteria for accreditation.

Essentially requirement for an Energy Audit is a part of the criteria 7 and is vital to the accreditation process. This accreditation provides a college with an opportunity to present itself as an esteemed institution without impeccable values, infrastructural advantage and endless opportunities it could provide its students.



### **Need for Energy Audits:**

Energy audits help analyse and determine good institutional practices; whether they are eco-friendly or sustainable. With the world constantly changing, development, unfortunately, results in large-scale utilization of natural resources. Now natural resources are not just used for the supply of products. Energy, water are all basic commodities that are used generously by all. With the threat of depleting resources looming over our heads, it is imperative to determine how much we use and where we waste resources to ensure efficient usage. Energy audits provide opportunities to determine the same and help the organization to reflect, improve and expand their processes and shift to clean green resource utilization. Apart from this, it helps instil consciousness among people as part of the institution towards the environment and sustainable resource utilization.

### **Goals of Energy Auditing:**

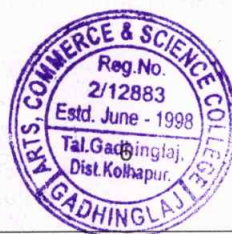
- Identification of strengths and weaknesses in green practices.
- Analyze and suggest solutions for problems identified.
- Identify and assess environmental risk.
- Motivate staff for optimal sustainable use of available resources.
- Increase environmental awareness throughout the campus.
- Collect baseline data of environmental parameters and prepare plans for issues before they become problems.

### **Objectives of Energy Audit:**

- Analyze current practices and determine their impact on the environment.
- Identify and analyze significant environmental issues.
- Continuous assessment for better environmental performance.
- Establish and implement a green energy strategy in the campus and sensitize the faculty and students.

### **Benefits to Educational Institutions:**

- Improve the energy utilization within and outside the campus premises.
- Help recognize cost-effective green strategies that enable conservation of energy.
- Empower people linked to the organization to move towards conscious environmental thinking and practice.
- It helps improve the image and builds a positive impression of the institution for its green and clean resource use.



## **2.0: COLLEGE PROFILE:**

### **About College:**

The Institute named 'Omkar Shikshan Prasarak Mandal' come into existence in 1996 in Gadhinglaj Kolhapur district in southern Maharashtra (India). Our aim is to provide higher education at affordable price to Socio-Economically backward students in the city area and surrounding villages this was our motto behind the establishment of the institute.

Our institute established Arts, Commerce and Science College in June, 1998 and our first batch of B.A. passed out in April 2001. Initially we had three full time departments viz. Political Science, Economics and Marathi, after taking into consideration the need of students English and History departments were started from June 2011 and June 2012 respectively. We acquired our salary grant from government of Maharashtra from June 2004 for the degree college.

In 2004 management decided to start Junior college and sought the permission for the same immediately in June 2004 and hence institution started Rajarshree Shahu Junior College.

In 2008 the institution constructed an independent building to run these two with Co-Operation of community it has recruited quality teaching and non-teaching staff for betterment of the institution.

Shri. Rajan J. Pednekar is the founder president of the institute, and Shri.Gajanan Gijvanekar is the founder seceratry of the institute. Smt. Anuya Kiran Gune also served as the president of the institute. We are going with able leadership of Honorable president Shri. Rajan Pednekar right now. Our institution is making progress with his all trustees including Vice President Dr. Rutuja Pednekar-Bandivadekar and Secretary Advt. Vijayalaxmi Kadane and Treasurer Shri. Uddhavrao Ingavale.

### **Vision**

“Education for deprived sections of society and promoting the values of Liberty, Equality, Fraternity and justice”

### **Mission:**

“Producing youths for nation building”



**Goals:**

- Providing quality education to students residing in rural and hilly area.
- Developing scientific attitude among students.
- Mental, cultural, psychological and physical developments of the students through curricular and co-curricular activities.
- Promoting the values incorporated in the constitution of India.
- Inculcating the value of 'Health in Wealth.'
- Promoting the use of ICT in higher education.

