

2024-25

Energy Audit Report of



Mahe Institute of Dental Sciences and Hospital., Mahe

Energy Audit by
Sri Energy
Solutions

18/09/2025

Project Report Title : **Energy Audit**

Client Name : **Mahe Institute of Dental Sciences and Hospital**

Plant Location : **Chalakkara,
Paloor,
Mahe – 673 310**

Date of Audit : **18.09.2025**

Audit Period : **01.06.2024 to 31.05.2025**

Energy Audit by : **M/s. Sri Energy Solutions, Dindigul**

Energy Audit Team : **1. M.Rameshkumar., B.E, M.B.A, PGDEEM&EA,
BEE Certified Energy Auditor**

**2. C.Sekar.,
Chemist**

Acknowledgement

Sri Energy Solutions acknowledge with hearty thanks to **Mr.K.P.Rameshkumar, Chairman, Mahe institute of Dental Sciences and Hospital, Mahe** for their support for carrying out this audit.

Our special thanks to **Dr.Anil Melath – Principal, Mr.Madhu Viswanath – Administration Manager and Mr.K.Jayarajan – Office Superintendent** for their co-operation and support us to carry out the Energy audit on time.

In addition, with this we are grateful to your staff **Mr.Praseeth.C.K** for his co-operation and support us to carry out the Energy Audit very effectively.

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1. Introduction

Mahe Institute of Dental Sciences and Hospital is one of the leading educational institution affiliated to Pondichery University. This college was established by **Mahe Educational and Charitable NRI Trust** in the year of 2006.

This college is located at prime location of Mahe. This college is having lot of courses in Dental Science sector with completely equipped. It has been providing quality education to the students of Kerala, Karanataka and Tamilnadu. This institution has one HT GPED service and two backup generators. High quality panels and switch gears are connected with this service for giving quality supply to the equipment. The capacity of generator is also well enough to meet the demand.

This college is located is well away from main road which leads to dust free environment. Moreover, college is concentrating much on green garden with enough trees and plants. The water supplied inside the campus is good. On the next step, the management decided to conduct the energy audit in their institution to provide effective environment.

2. Objectives

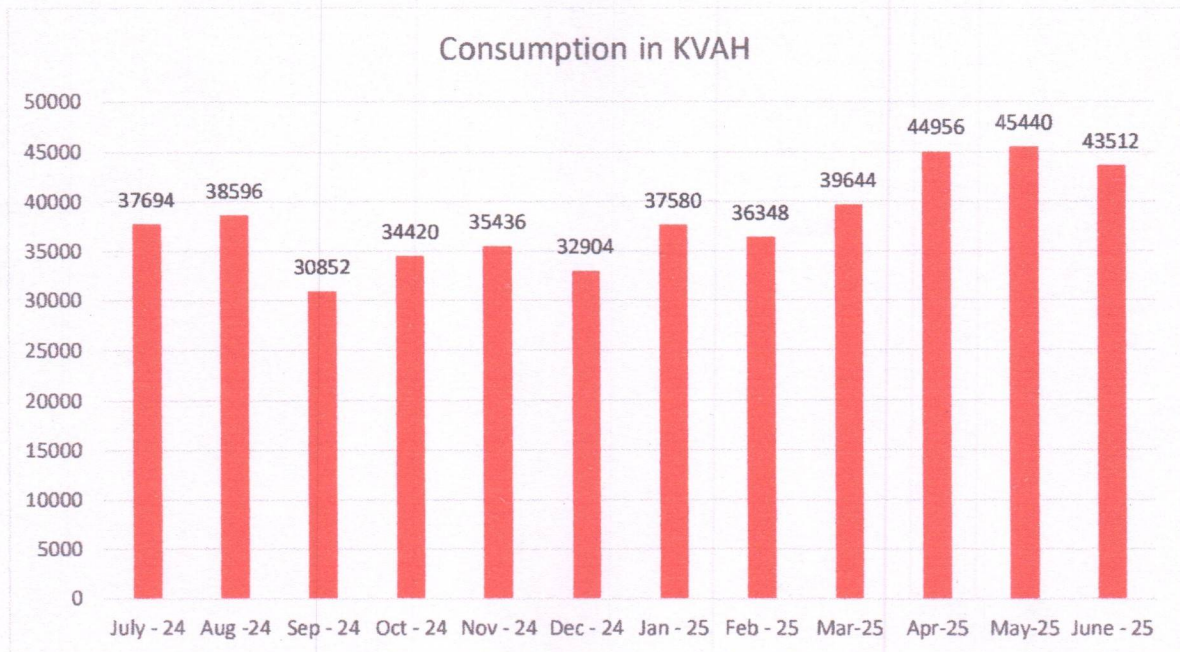
The following objectives of Energy Audit are,

- To reduce the energy wastage
- To standardize the preventive maintenance
- To improve the quality of supply
- To improve the service life of equipment
- To improve the safety of equipment and workmen

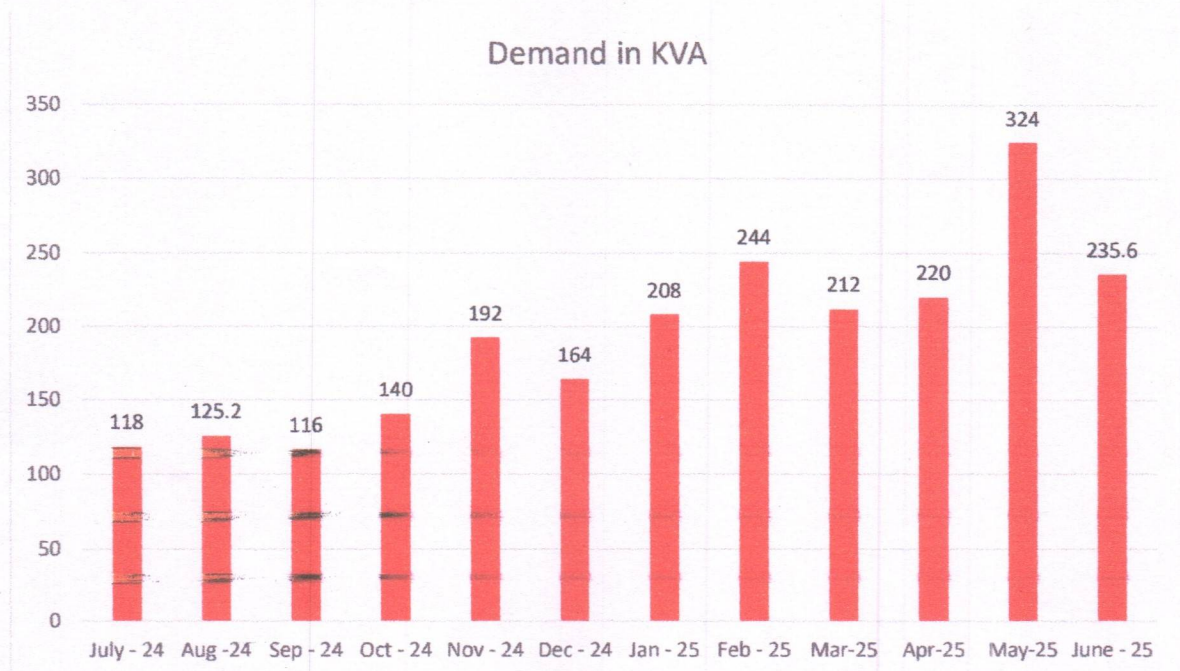
3. Executive Summary

- The common HT service is used for Colleges, Companies and schools etc.
- The sanctioned demand of **GPED supply of 250 KVA** is well enough to meet the connected load of **521.6 KW**. Since it is batch process service.
- Standby power source is from **200 KVA and 82.5 KVA** generators are more than enough
- Average monthly Energy consumption is **37, 706 units**
- Energy efficient lighting conversion is already in the process
- Total lighting load is **68.6 KW** and has saving potential of **6.32 KW**. The saving potential is **9.21%**
- Total Fan load is **52.95 KW** and has saving potential of **28.24 KW**. The saving potential is **53.3%**
- Total Air Conditioner power load is **194.8 KW** and has saving potential of **29.22 KW**. The saving potential is **15%**
- Some panels required earthing connections, which is very essential in safety aspects and to reduce the components failure
- Some windows required cooling sheets to reduce the power consumption of Air conditioners
- The Annual energy saving by energy efficiency method is **1,02,694 units**
- The Annual energy saving by **30 KW** solar power plant will be **40,500 units**
- The overall annual cost saving by implementing the recommendations mentioned in this report is **Rs.9,36,067 /-**

