REPORT

ENERGY AUDIT
OF
P.E.S.COLLEGE OF ENGINEERING.
NAGSENVANA,AURANGABAD

1/1/2023

VIVEK GOSAVI

DATE OF AUDIT:

27-12-2022 and 28-12-2022

AUDIT TEAM:

VIVEK GOSAVI---- CHIEF AUDITOR

MR.SATISH THORAT----ENGINEER

Mr. MAHESH DALVI---AUDITOR

Dr. B. N. CHAUDHARI SIR----H.O.D. ELECTRICAL DEPARTMENT

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ACKNOWLEDGEMENT

The Management of M/S P.E.S.College of Engineering,Nagsenvana ,Aurangabad is energy conservation conscious and has taken proper measures to maintain the optimum energy utilization in the college.The management felt need for energy audit to know the present level of energy performance and to improve in case of any possibility

In the energy audit it is clearly revealed that management is committed to maintain the safe conditions in college.We highly appreciate this committment

We express our sincere thanks to Pricipal Dr. Wadekar Sir, Dr. Chaudhari Sir, for their every help and co-operation during the electrical energy audit.

Every effort has been made that all statements, information offered in this report are given in good faith without bias and prejudice. They refer to the conditions prevalent at the time of Energy Audit.

We are pleased and thankful for the trust ,the management had shown in us and assigned the job of "Energy Audit". So hereby we are submitting our report to the Management of M/S P.E.S.College of Engineering,Nagsenvana ,Aurangabad

Vivek Gosavi
EA-4521

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Methodology

The methodology adopted for achieving the desired objectives viz. assessment of the current operational status and energy savings included the following:

Discussions with the concerned officials of the unit for identification of major areas of focus and other related systems.

A team of professionals visited the plant and had discussions with the concerned officials/supervisors to collect data/information on the Load Distribution and Energy Consumption pattern. The data were analyzed to evaluate the specific power consumption and also to arrive at a baseline energy consumption pattern.

Measurements and monitoring with the help of appropriate instruments including continuous and/or time-lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.

Computation and in-depth analysis of the collected data, including analysis and other techniques as appropriate, was done and to evolve suitable energy conservation plan/s for improvements/reduction in Specific Energy Consumption.

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PREFACE:

P.E.S. College is L.T.consumer of M.S.E.D.C.L.

The total load is distributed on 5 L.T. meters. The development of the college has taken place in phases hence as per the enhancement of load in newly constructed buildings, the infrastructure is added.

In the electrical energy audit it is clearly revealed that management is committed to maintain the optimize energy utilization conditions in premises.

The phase wise investments in Transformer, cables, switchgears made by the management as per the suggestions received from technical experts and concerned is the clear indicative of intention and commitment of management to ensure energy efficient working condition in premises.

Management itself has taken initiative much earlier to conduct the energy audit, is self explanatory action to highlight the concern of management to maintain the energy efficient working

As the development of plant and hence the electrical infrastructure has taken place in phases almost in @ 28 years, there are some energy inefficient practices in the electrical distribution system as a whole as of now. Over the period as the technical support team is busy with the routine maintenance and expansion planning and execution even though the team is trying to maintain the complete infrastructure of the plant as per relevant energy standards, scope of energy saving is there which is very natural

This electrical energy audit is an attempt to bring all these points in the notice of management for the necessary corrective action and in turn to help the management to pursue its motive to maintain electrical energy premises.