**NAME AND ADDRESS OF COLLEGE:**

<b>Name of college:</b>	ARTS, COMMERCE & SCIENCE COLLEGE GADHINGLAJ
<b>Address</b>	132/12, Sarswati Nagar, Gadhinglaj,
<b>Pin:</b>	416502
<b>Website:</b>	www.acsc.ac.in
<b>Status of the institution:</b>	Permanent Affiliation
<b>Type of institution:</b>	Co-Education
<b>a. By gender</b>	Co-Education
<b>b. By shift</b>	Day Time
<b>Sources of funding:</b>	Grant in Aid
<b>a. Date of establishment of the college:</b>	June 1998
<b>b. University to which the college is affiliated:</b>	Shivaji University, Kolhapur
<b>Details of UGC recognition:</b>	
<b>Under section</b>	
<b>a. 2 (f)</b>	8-7/2016 (CPP-I/C), 7 <sup>th</sup> November 2016
<b>b. 12 (B)</b>	8-7/2016 (CPP-I/C), 7 <sup>th</sup> November 2016

**COURSE OFFERED BY COLLEGE:**

<b>Sr. No.</b>	<b>Programme level</b>	<b>Name of programme</b>
1.	U.G.	B.A.
2.	U.G.	B.Com.
3.	P.G. (Distance Education)	M.A.





### **3.0 ENERGY POLICY:**

A key component of the College Sustainability Program is energy conservation. Listed below are several guidelines that are intended to manage and reduce energy consumption on all college campus. These guidelines should be followed by all faculty, staff, administration, and students. The Energy usage Policy of college is to manage energy in such a systematic way to minimize its impact on the environment. It will help us to embed efficiency and environmental awareness into our everyday activities, thus helping us to realize our responsibilities and commitment to conservation of natural resources and to limit its usage.

#### **Policies:**

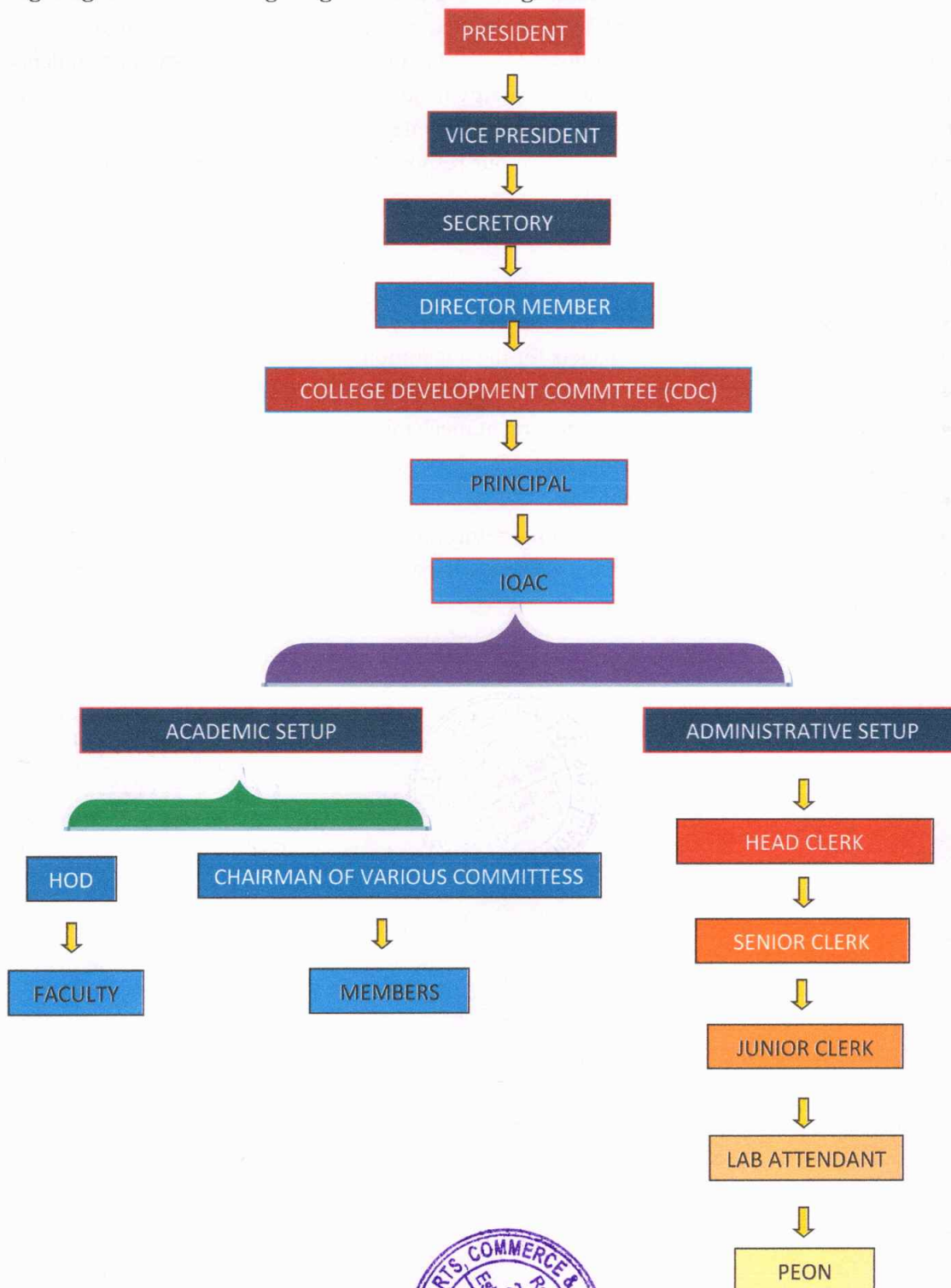
- To assess source energy usage and measure its impact on the environment.
- To install photovoltaic solar panels for the generation of alternate energy.
- To install LED bulbs in the whole campus to save energy.
- To develop systematic waste management mechanism.
- To develop rainwater harvesting unit.
- To undertake tree plantation drive.
- To monitor and respond to emerging environmental and energy issues. To strengthen our employees' and students' environmental knowledge and skills to improve our own environmental performance.