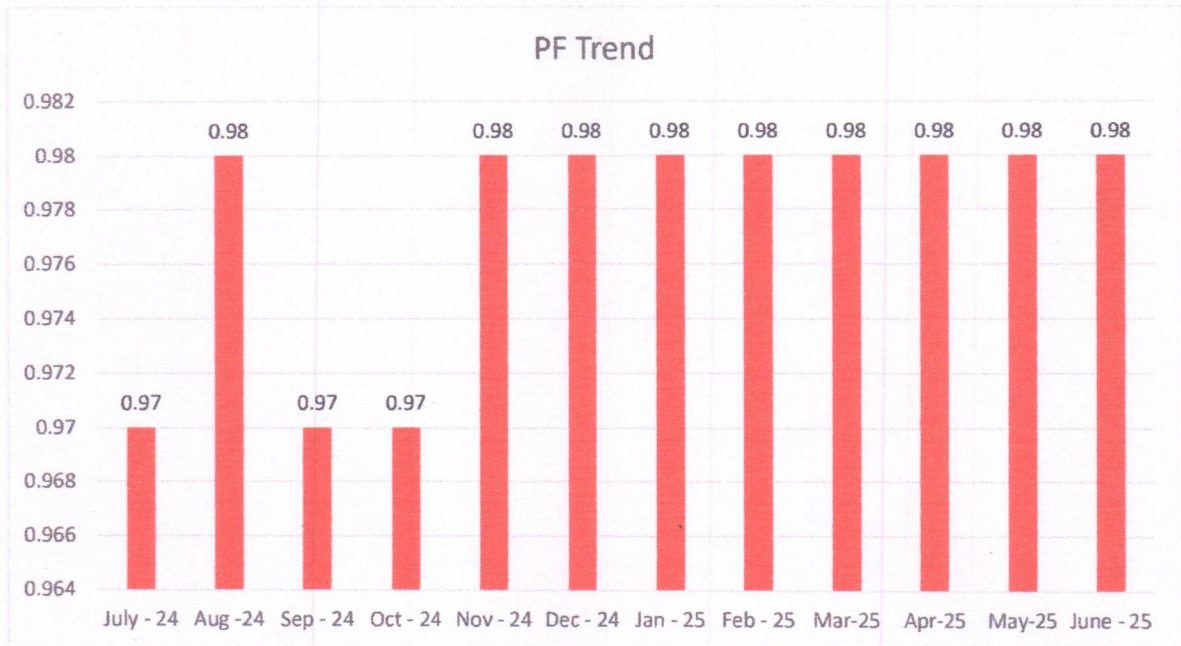
4. GPED Energy Consumption Trend



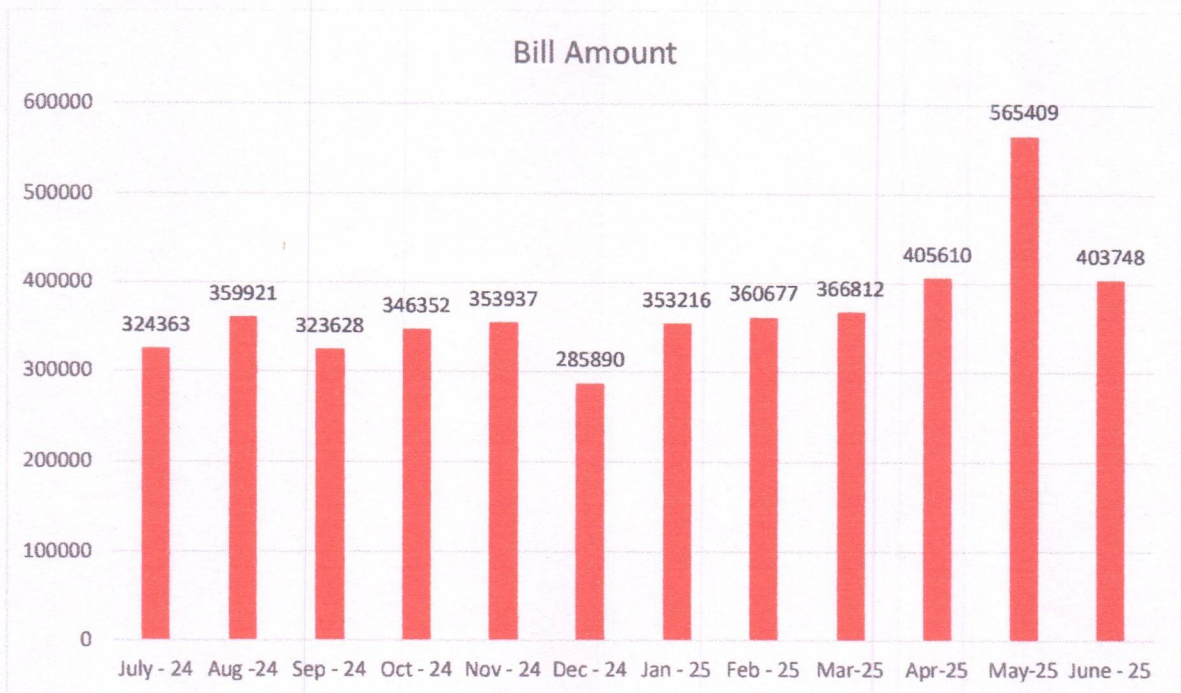
5. GPED Recorded Demand Trend



6. GPED Power Factor Trend

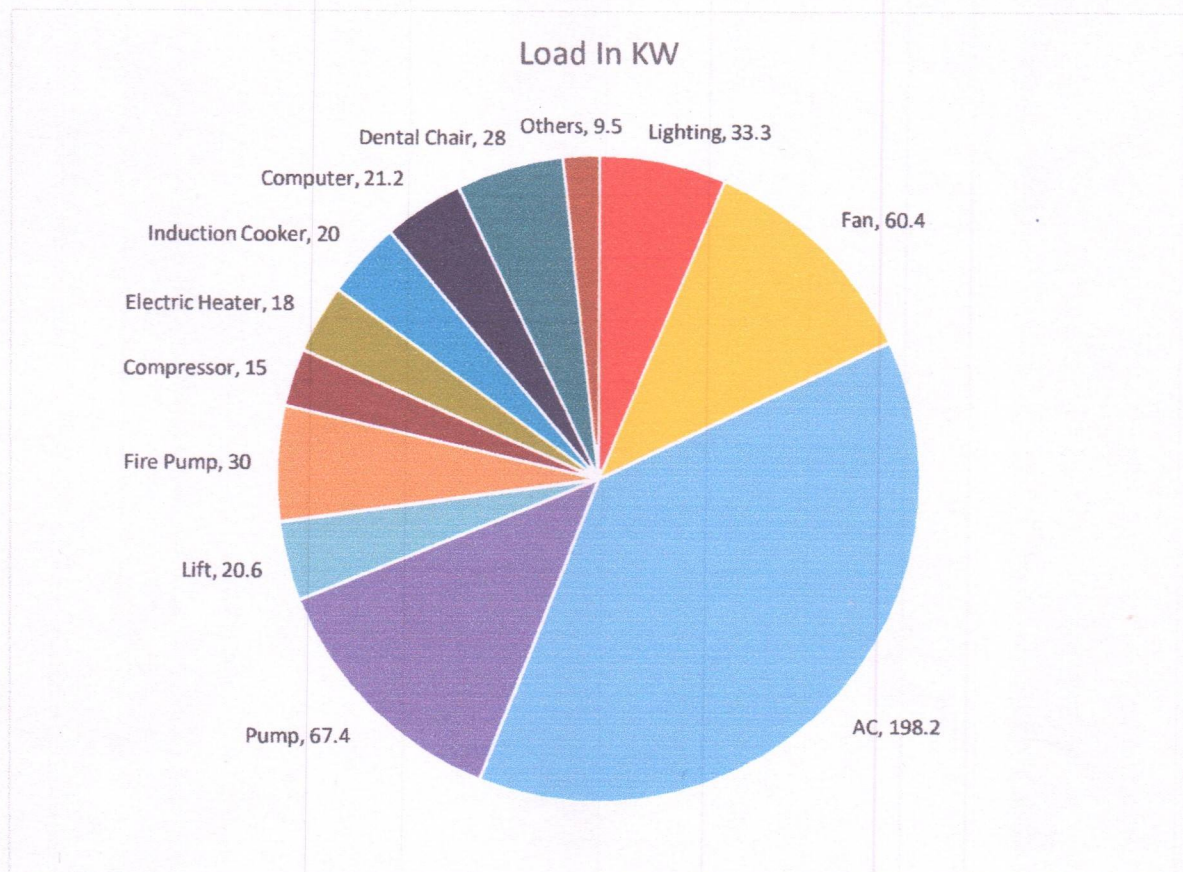


7. GPED Bill Amount Trend



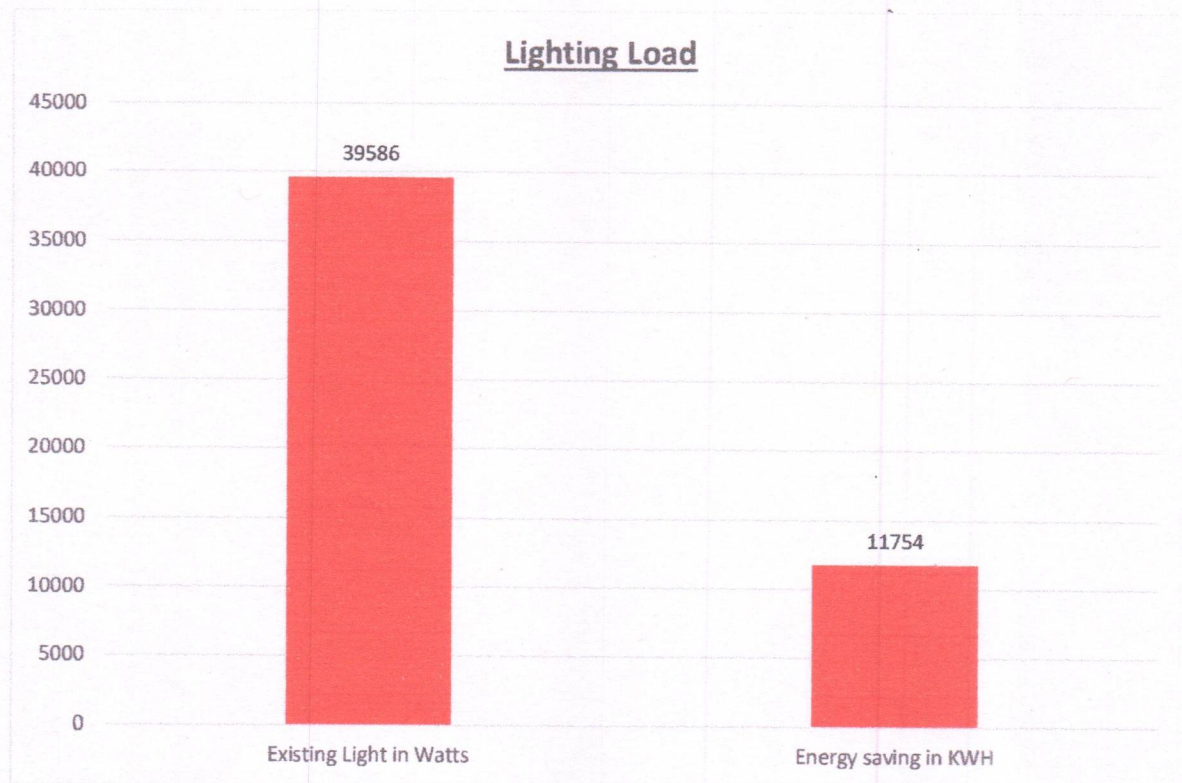
8. Energy Consumption Analysis

Load Type	Load In KW	Load in Percentage
Lighting	33.3	6
Fan	60.4	12
AC	198.2	38
Pump	67.4	13
Lift	20.6	4
Fire Pump	30	6
Compressor	15	3
Electric Heater	18	3
Induction Cooker	20	4
Computer	21.2	4
Dental Chair	28	5
Others	9.5	2
Total	521.6	100



9. Lighting Power Consumption Analysis

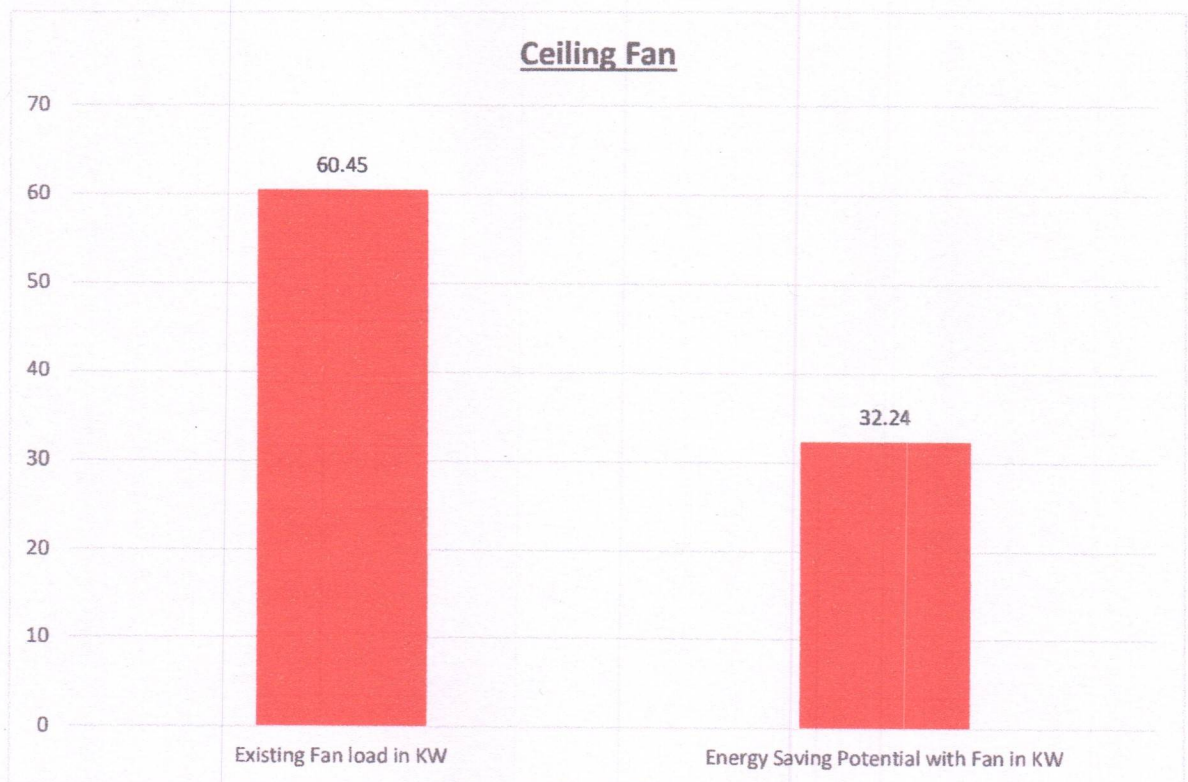