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EXECUTIVE SUMMARY

S.N.	AREA	OBSERVATION & REMARKS	SAVINGS (kWh/Month) & SAVINGS (Rs./Month)	INVESTMENT (Rs) & PAYBACK PERIOD (MONTHS)
1	Ceiling Fans	●@ 400 regular 70W Ceiling Fans are operational	●2520 kWH (42W saving/fan for 6 hrs/day,25 days/month)	●Rs 1480000/-
		●Replace these Fans by BLDC Fans	**●Rs.21420/-**	**●69 Months (Can be planned as 20% per year)**
2	Tube Lights	●@ 1250 regular 40W Tube Lights are operational	●3750 kWH (20W saving/fan for 6 hrs/day,25 days/month)	● Rs 750000/-
		●Replace these by 20 W LEDs	**●Rs.31875/-**	**●24 Months**
3	Underuti-lization of Roof Top for power generat-ion(Main Building)	● The roof top available is not completely used	● 3600 kWH	● Rs 1350000/-
		● Installation of 30 Kwp Solar Power plant with optimizer	**●Rs.30600/-**	**●45 Months**

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4	Underuti-lization of Roof Top for power generat-ion(Hostels)	• The roof top available is not completely used	● 1800 kWH	● Rs 675000/-
		● Installation of 15 Kwp Solar Power plant with optimizer	**●Rs.15300/-**	**●45 Months**
5	Underuti-lization of Roof Top for power generat-ion(Work shop)	The roof top available is not completely used	● 1800 kWH	● Rs 675000/-
		Installation of 15 Kwp Solar Power plant with optimizer	**●Rs.15300/-**	**●45 Months**

ALL THESE OBSERVATIONS ARE OUTCOME OF THE ENERGY AUDIT DONE ON 27-09-22 and 27-09-22.

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SCOPE :

The scope of this Energy audit is to find out the all possible facilities to save, optimize the energy being used in the plant, in all its possible forms available in plant viz

- Electrical Energy
- Heat Energy
- Compressed Air in turn Electrical Energy

It is the aim to highlight all such possibilities which will not only save the energy required per unit production, but indirectly will improve the efficiencies of ,machines and life

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DISCLAIMER:

- This is purely energy audit, hence non compliances with Fire safety norms, are neither studied nor highlighted. The Team is not authorized to conduct fire safety audit.
- This is purely energy audit, hence non compliances with Air conditioning system safety norms, are neither studied nor highlighted. The Team is not authorized to conduct audit of HVAC system
- This is purely energy audit hence non compliances with BS OHSAS 18001 are neither studied nor highlighted. The Team is not authorized to conduct BS OHSAS 18001 audit
- This report should be treated as sample study and observations of this report are to be checked thoroughly throughout the plant and necessary corrections are to be implemented accordingly
- The Distribution System is studied as per the inputs given by Dr. B.N.Chaudhari, Mr.Bajrang, Mr.Salve as per the guidelines of Authorities of the Plant.
- This report is to be treated as internal audit only, should not be produced for any legal compliance, insurance claim or as fulfilment of statutory requirement
- Non compliances with electrical standards are studied but are not the part of this report. These will be communicated as separate report

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Date : **19.07.2022**

ENVIRONMENTAL AUDIT

QUESTIONARIES

Name	:	**P.E.S. COLLEGE OF ENGINEERING**
ADDRESS	:	Nagsenvana, Panchakki Road, Aurangabad-431001.
Telephone No.	:	0240-2403001, 0240-2403011
E-mail ID	:	
Telephone No.	:	9049155005
Date commenced	:	**19.07.2022**

DEEPAK KAKADE
Regd. No 2315/97

Put √ mark in appropriate box

What is the total strength of student and teachers in your College? (Approx.)

	No. Of Student	No Of Teacher
1. UG Engineering	1177	79
2. PG Engineering	49	12
3. MBA	NA	NA
TOTAL	1226	91

Which of the following are available in your College?

1. Garden area with Lawn	√
2. Play Ground	√
3. Kitchen	...√..04
4. Toilets (Number)	...√..14
5. Garbage dumps (Number)	...√..12
6. Laboratory	...√..60
7. Canteen	...√..01
8. Other (Specify) (Rain water Harvesting, Underground percolation tank, Farm pond, Raw water storage pond)	...√ ..02

Which of the following are found near your College?