  
**I/C. PRINCIPAL**  
Arts, Commerce & Science College  
Gadhinglaj, Dist. Kolhapur.

• **COLLEGE ORGANOGRAM:**

Organogram of the college is given in below : **Figure 1**



#### **4.0 GEOGRAPHICAL INFORMATION:**

##### **DETAILS OF AREA:**

Table no. 1: Location of the campus and area in sq. mts.is given below:

<b>Location</b>	<b>Rural</b>
<b>Area</b>	1141.48 Sq. Mt

##### **3.1.3 LAND USE PATTERN OF COLLEGE:**

**Table No.2: land use pattern of college**

<b>Land use pattern</b>	<b>Area (m<sup>2</sup>)</b>
Total area	1141.28 Sq. Mt
Area occupied by buildings	348.33 Sq. Mt
Ground	307.5 Sq. Mt
Open space	485.45 Sq. Mt

**Table No. 3: Geographical details of the college area**

<b>Latitude (N)</b>	<b>Longitude (E)</b>	<b>Elevation (m)</b> <b>MSL</b>
16.221692	24.341112	623 mt



Location of the college area is shown on Google Earth map (Figure No. 2)



## **5.0 SCOPE OF ENERGY AUDIT IN TERMS OF ENVIRONMENTAL ASPECTS:**

- 5.1 Energy Conservation: Energy conservation is the effort made to reduce the consumption of energy by using less of an energy service. This can be achieved either by using energy more efficiently (using less energy for a constant service) or by reducing the amount of service used
- 5.2 Use of Renewable Energy: Renewable energy is useful energy that is collected from renewable resources, which are naturally replenished on a human timescale, including carbon neutral sources like sunlight, wind, rain, tides, waves, and geothermal heat.
- 5.3 Efforts for Carbon Neutrality: carbon-neutral (or carbon neutrality) is the balance between emitting carbon and absorbing carbon emissions from carbon sinks.



### **5.1: ENERGY CONSUMPTION:**

**Number of rooms under use in college: 21**

Details of various sources of energy consumption units are given in table No.4.

**Table No.4: Sources of Energy Consumption**

<b>Sr.No.</b>	<b>Energy sources</b>	<b>Electricity/generator/solar lamps</b>
a.	No. of Computers	11
b.	No. of tube lights	12
c.	Number of LED bulbs	32
d.	No. of UPS	02
e.	No. of fans	13
f.	No. of fridge	01
g.	No. of CCTV	08
h.	Electric pumps of 1 HP	01
i.	No. of smart T.V.	01
j.	No.of printers and Xerox machine	03
k.	Mixer	01
l.	Oven	01
m.	Bell	01
n.	Bio-metric Machine	01
o.	LCD Projector	01

### **5.2: ENERGY REQUIREMENT: sanctioned load (6.6 kw)**

Electricity supplied from the Maharashtra State Electricity Board is the main source energy for the activities on the campus. In addition to the regular supply, energy consumed (KW) during the last year is shown in tabular as well as graphical form.

Electricity supplied from the Maharashtra State Electricity Board is the main source energy for the activities on the campus. In addition to the regular supply, energy consumed (KW) during the last year is shown in tabular as well as graphical form.



