

Dattajirao Kadam Arts, Science and Commerce College

ENERGY AUDIT REPORT

2017-18 to 2020-21



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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.

ENVIRONMENTAL POLICY OF COLLEGE:

“Together we can make our campus clean and green”

Environmental mission:

1. Implement term „Go green“ – Making the campus green in every possible way and foster environmental literacy
2. To identify and implement opportunities to save energy.
3. Encourage everybody to avoid pollution and to see that proper steps are being taken to control or to prevent pollution.

4. To reduce solid and liquid waste and adopt green methods to dispose waste and monitor the processes.

5. Health and safety practices. 6. Minimize human exposure to risks from environmental health and safety problems

Encourage adopting Green culture and to contribute in resource conservation In order to achieve above missions following action plan is prepared and activities are continuously monitored.

2. COLLEGE PROFILE:

Profile of the Institute : Institute sprawls on total area of 15175.71 sq. mts with carpet area of 7000 sq mts. which consists of administrative building with offices, departments with classrooms, laboratories, library and canteen. There is open ground of 8195 sq. mts consisting garden along with parking facility for Institute buses. The constructed area consists of five separate buildings viz. old west side building, old science building, new science building, new BCA building, administrative building and library building. Total area under class rooms; 2259 sq. mts.

Location	Urban
Campus area	3.7515 acres/ 15175.71 sq.mts.
Carpet area	7000 sq mts.
Old building	155.65 sq.mts.
Toilet blocks	78.42 sq.mts.
Near Urinals room	41.80 sq.mts.

Details of the campus area

VISION:

Dattajirao Kadam Arts, Science and Commerce College, Ichalkaranji will provide excellent educational opportunities that are responsive to the needs of the community and help students meet economic, social, and environmental challenges to become active participants in shaping the world of the future.

MISSION STATEMENTS:

- Meeting community and students needs by creating an educational environment and culture so students can attain a variety of goals.
- To maintain a high standard of integrity and performance leading to the achievement of academic and professional goals.
- Imparting quality education for achieving overall personality development of youth.
- Education to inculcate scientific temperament.
- Education to inculcate cultural values into students and to make them better citizens.
- To ensure values like truth, honesty, character, sacrifice, curbing social exploitation through education.
- To aim at overall personality development through extracurricular activities.
- To provide opportunities to students to enhance their skills, potential, social responsibilities, sportsman spirit through NCC, NSS, sports, cultural activities, career oriented courses.
- Enabling students to face challenges of ever changing modern world and to contribute to it in meaningful way.
- To help the students for on-the-job training and placements.

COURSE OFFERED BY COLLEGE:

Sr. No.	Programme level	Name of programme
1	Undergraduate	Arts
2	Undergraduate	Commerce
3	Undergraduate	Science
4	Undergraduate	B.C.A.
5	Undergraduate	B.B.A
6	Post graduate	M.A
7	Post graduate	M.Sc.
8	Certified/ Diploma courses	Proof reading
9	Certified/ Diploma courses	Spoken English
10	Certified/ Diploma courses	Political companies and leadership
11	Certified/ Diploma courses	Historical travel tourism
12	Certified/ Diploma courses	Micro-finance
13	Certified/ Diploma courses	Tourism development
14	Certified/ Diploma courses	Event Management
15	Certified/ Diploma courses	Maintenance and repair of domestic appliance
16	Certified/ Diploma courses	Vermicomposting
17	Certified/ Diploma courses	Nursery techniques
18	Certified/ Diploma courses	Bonsai techniques
19	Certified/ Diploma courses	Preparation of house hold chemicals
20	Certified/ Diploma courses	Ardeurino programming
21	Certified/ Diploma courses	Programming with triple "C" and Scilab
22	Certified/ Diploma courses	Web designing technologies
23	Certified/ Diploma courses	Statistics using MS-Excel
24	Certified/ Diploma courses	Yoga and physical management skill
25	Certified/ Diploma courses	Human rights
26	Certified/ Diploma courses	Library managment

NAME AND ADDRESS OF COLLEGE:

Name of college:	DATTAJIRAO KADAM ARTS, SCIENCE AND COMMERCE COLLEGE, ICHALKARANJI
Address	Survey No.17/436, Shivajinagar, Near ShahuPutala, Kolhapur Road, Ichalkaranji.
Pin :	416115
Website :	http://www.dkasc.ac.in

Status of the institution:	Affiliated
Type of institution:	Co-education
a. By gender	Male and female
b. By shift	Morning and evening
Sources of funding:	Grant -In-aid
a. Date of establishment of the college:	June 1962
b. University to which the college is affiliated:	Shivaji University , Kolhapur, Maharashtra.
c. Details of UGC recognition:	Recognised
Under section	
i) 2 (f)	YES
ii) 12 (B)	YES

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

Table No. 1: Number of rooms in the college:

1.	Total number of buildings	08
2.	Total number of rooms:	60 old Building + 4 New building
3.	Total number of labs:	21
4.	Seminar halls	01
5.	Departmental staffrooms	08

Details of various sources of energy consumption units are given in table no. 2.