Item	Population	Existing Light in Watts	Proposed LED Light in Watts	ES Potential in watts	Energy saving in KWH
9 W LED	286	2574			
30W LED	36	1080			
15W LED	177	2655			
20W LED	275	5500			
36W Tube Light	653	23506	18W LED	18	11754
50W LED	7	350			
Spot Light	25	3921			
Total		39586			11754



Power consumption indicated in KW

10. Fan Power Consumption Analysis

Particulars	Load in KW
Existing Fan load in KW	60.45
Energy Saving Potential with Fan in KW	32.24

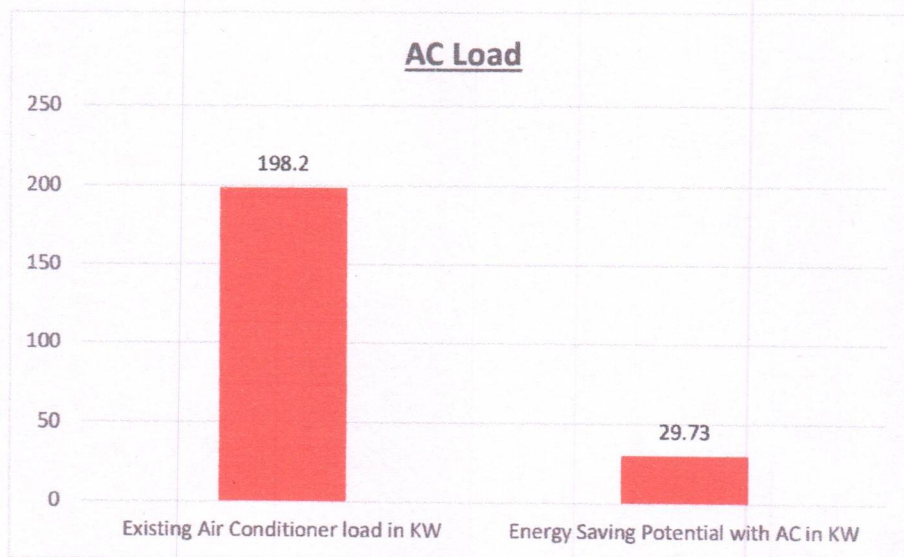


Power consumption indicated in KW

By replacing existing induction motor-based ceiling fan with BLDC fan, we can achieve the above said energy saving potential.