**Table No. 5: Energy consumption during the Year 2020-21 and 2021-22**

**Consumer No - 253510096211**

<b>Sr. No.</b>	<b>Months</b>	<b>Consumption (In units) 2020 - 2021</b>	<b>Consumption (In units) 2021 - 2022</b>
1	June	273	95
2	July	70	101
3	August	85	103
4	September	69	90
5	October	121	189
6	November	72	118
7	December	105	114
8	January	79	99
9	February	84	111
10	March	21	107
11	April	228	139
12	May	75	121
	<b>Average</b>	<b>106.83</b>	<b>115.58</b>



Figure 4: Graphical representation of energy consumption during 2020-21

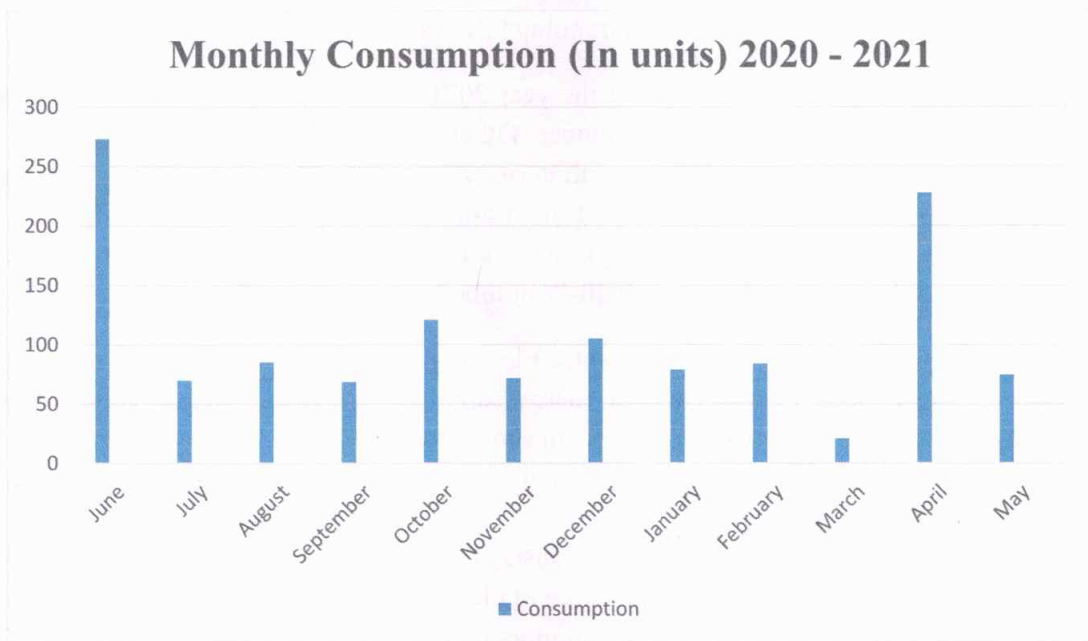
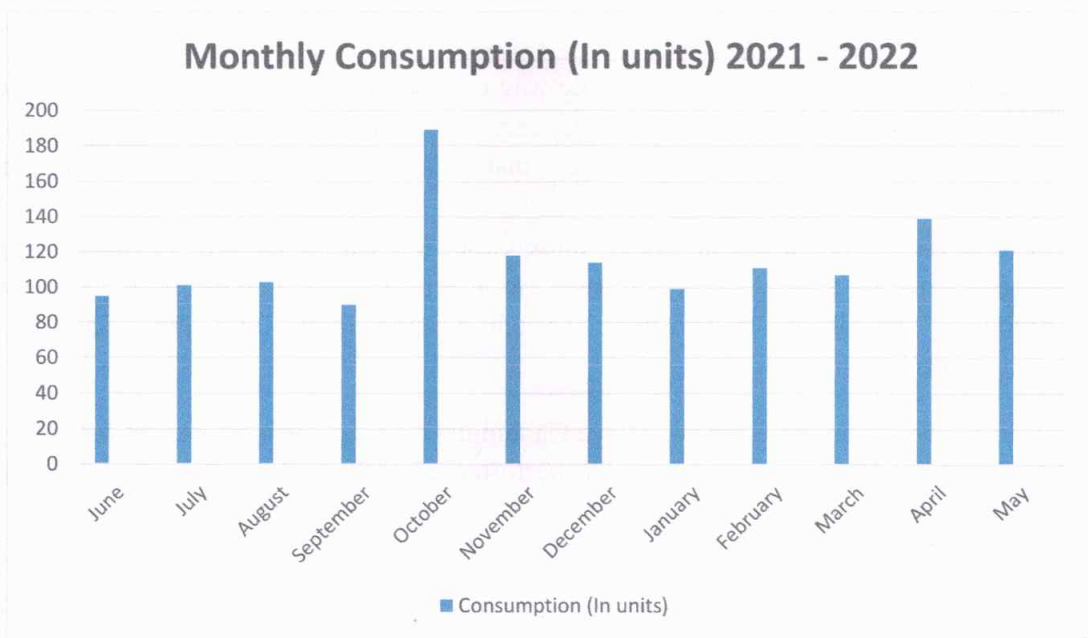