4. ENERGY CONSUMPTION UNITS

Table No. 2: Energy consumption units

	Energy sources	Electricity/generator/solar lamps
a.	No. of Computers	169
b.	No. of Laptop	07
c.	No. of tube lights	179
d.	Number of LED bulbs/Tube <i>20/25 watt</i>	44 <i>7-8-25 watt</i>
e.	No. of CFC bulbs	26
f.	No. of UPS	07
g.	No. of fans <i>75 watt (3 stars)</i>	80
h.	No. of fridge	04
i.	No. of generators	01
j.	No. of A.C.	Nil
k.	No. of LED bulbs	Nil
l.	Electric pumps of 5 HP	5 Hp (1) Submersible 3 HP (1motor) used for bore Submersible 1 HP Motor used for check dam $\frac{1}{2}$ HP motor (2)used for drinking water

5. ENERGY REQUIREMENT:

Electricity supplied from the Maharashtra State Electricity Board is the main source of energy for the activities on the campus. In addition to the regular supply, the college has two generators (30 KVA) and 13 UPS of 45 KVA capacity.

Energy conservation measures taken up by the college:

1. Increased use of Compact Fluorescent Lamp and LED bulbs against incandescent bulbs
2. Increased use of UPS against conventional generator

3. Most of the fans carry three star rating of electrical appliances.
4. College has encouraged use of SMS/e-mail instead of sending notices and faxing documents.
5. Awareness amongst students was carried out and accordingly sign boards are displayed at strategic locations for conservation of energy and students positively responding.
6. College is using flat-screen LCD monitors rather than CRT monitors.

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2

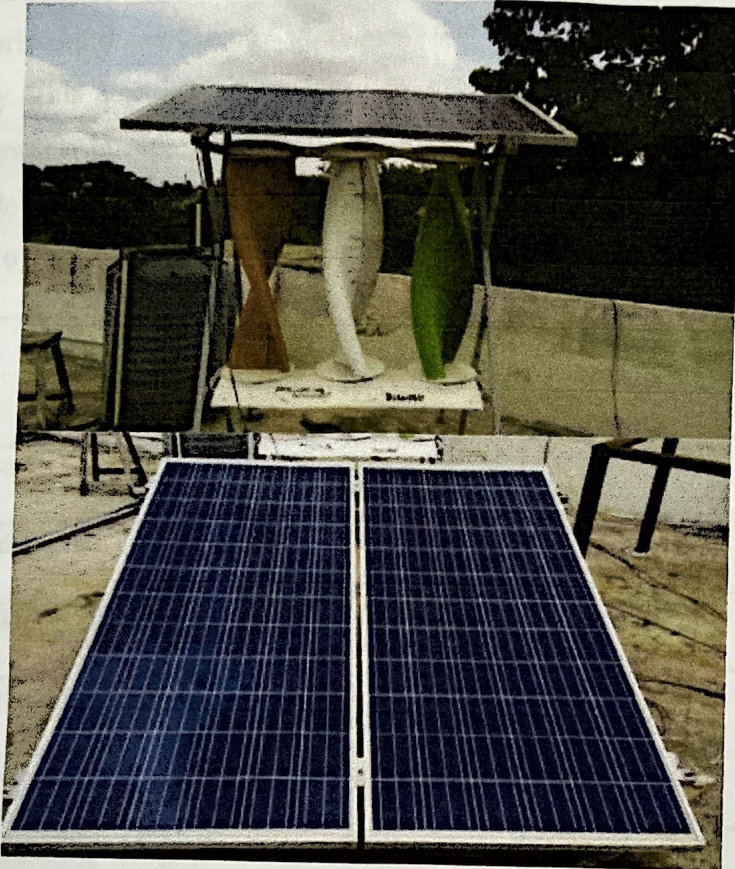
6. USE OF RENEWABLE ENERGY:

1. **Use of solar lamps:** In order to reduce the dependency on non-renewable sources of energy to certain extent, the college has installed solar lamps on streets.
2. **Use of solar water heater:** Previously, electricity based hot water geysers were used in the hostel which used to consume huge amount of energy. But then these water geysers were replaced by solar water heater.
3. **Efforts for carbon neutrality:**
 - The college is situated away from city and the nearby road is connected to villages bearing less traffic. Proper measures have been taken to reduce carbon emissions to keep campus pollution free and uncontaminated.
 - The two wheelers and four wheelers of the college staff are monitored by PUC.
 - Car pooling and share auto system is used by staff for transport and conveyance.
 - Carbon emission is minimized by the greenery planted in the spacious area on the campus. Along with that, botanical garden and nursery are established in college campus. The trees planted in campus and the garden in college helps for reducing concentration of carbon dioxide in college campus and helps for carbon neutrality.