11. AC Power Consumption Analysis

Particulars	Load in KW
Existing Air Conditioner load in KW	198.2
Energy Saving Potential with AC in KW	29.73

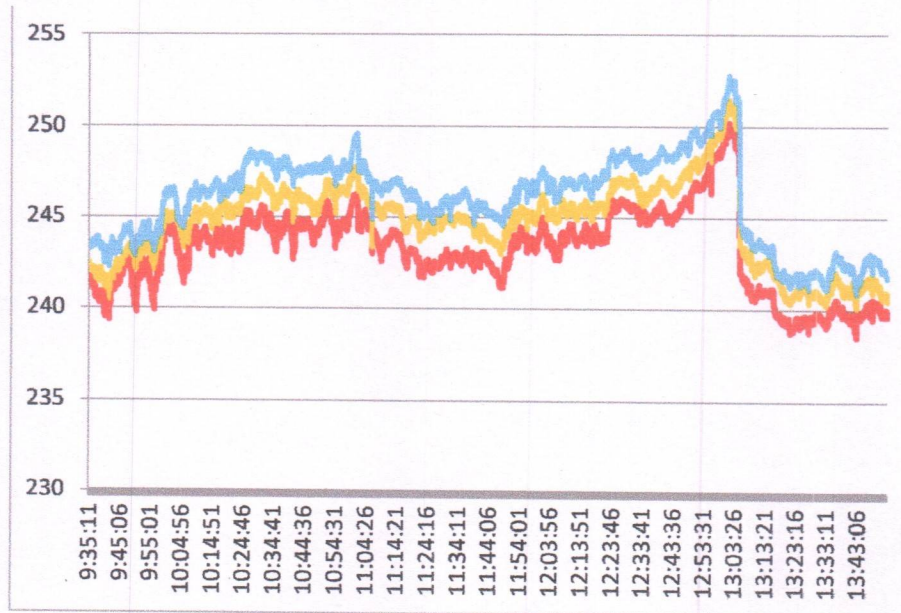


Power consumption indicated in KW

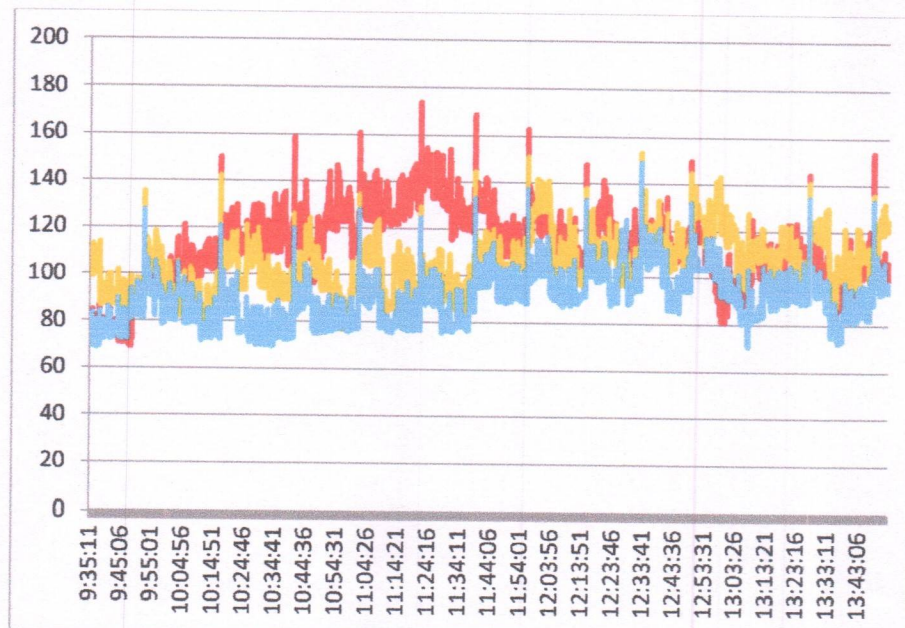
By installing energy saver with all your air conditioner and using ceiling fan with AC, we can achieve the above said energy saving potential.