Figure 5: Graphical representation of energy consumption during 2021-22



### **Energy conservation measures taken up by the College:**

From the energy consumption pattern of the year 2020 - 21, it is found that there was increase of energy consumption in the month of April and June as compared other months. Thereafter, the energy consumption is gradually decreasing in January to March. Maximum energy requirement was 273 units during month of June and minimum 21 was in March.

From the energy consumption pattern of the year 2021 - 22, it is found that there was increase of energy consumption in the month of October. Other than that the energy consumption is on the regular basis close to the average consumption of 115.58 units. Maximum energy requirement was 189 units during month of October and minimum 90 units was in September, The energy consumption decrease during the last two years is mainly due to switching over the use of LED bulbs in place of high energy consuming 40-Watt tube lights.

The requirement is met from the Maharashtra Electricity Board. College is aware of environmental impacts of consumption of conventional energy supplied by MSEB. Hence, college has adopted following measures to minimize the energy consumption.

1. Switching over to the use of LED bulbs as a replacement to conventional high energy consumption bulbs
2. College has encouraged use of e-mail instead of sending notices and faxing documents.
3. Most of the fans carry three stars rating of electrical appliances.
4. Increased use of flat-screen LCD monitors rather than CRT monitors
5. Awareness amongst students was carried out and accordingly sign boards are displayed at strategic locations for conservation of energy and students positively responding.

### **5.3: EFFORTS FOR CARBON NEUTRALITY:**

Thinking about carbon footprints is a simple way of thinking about ways to reduce environmental pollution. By reducing our carbon footprints, each one of us can contribute to making the earth a safer, better place to live. Estimates suggest that almost half of our carbon footprint is due to electricity and 17% is due to lighting alone.

Carbon footprint is the amount of Green House Gases like carbon dioxide, methane, nitrous oxide emissions emitted by a building, organization etc. It relates to the amount of greenhouse gases we are producing in our day-to-day lives through burning fossil fuels for electricity, heating, transportation etc.

Arts, Commerce & Science, Mahavidyalaya Gadhinglaj College, carbon footprint for indoor lighting in office building is considered. The performance of the building by using LED lights reduces the building carbon foot print. The carbon foot print is for –

1. Incandescent Light
2. CFL
3. LED Lights





## Electricity:

By and large, half of our carbon footprint is due to electricity and 17 % is due to lighting alone. Electricity in turn can be produced by coal, natural gas, petroleum, and other. Electricity is produced from different sources and how much GHG released is shown in table no. 6.

**Table No. 6: Electricity produced from different sources**

Source	Million metric tons of CO <sub>2</sub> emission for 1 year	Electricity generation (Billion kWh) for 1 year
Coal	1788	1882
Petroleum	106	119
Natural gas	337	562
Other	14	22
Non fossil fuels	None	1106
<b>Total</b>	<b>2245</b>	<b>3621</b>

Since close to 2245 million metric tons of CO<sub>2</sub> emitted by total electricity generation per year. A single kilowatt-hour of electricity will generate 619 grams of CO<sub>2</sub> emissions.

### 1. Incandescent Light

Incandescent lamp is a source of light which produce light when the filament is being heated. It can release 80% electrical energy converted into heat energy. We can calculate how much CO<sub>2</sub> will be emitted by 40-watt incandescent bulb.

Power Consumption- 40 watts

- Operation per day- 10 hours
- Power Consumption per annum-146000 watt
- Electricity per hour (kwh) - 0.04 (1 kWh=619g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp (146\*619g) -90.3 kg.

A single 40 watts incandescent bulb will generate 90.3 kilograms of CO<sub>2</sub> for every year. The reduction of carbon footprint is none for this lamp.



## 2. Compact Fluorescent Light

CFL produce less heat and more visible light compare than incandescent lamp. We can calculate how much CO<sub>2</sub> will be emitted by 14-watt incandescent bulb.