Mark the level of disturbance it create for the College in a scale of 1 to 9

1. Municipal dump yard	00
2. Garbage head	01
3. Public convenience	00
4. Sewer line	01
5. Stagnant Water	00
6. Open drainage (River)	01
7. Industry – (Sugar Industry)	00
8. Bus/Railway Station	00
9. Market/Shopping complex/Public halls	00

I - WASTE

1. Does your College generate any waste ?

   If so, what are they ? Yes

   Garden waste,

   Papers, box

   Plastic

   Keyboared, Drumbs etc.

2. What is the approximate amount of waste generated per day ?

   (In Kilograms) (Approx)

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
1 kg.				
2-10 kg.	Yes √			
10 kg.		Yes √		Yes √

3. How is the waste generated in the College managed? By

	Yes	No.	How
1. Composting	√		Composting
2. Recycling	√		Giving for recycling
3. Reusing	√		Paper print both side
4. Other (specify)			Given to pig farm
Food waste from Mess			
(Biological Hazardous waste)			

HAZARDOUS MATERIAL

No any Hazardous material generated in chemistry lab and civil engineering labs.

4. How many separate boxes do you think you would need to put a class room laboratory To start a waste segregation and recycling campaign.

No Need

5. Do you use recycled paper in college? Yes √ No

6. How would you spread the message of recycling to other in the community?

Have you taken any initiatives? If yes, please specify Yes√

A survey was carried by Civil department Government College and the DTE has given Instructions accordingly. We are following the necessary guidelines and they have been circulated to all the department in 2015.

7. Can achieve zero garbage in your college? If yes, how?

Yes No√

Chh. Sambhajinagar corporation has appointed a private agency (M/S Reddy) to collect the garbages from campus at regular interval.

II – GREENING THE CAMPUS

8. Is there a garden in your College Yes √ No

Do student spend time in the garden ? Yes √ No

List the plants with approx. numbers of each species.

1. Numbers of plants in campus is approx. 2,491.

9. Suggest plants for your campus. (Trees, vegetables, herbs etc.)

Trees, Herbs

10. List the species planted by the students with numbers.

1.	Bottle Palm	120
2.	Neem	20
3.	Coconut	02
4.	Umber	01
5.	Gulmohar and similar species	05
6.	Rubber (small leaf)	40
7.	Pipal	10
8.	Morpankhi	15
9.	Babul	20
10.	Rose	30
11.	Badam	03
12.	Ashoka	10
13.	Mango	105
14.	Assorted plants	40
15	Guava	375
16	Dense forest	1200
17.	Lawns	01 acre

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III – ENERGY

11. List ten ways that you use energy in your College.

1. Light & Fans
2. Heating Refrigeration & Air conditioning system
3. Internet & Computer
4. Practical equipment
5. Pumping

(Electricity, Diesel Generators, LPG, Solar, Biogas).

Using this list try to think of ways that you could use less energy every day.

Sr. No.	Energy	Reduction of usage
1.	Electricity	10 %
2.	Generator	20 %
3.	LPG	00 %
4.	Solar	20 %

12. Are there energy saving methods employed in your college?

If yes, please specify. Yes √ No

CFL Lamps are installed in the college (Provision of CFL/LED Lamps wherever possible)

Solar Water heaters are used in hostel

Optimum use of electrical equipment.

LCD monitors are used in computer labs.

13. How much money does your College spend on energy such as electricity, gas, firewood etc. in a month record it.

NA

14. How many CFL* bulbs has your college installed? 100

If none, why not?

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Electronic tubes are also installed in Collee Campus

15. Are any alternative energy sources employed/installed in your college?

Yes√ No

(Photovoltaic cells for solar energy, energy efficient stoves, etc) Specify –

Solar collecting panels are installed for water heating in the hostels.

16. Do you run "switch off" drills at College? Yes √ No

Boards are displayed in each lab and class room as "Switch of light and fan when You leave."