12. Main Incoming Trends

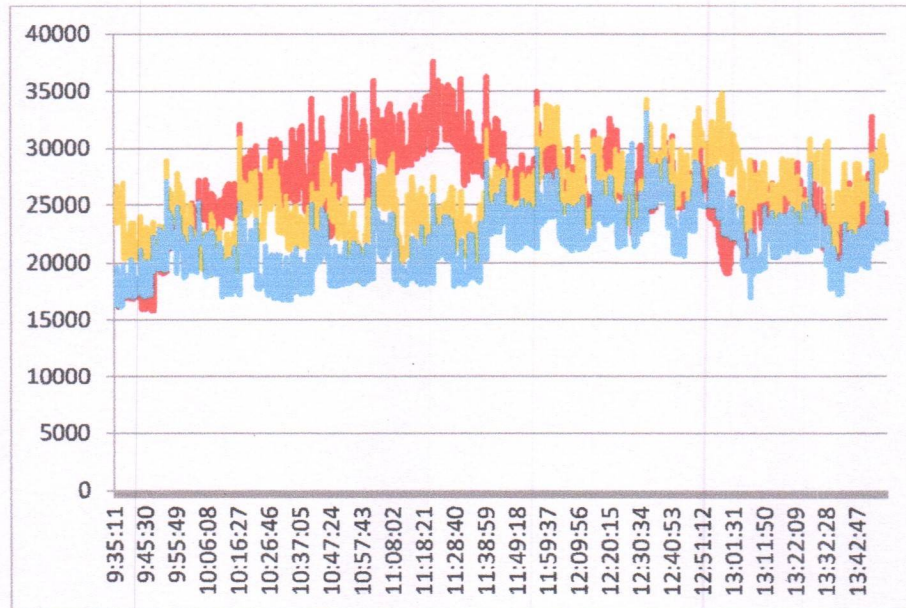
Voltage Trend



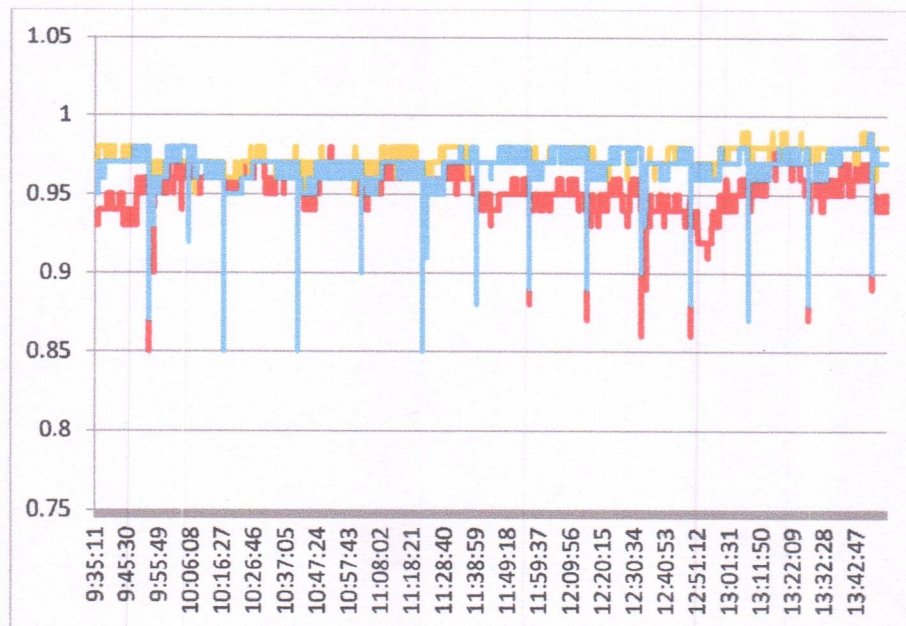
Current Trend



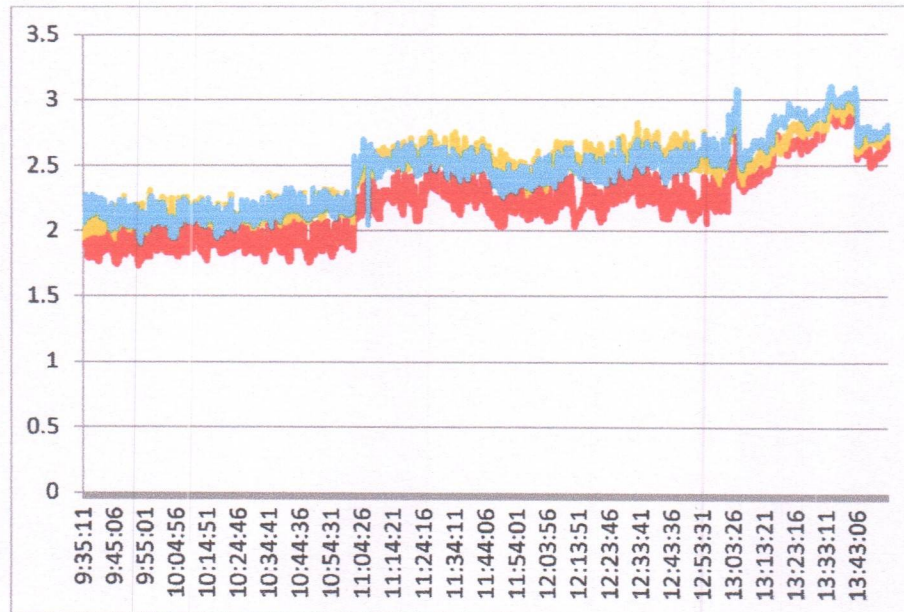
Power Trend



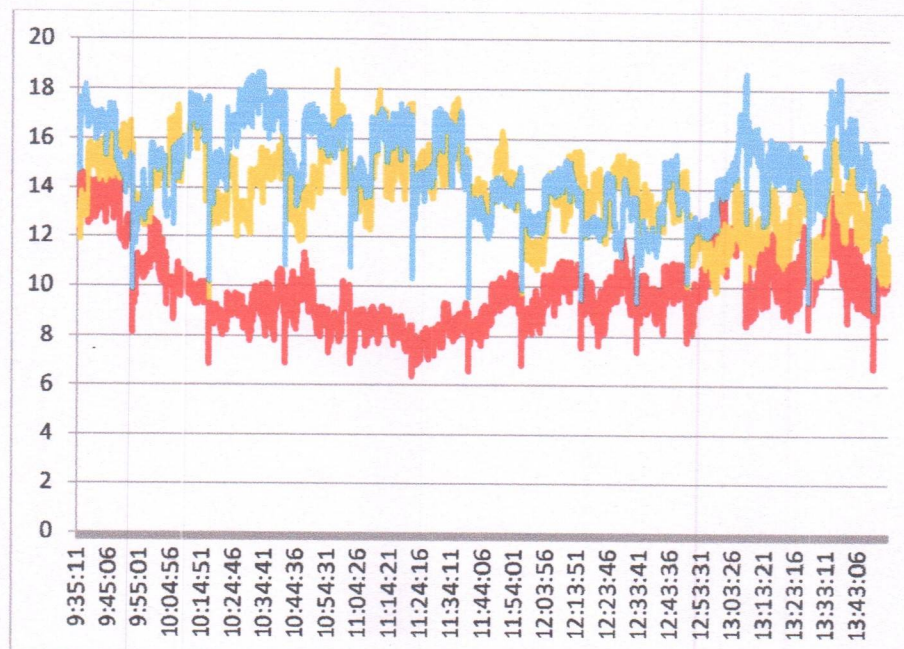
Power Factor Trend



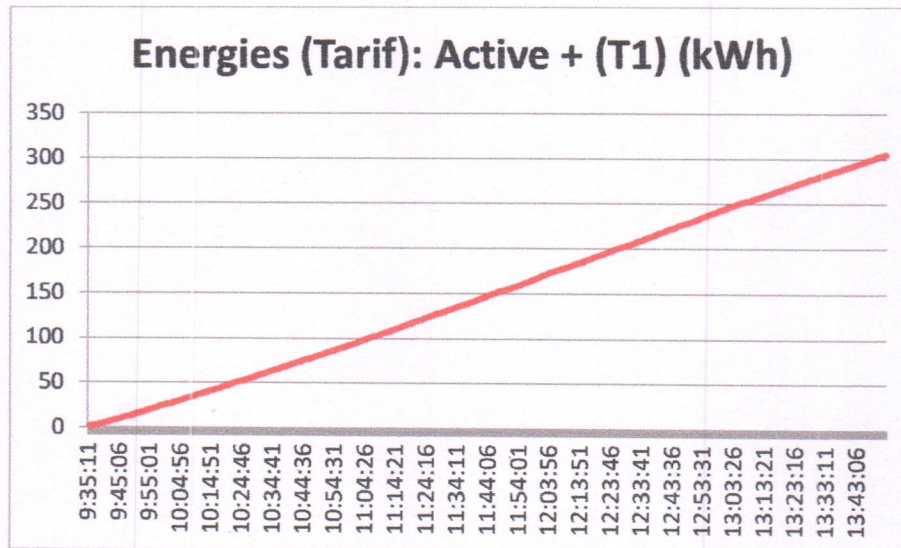
Voltage Harmonics Trend



Current Harmonics Trend



Active Energy Consumption

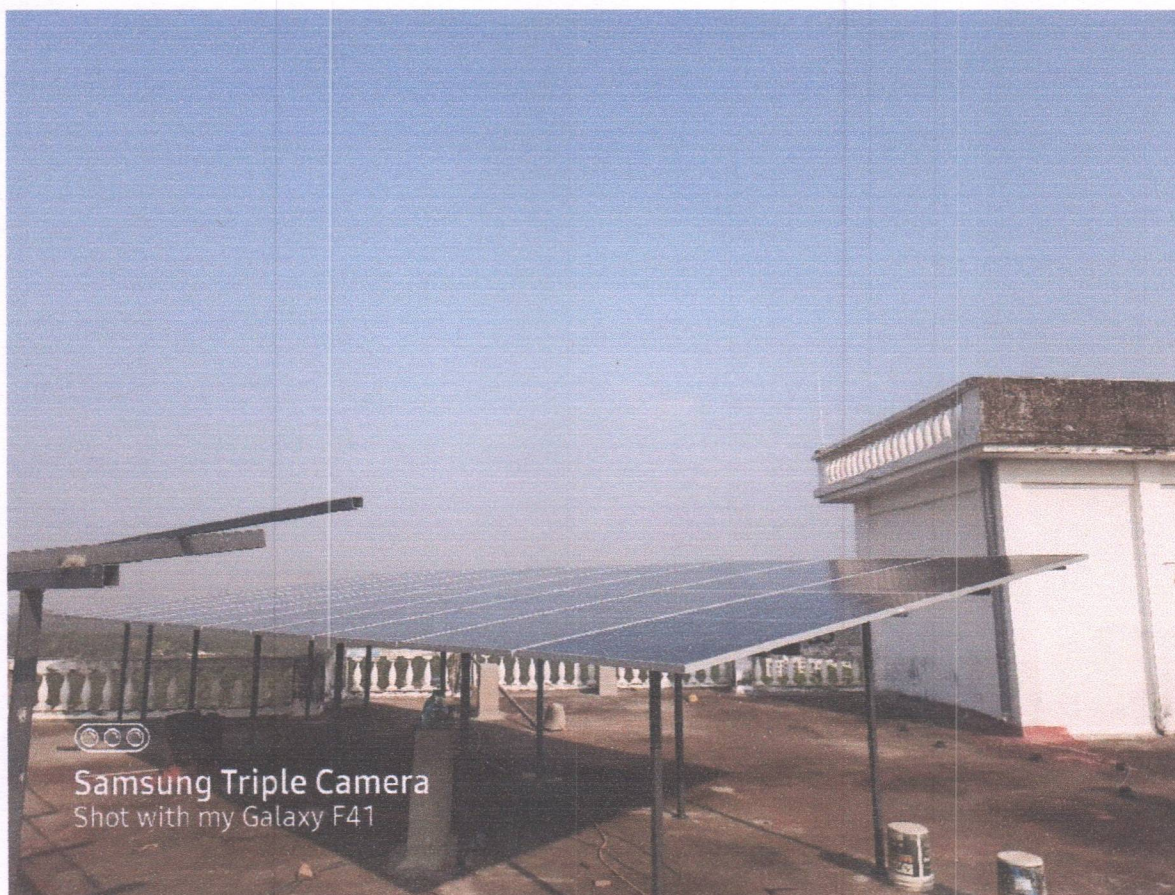


Key Points

- Average energy consumption is 82 KWH per hour in day time
- Both voltage harmonics and current harmonics are on higher side requires harmonics mitigation equipment at all UPS and Lighting Circuits
- Isolated earthing is needed for all UPS and Lighting Circuits
- Some portion of the tube lights are conventional 36 W bulbs and the same should be replaced with 18 W LED tube light which gives same illumination. This saves 50% of energy bill.
- Most of the ceiling Fans used here are conventional type 75W fans and the same should be replaced with 35W BLDC Fan which saves 53% energy bill.
- Air conditioner can be operated with AC energy saver and Ceiling Fans which saves 15% energy bill.
- We can install 20 KW solar power plant which will reduce day time GPED consumption
- We can go for solar water heater and thereby we can reduce water heater consumption
- Introduce the practice of conducting the leak test with compressor at least once in a month.