Power Consumption- 14 watts

- Operation per day- 10 hours
- Power Consumption per annum-51100 watt
- Electricity per hour (kwh) – 0.014 (1 kWh=619 g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp- (51.1\*619g) - 31.6 kg.

A single 14 watts CFL lamp will generate 31.6 kilograms of CO<sub>2</sub> for every year. The reduction of carbon footprint is none for this lamp. CFL contains harmful mercury which creates mercury emission. Estimated suggestion led lights only will reduce our carbon foot print over than other lights.

## 3. LED Lights

LED lights consumes low power and energy efficient over than other lights. Not even a single point we can't compare led lights with other lighting. We can calculate how much CO<sub>2</sub> will be emitted by 8-watt LED lamp -

- Power Consumption- 8 watts
- Operation per day- 10 hours
- Power Consumption per annum-29200 watt
- Electricity per hour (kwh) – 0.008 (1 kWh=619 g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp (29.2 \*619g) - 18 kg.

**A building's carbon footprint from led lighting can be reduced by 68%.**

- Reduction in Carbon Footprint (tons)-0.122(12.28 kg)

The 8-watt LED equivalent will only be responsible 18 kilograms of CO<sub>2</sub> over the same time span.

**Table No. 7: Carbon foot prints**

	Incandescent Bulb	LED light
Power Consumption(watt)	40	8
Electricity(kwh)	0.04	0.008
Hours of Operation Per Day	10	10
Carbon Emissions (tons) per year/lamp	0.903	0.18



Reduction in Carbon Footprint (tons) / lamp	--	0.12
---	----	------

- LED light can reduce our carbon footprint by 0.12 tons per year.
- Led light does not contain mercury; it is a big benefit for this lamp.
- Incandescent, it is 5.8 mg from power plant.

The 8-watt LED equivalent will only be responsible 18 kilograms of CO<sub>2</sub> over the same time span.

Based on above comparisons, LED emerges as the BEST option to reduce carbon footprint.

At ARTS, COMMERCE & SCIENCE, MAHAVIDYALAYA GADHINGLAJ, all together there are 21 rooms (including, class rooms, offices, labs etc.) 29 LED lights and 13 tube lights

Details of CO<sub>2</sub> emitted from these lights is given in table 8.

**Table No. 8: Details of CO<sub>2</sub> emitted due to bulbs**

Light	No. of bulbs	CO <sub>2</sub> emitted per lamp / year	Total CO <sub>2</sub> emitted kg per year
LED	9 (8 watt)	18 kg.	162
	23 (9 watt)	25.55 kg	587.65
CFL	02 (12 watt)	27.08 kg	55.6
CFL	01 (18watt)	38.93 kg	38.93
Tubes	11 (36watt)	77.86 kg	856.46
<b>Total</b>			<b>1700.7</b>

CO<sub>2</sub> emitted from utilizing all types of bulbs per year is 738 kg/yr. Presently, College has taken initiative to replace Incandescent bulbs and CFL bulbs by LED. During the last year energy consumption of LED bulbs against the total energy requirement has been decreased. This has shown substantial reduction in the CO<sub>2</sub> emission per year. If all 46 bulbs and tubes are replaced by 8-Watt LED bulbs, CO<sub>2</sub> emitted per year would be 46 x 18 kg = 828 kg / year. This means college can reduce CO<sub>2</sub> by 872.7 kg / year (1700.7-828 kg). It is suggested to replace all bulbs by LED bulbs in a phase manner. Further, all the fans should be replaced in phased manner energy efficient five-star rating fans.

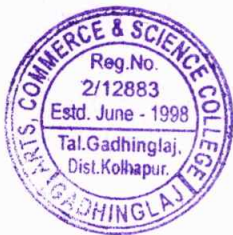



## **6.0: Suggestions:**

The college has taken a good number of good initiatives for the sustainable energy consumption. However, to get better result following suggestions may be considered by the college in a phased manner.

- Annual Power requirement met through LED bulbs 20.89 %. Further, all the fans should be replaced in phased manner energy efficient five-star rating fans.
- Replacement of conventional bulbs has contributed significantly in the reduction of CO<sub>2</sub>.
- A solar system should be installed to meet the entire energy requirement in a phased manner.
- It is also suggested to use solar energy as an alternate of energy for street light.

**Overall, the performance of Institute is good in green initiative front and can take somemore green initiatives for sustainable future.**



  
**I/C. PRINCIPAL**  
Arts, Commerce & Science College  
Gadhinglaj, Dist. Kolhapur.