Whenever we think about carbon neutrality, carbon footprints should be taken into consideration. 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.

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.



Solar Panel

Hybrid Solar and wind power plant

TYPE: SOLON Blue 270/12

Max. Voltage : 1000V

Power rating : 305Wp

Power Rating Tolerance: 0 to + 4.99 Wp

Voltage (Vmpp) 37.30 v

Current (Impp) 8.18 A

Open circuit Voltage (Voc) 45.20 v

Short Circuit Current (Icc) 0.53 A

Font, justify

At Dattajirao Kadam Arts, Science and Commerce College carbon footprint for indoor lighting in office building is considered. The performance of the building by using LCD and LED lights is monitored which reduces the building carbon foot print. The carbon foot print is monitored for –

1. Incandescent Light
2. Compact Fluorescent Light

7. ELECTRICITY:

Nearly half of our carbon footprints are due to electricity and 17 % are due to lighting only. This electricity is produced by natural gas, coal, petroleum and some other renewable resources. Electricity is produced from different sources. The following table shows the quantity of green house gas released from them:

Table No. 03: Electricity produced from different sources

Source	Million metric tons of CO ₂ 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
Total	2245	3621

Since close to 2245 million metric tones of CO₂ emitted by total electricity generation per 1 year. A single kilowatt-hour of electricity will generate 619 grams of CO₂ emissions.

Following sources of light are generally used:

1. Compact Fluorescent Light

Compact Fluorescent Light produce less heat and more visible light compare than incandescent lamp. We can calculate how much CO₂ 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 CO₂ 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 CO₂ 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.

2. 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 CO₂ 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 CO₂ 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 CO₂ for every year. The reduction of carbon footprint is none for this lamp.

Table No. 04: Carbon foot prints

	CFL	Incandescent bulb
Power Consumption(watt)	14	40
Electricity(kwh)	0.014	0.04
Hours of Operation Per Day	10	10
Carbon Emissions (tons) per year/lamp	0.316	0.903
Reduction in Carbon Footprint (tons) / lamp	--	

- LED light can reduce our carbon footprint by 0.12 tones per year.
- Led light does not contain mercury; it is a big benefit for this lamp.
- CFL contain 3-5mg per bulb which is poisonous. Mercury emission is 1.2mg from power plant using CFL.
- Incandescent, it is 5.8 mg from power plant.

The 8-watt LED equivalent will only be responsible 18 kilograms of CO₂ over the same time span.

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

At Dattajirao Kadam Arts, Science and Commerce College, all together there are 94 rooms with 26 CFL bulb and 44 LED bulbs.

66

2 CFL

Details of CO₂ emitted from these lights are given in table 07.

Table No. 05: Details of CO₂ emitted due to bulbs

Light	No. of bulbs	CO ₂ emitted per 40 watt lamp / year	Total CO ₂ emitted per year
CFL	26	31.6 kg.	821.6 kg
LED	44	18.0 kg	792 kg

Table No. 6: Total CO₂ emissions:

Light	No. of bulbs	CO ₂ emitted per 40 watt lamp / year	Total CO ₂ emitted per year
CFL	26	31.6 kg.	821.6 kg
LED	44	18.0 kg	792 kg

- From the energy conservation point of view, college has taken initiative to replace conventional incandescent bulb by means of CFL.
- Considering the benefits of CFL and LED it is recommended to replace all the existing Incandescent light bulbs by CFL and subsequently by LED during the time period of next two years.
- Even after installation of Solar Power Pack system, consumption of energy can be saved, so that surplus energy can be sold.
- Replacement of conventional bulbs has contributed significantly in the reduction of CO₂.
- Further, all the fans should be replaced in phased manner energy efficient five star rating fans.

8. Suggestions for improvement:

Dattajirao Kadam Arts, Science and Commerce College has already taken various measures for creating environmental awareness among students and staff. Along with these efforts, some more measures can be taken for further improvement in energy conservation:

1. Even after installation of Solar Power Pack system, consumption of energy can be saved, so that surplus energy can be sold.
2. Replacement of conventional bulbs has contributed significantly in the reduction of CO₂.
3. Further, all the fans should be replaced in phased manner energy efficient five-star rating fans.

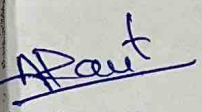
Dr.RASHINDE
Secretary & Managing Trustee

Date:

CERTIFICATE

This is to certify that Energy Audit Report for the academic year 2017-18 to 2020-21 of the Dattajirao Kadam Arts, Science and Commerce College has been prepared by us based on the document submitted by Dattajirao Kadam Arts, Science and Commerce College.

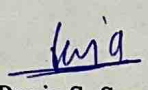
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