13. Solar Power Plant

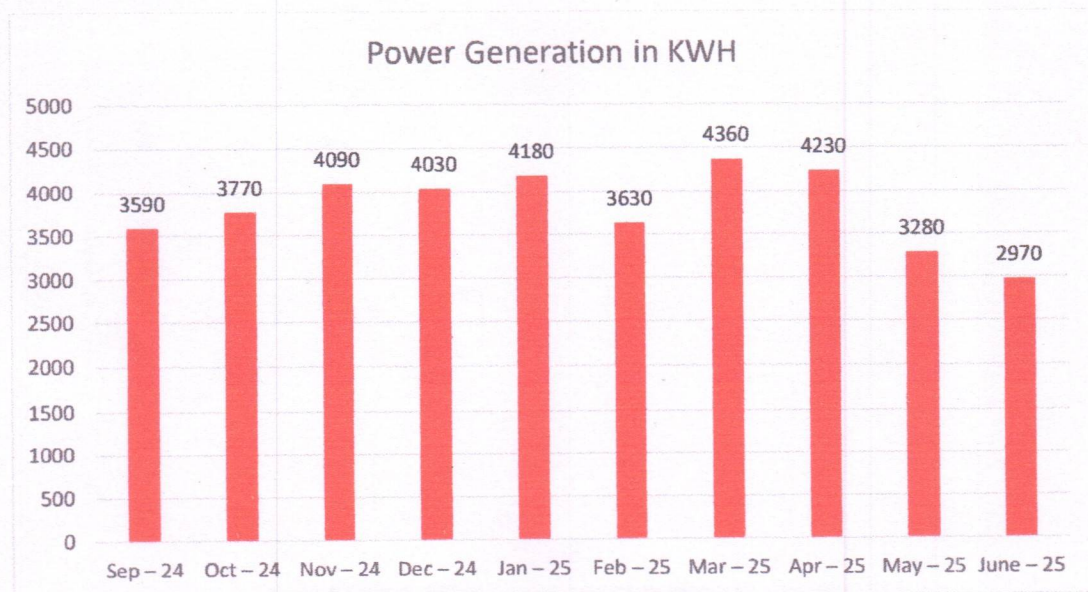
30 KW solar power plant installation is completed and the generation is also good. Based on the load study we can go up to 60 KW solar power plant. This solar power plant will reduce our GPED power consumption and supports our green initiative.



Expected annual unit Generation in KWH	=	40,500
Annual GPED Energy bill reduction with solar power plant=		2,26,800
Carbon intensity in KgCo2/KWH	=	0.82
Reduction in CO ₂ Emission in Kgs	=	33,210 Kgs

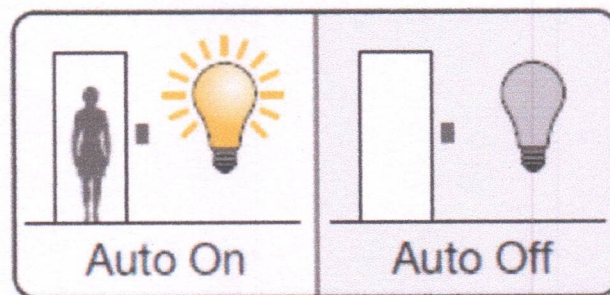
Solar Power Generation

Month	Power Generation in KWH
July – 24	-
Aug – 24	-
Sep – 24	3590
Oct – 24	3770
Nov – 24	4090
Dec – 24	4030
Jan – 25	4180
Feb – 25	3630
Mar – 25	4360
Apr – 25	4230
May – 25	3280
June – 25	2970



14. Points for Improvement

- Provide double earth to all the motors and panel boards as a safety measures. All the earthing needs to be checked at least once in a year with valid certificates
- We have to maintain the Generator log book at Power house which should have the details of Diesel top up, running hours and unit generation
- Try to conduct the pneumatic line leak test in every month during no operation day. Arrest the air leaks and save the energy
- Maintain the Air compressor log book with the daily details of Running hours and electricity consumption of Air compressor. This will help us to find out the air leak or compressor problems at ease
- Provide automatic water drainer (Not a timer based) at air receiver tank
- Provide lower range capacitors like 5 KVAR, 3 KVAR at APFC panel to reduce the KVAH consumption. Since GPED is charging the bill based on KVAH consumption
- Try to change the APFC relay by Elmeasure make relay with three phase sensing and TPF Compensation. This will improve the APFC efficiency
- Reduce the air compressor operating pressure to 6 bar from 7.5 bar
- Provide MPD in all pumping application which is will protect your pumps from dry run.
- Provide automatic lighting on-off and trim control in all Street light and Varandha lighting circuits. Occupancy sensors function by switching the lights ON and OFF based on the occupancy of the room and are a smart way to save energy in commercial organizations.



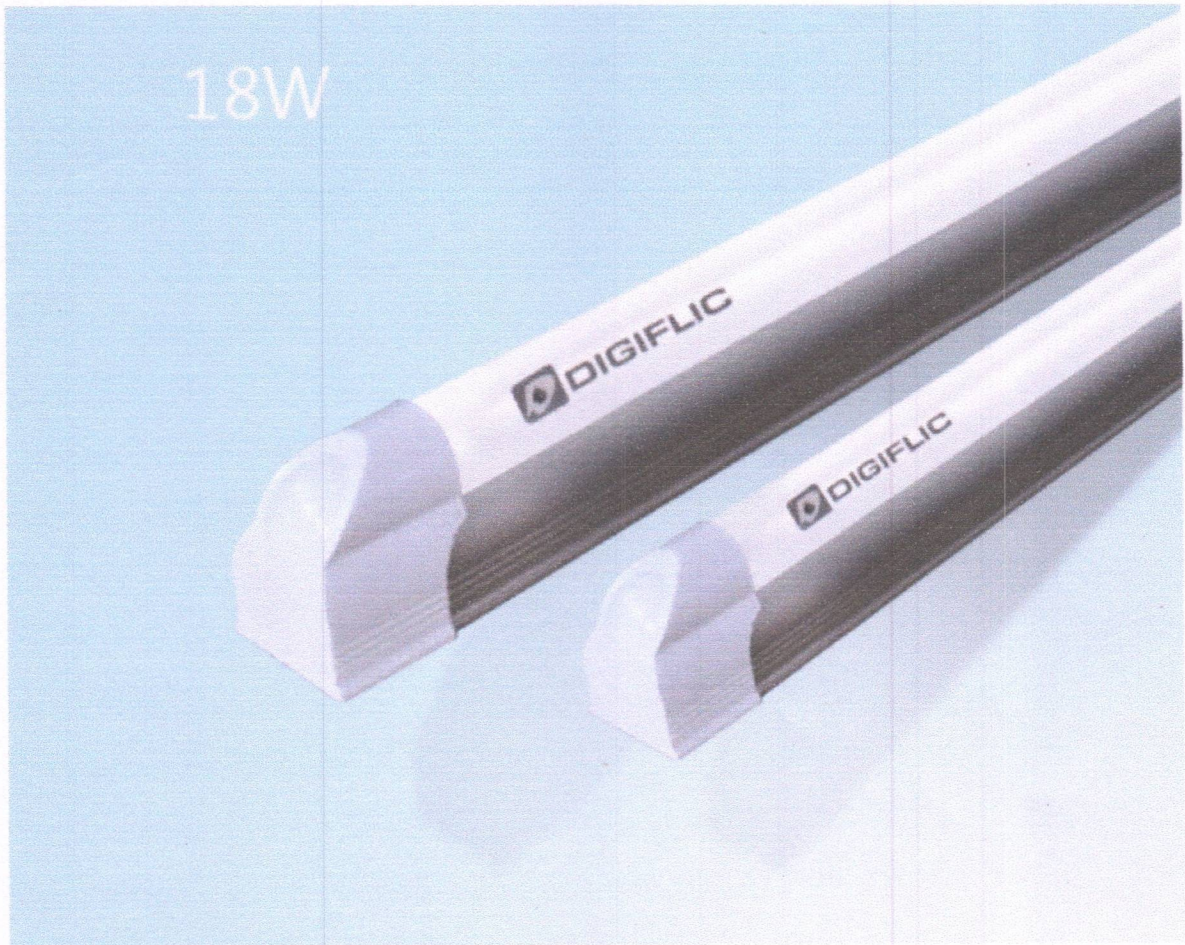
- Use 5 star rated AC's in all your new installations which will aid in energy savings

January 01, 2018, to December 31, 2020			January 01, 2021, to December 31, 2023		
Star Rating	Minimum	Maximum	Star Rating	Minimum	Maximum
1-Star	3.1	3.29	1-Star	3.3	3.49
2-Star	3.3	3.49	2-Star	3.5	3.79
3-Star	3.5	3.99	3-Star	3.8	4.39
4-Star	4.0	4.49	4-Star	4.4	4.99
5-Star	4.5		5-Star	5.0	