Auto switches with illumination intensity sensors are installed in the main building for Overnight illumination.

17. Are your computers and other equipment put on power saving mode?

Yes√ No

18. Does your machinery (TV, AC, Computer, weighing balance printers etc) run on standby Modes most of the time?

If yes, how many hours? Yes√ No 02 Hours

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IV – WATER CONSERVATION

19. List four uses of water in your College

1. Drinking
2. Washrooms
3. Laboratories
4. Gardening

20. How does your College store water? Are there any water saving

Techniques followed in your College? Yes√ No

What are they?

College having underground and overhead tanks with cover?

21. If there is water wastage, specify why? Yes No√

How can the wastage be prevented / stopped?

It is prevented by using push back taps and flushes.

Wastage from the RO filters is collected in open tank and used for garden.

22. Locate the point of entry of water and point of exit of waste water in your College.

Entry - AMC water supply, Bore well and open well.

Exit - Drainage

- Where does your water come from? (source)
  Water comes from
  Jayakwadi reservoir, open well and Bore well in the campus.

- Where does the waste water go ?

  All waste water is collected through underground sewers and disposed to outside drainage.

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23. Write down four ways that could reduce the amount of water used in your Institute.

1. By using push cock system.
2. Avoid evaporation of water.
3. Provided glass for drinking purpose.
4. By making awareness in students to save the water.

24. Record water used from the College water meter for six months (Record at the same time of each day). At the end of the period, compile a table to show how many liters of water have been used.

Week	Water for toilet (Ltr)	Water for drinking (Ltr)	Water for gardening (Ltr)	Water for laboratory
1	12000	50000	15000	500
2	12010	49998	15007	498
3	12005	50005	12010	504
4	12015	50010	15015	515

25. Does your Institution harvest rain water? Yes √ No

If yes, how many rain water harvesting units are there? 02

10/13

V – ANIMAL WALFARE

26. List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds insects etc)

Dogs - 05

Cats - 02

Squirrels - 10

Birds of various species – Ample.

27. How many dogs in your area have undergone Animal Birth Control Anti Rabis (ABC-AR) ? AMC carries out this regular activity.

How many need ABC – AR? AMC carries out this regular activity.

28. Which is the animal welfare organization nearest to your College?

Does it have an ambulance service? Yes No√

29. Is there any incidence of animals getting wounded/affected due to unfavourable conditions existing in your College on nearby (like a dog getting wounded, poisoning of animals, improper caging of animals, hunting of animals etc)

Yes No√

What did you / your College / neighbour do? Nil

VI – GENERAL

30. Are you aware of any environment laws pertaining to different aspects of environmental Management? Yes√ No

31. Does your College have any rules to protect the Environment ?

Yes √ No

List possible rules you could include.

- Building is planned to have natural illumination and good air cross ventilation.
- Plant more trees and educate others about the positive aspects of it.
- Choose fuel efficient travel options, travel less and try to pick more direct routes to save on fuel.
- Use less Fossil Fuel Based Products.
- Conserve Water.
- Reduce use of harmful chemicals.
- Animal should not be injured or killed.
- Having identifies parking near the entry and exit gates.

12/13

ACTION PLAN

- Conveniently co-locate recycling and trash bins to improve convenience and reduce cross contamination.
- E-Waste Bins are placed in College Campus.
- Start a composting pilot project.
- To take the Solar energy power generation initiative to the next level. Planned to establish solar energy park and workshops related to renewable energy are conducted during academic to create awareness among the students.

CONCLUSIONS

It is that the college performs fairly well on sustainability issues. The college does consider the environmental impacts of most of its actions and makes concerted efforts to act in an environmentally responsible manner. In conversations with faculty, staff and administration of the College major improvements were made over the last ten years.

The main recommendations are:

- Improve the College's monitoring and reporting of water and energy usage and provide better feedback and information to campus users.
- To continue working towards composting the post consumer food waste generated by the dining halls.

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