Energy and Cost Savings for 1.5 Ton Window or Split Air Conditioner at Different Star Ratings (under standard test conditions and as per latest BEE regulations)

Star Rating	Minimum Energy Star (Approx.) Efficiency Ratio (EER)	Maximum Cooling Capacity (Watts)	Input Power (Watts)	Units Consumption/ Day (kWh)	Electricity Cost/Day	Electricity Cost/Month (Rs)	Savings per Month (w.r.t. 1 star) (Rs)
1*	2.7	5,200	1,926	15.4	108	3,234	0
2**	2.9	5,200	1,793	14.34	100	3,011	223
3***	3.1	5,200	1,677	13.42	93.94	2,818	416
4****	3.3	5,200	1,575	12.6	88	2,652	582
5*****	3.5	5,200	1,486	11.89	83	2,497	737

15. Energy Saving Recommendation No.1



- Replacing 40W Conventional Tube lights with 20W LED lights. Thereby we can achieve 50% energy saving in this category

- For an Example, we can get more benefit if we are adopting these recommendations in class rooms, Varandha and Hostel rooms

16. Energy Saving Recommendation No.2



- In some common areas like Varandha, Bath rooms and Washing Rooms, we can use sensor-based LED lights which will reduce the energy consumption when no need
- It will switch off or dim the light, when no human movements found. Now we are getting this sensor-based LED lights at affordable Price

17. Energy Saving Recommendation No.3



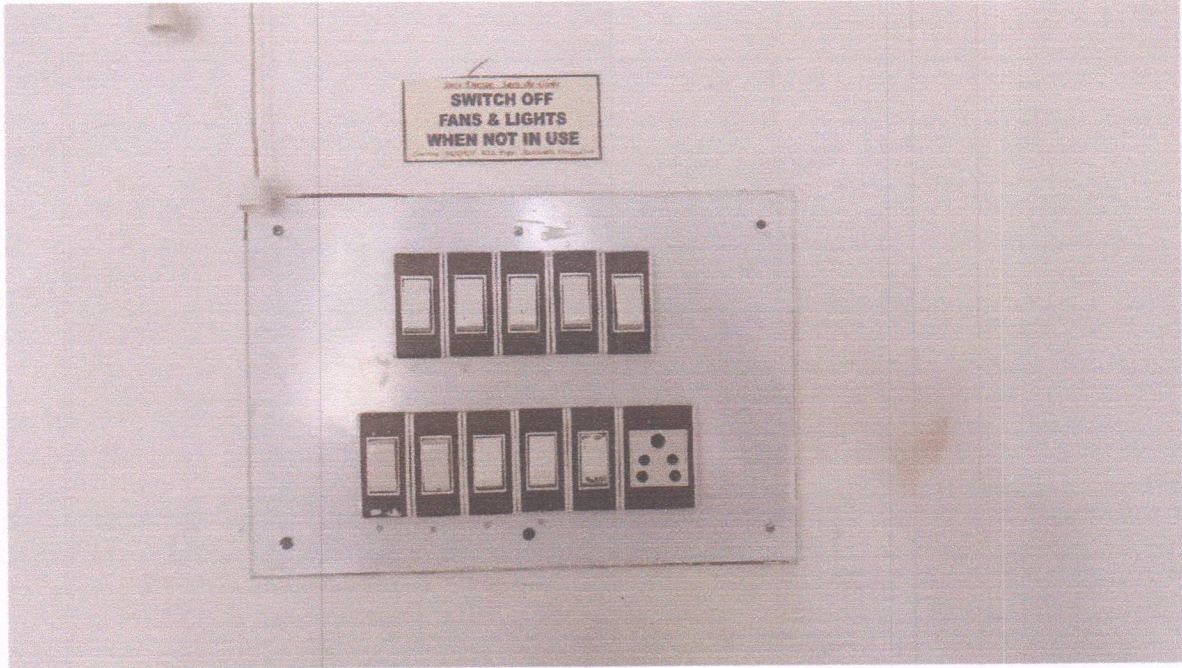
- The Ceiling fans used in maximum places except new girl hostel and some part of college are conventional type. The energy consumption of conventional fan is 75 watts and whereas for super fan it is only 35 watts. Hence we can save 53% of energy used in fan application
- Even in recent advancement BLDC fans comes with auto speed reduction options which will reduce energy consumption further

18. Energy Saving Recommendation No.4



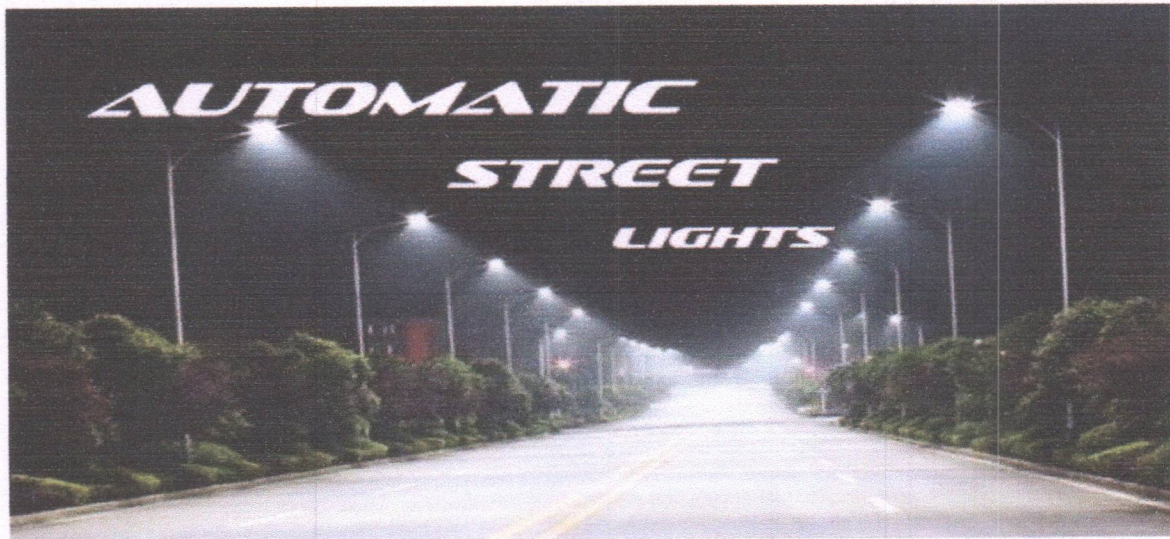
- At present, the college has 30 KW solar power plant
- But, the college load consumes minimum 75 KW power from GPED during day time. Hence we can go up to 60 KW solar power plant with college load
- Thereby we can reduce our consumption by 67500 KWH by considering 300 working days.
- We can get the cost benefit of 3,71,250 per year by installing 60 KW solar power plant

19. Energy Saving Recommendation No.5



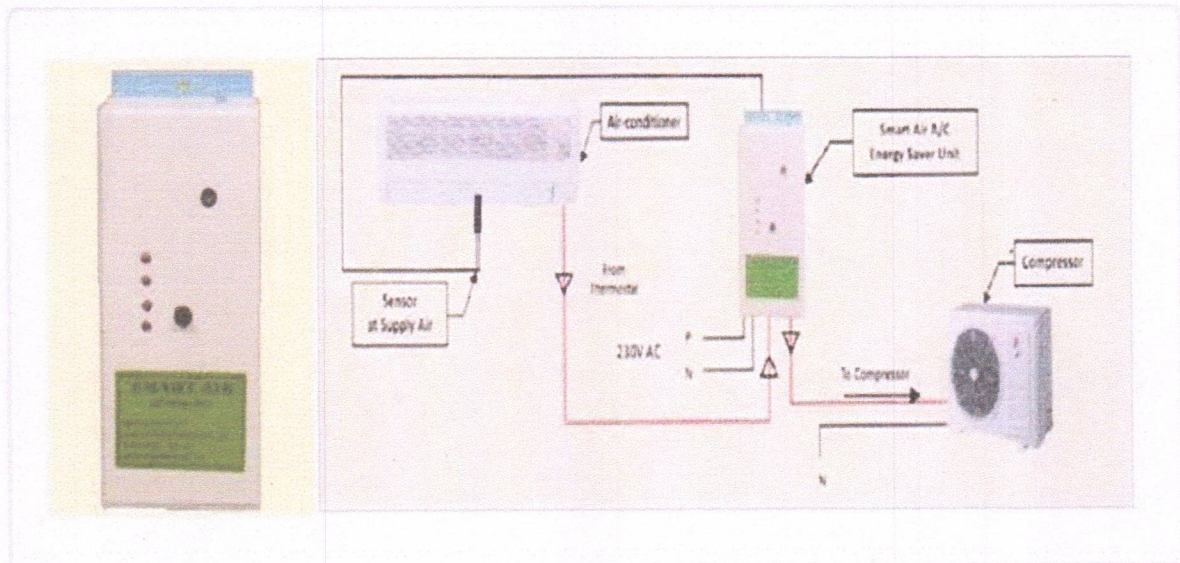
- Creating Energy saving awareness by displaying reminders as like above.
- This will reduce the wastage of energy uses when not necessary

20. Energy Saving Recommendation No.6



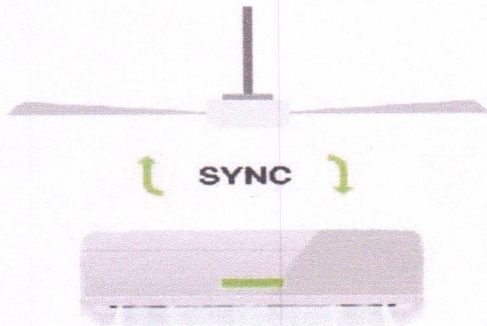
- We can install the automatic controller for street light based on our requirements
- We can switch off or dim when no movement found or we can switch off after particular peak time

21. Energy Saving Recommendation No.7

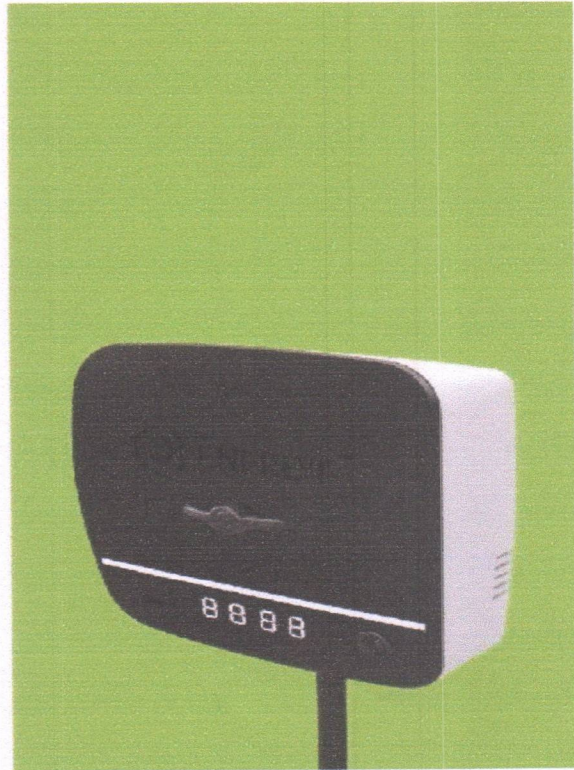


- We can reduce the energy consumption of Air conditioners by installing AC energy saver as like above
- It will reduce the compressor load on nearing set temperature. Thereby we can reduce the energy consumption of AC from 15% to 30% depends on model

22. Energy Saving Recommendation No.8

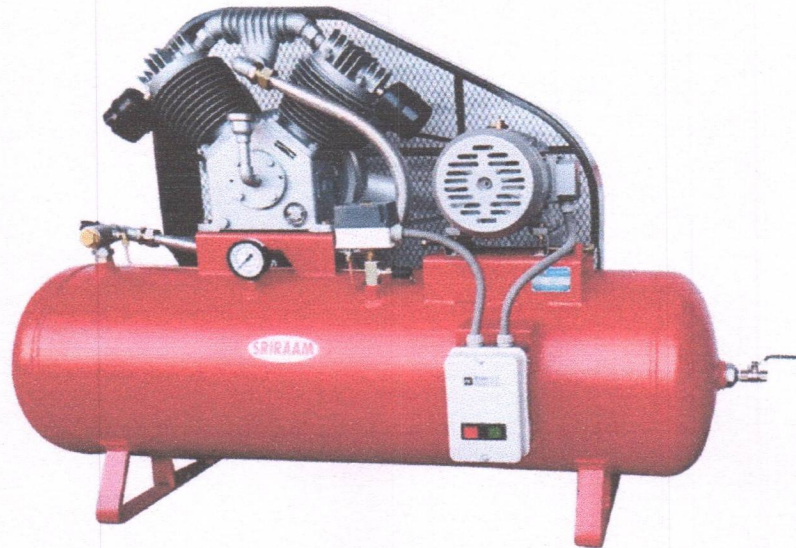


UPTO
45%
SAVINGS
IN AC BILLS



- By using Ceiling Fan along with Air conditioner will reduce the work load of air conditioner.
Thereby we can reduce the energy consumption of AC
- Either we can use direct connected Ceiling fan or controller connected ceiling fan

23. Energy Saving Recommendation No.9



We have to maintain the log book with running hours and electricity consumption of air compressor. Thereby we can easily find out the air leak in the system.

As per the dental chair air requirement we can maintain the air at 6 bar pressure will reduce the air compressor consumption by 8% which is around 0.5 KWH per hour. This will reduce the air compressor energy consumption by minimum one unit per two hours per day and more on if the running time is more

Conduct the air leak test at least once in a month will reduce the air leakage and compressor energy consumption

Also provide energy cum hour meter at air compressor house to monitor the running hours and energy consumption to analyse the compressor performance and air leak.

24. Energy Saving Recommendation No.10

Thermography is a non-destructive test method that may be used to detect poor connections, unbalanced loads, deteriorated insulation, or other potential problems in energized electrical components. These problems may lead to excess power use, increased maintenance costs, or catastrophic equipment failure resulting in unscheduled service interruptions, equipment damage, or other problems.

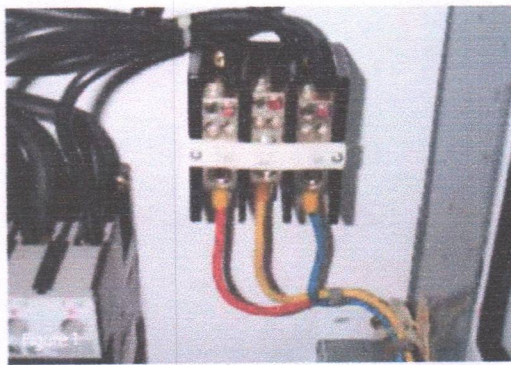


Figure 3 shows an electrical lead as seen by an electrician or maintenance technician.



Figure 4 shows the same lead in operation at 320° F. The infrared image shows a possible loose connection or overloaded circuit.

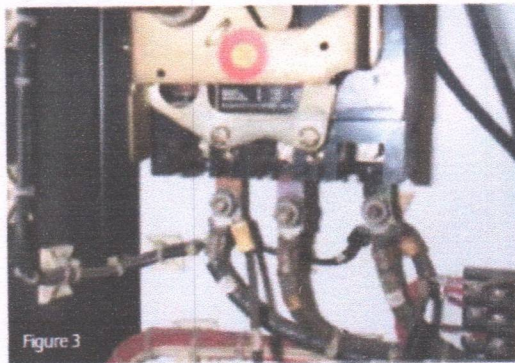


Figure 5 shows a breaker as seen by an electrician or maintenance technician.

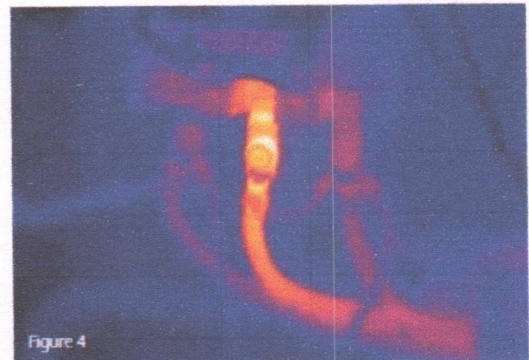


Figure 6 shows the same breaker operating at 247° F indicating a possible overloaded circuit.

25. Audit Report

We have conducted the Energy audit at all important power distribution boards up to our maximum possible extend. The following results were obtained. **Measurements were taken at variable load conditions.**

- The energy saving potential in lighting circuit is 11.7 KWH per hour at 100% loading, which is 29.6 %
- The energy saving potential in Fan circuit is 32.2 KWH per hour at 100% loading, which is 53.3%
- The energy saving potential in Air conditioner circuit is 29.7 KWH per hour at 100% loading, which is 15%
- The annual energy consumption from GPED grid got reduced by 40,500 KWH with existing 30 KW solar power Plant.

For Sri Energy Solutions,



M.Rameshkumar

BEE Certified Energy Auditor

26.Future Support

Thanks for your co-operation to bring out this energy saving operation. We will give necessary support to achieve your energy saving at any time.

THANK YOU

From,

M/s.Sri Energy Solutions

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Dindigul

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