

2021

Energy Audit Report

of

**Adhiparasakthi dental college
and Hospital., Melmaruvathur**

Energy Audit by

Sri Energy

Solutions

21/01/2022

Project Report Title : **Energy Audit**

Client Name : **Adhiparasakthi Dental College and Hospital**

College Location : **GST Road,
Cheyyur,
Chengalpattu – 603 319**

Date of Audit : **21.01.2022**

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. S.Hari Prasad.,B.E
Trainee Engineer – Energy Audit**




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Acknowledgement

Sri Energy Solutions acknowledge with hearty thanks to **Dr.T.Ramesh.,Correspondent, Adhiparasakthi Dental College and Hospital.,Melmaruvathur** for their support for carrying out this audit.

Our special thanks to **Dr.S.Karthiga Kannan – Principal and Dr.V.Sudhagar., NAAC coordinator** 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 **Dr.Ramya.,** for their co-operation and support us to carry out the Energy audit very effectively.



S. Karthiga Kannan

1. Introduction

Adhiparasakthi Dental College and Hospital is one of the leading autonomous educational institution affiliated to the tamilnadu Dr.MGR medical university. This college was established by **Arul.Thiru.Padmashri Bangaru Adigalar through Adhiparasakthi Charitable, Medical, educational and cultural trust (ACMEC)** in the year of 2005.

This college is located in the prime location of Melmaruvathur city. This college is having lot of courses in Dental science with completely equipped. It has been providing quality education to the rural and urban students of Tamilnadu, Andhra and Kerala. This institution has one three LT TNEB services and three backup generators. High quality panels and switch gears are connected with this service for giving quality supply to the equipments. 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. More over 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 Green 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 equipments
- To improve the safety of equipments and workmen



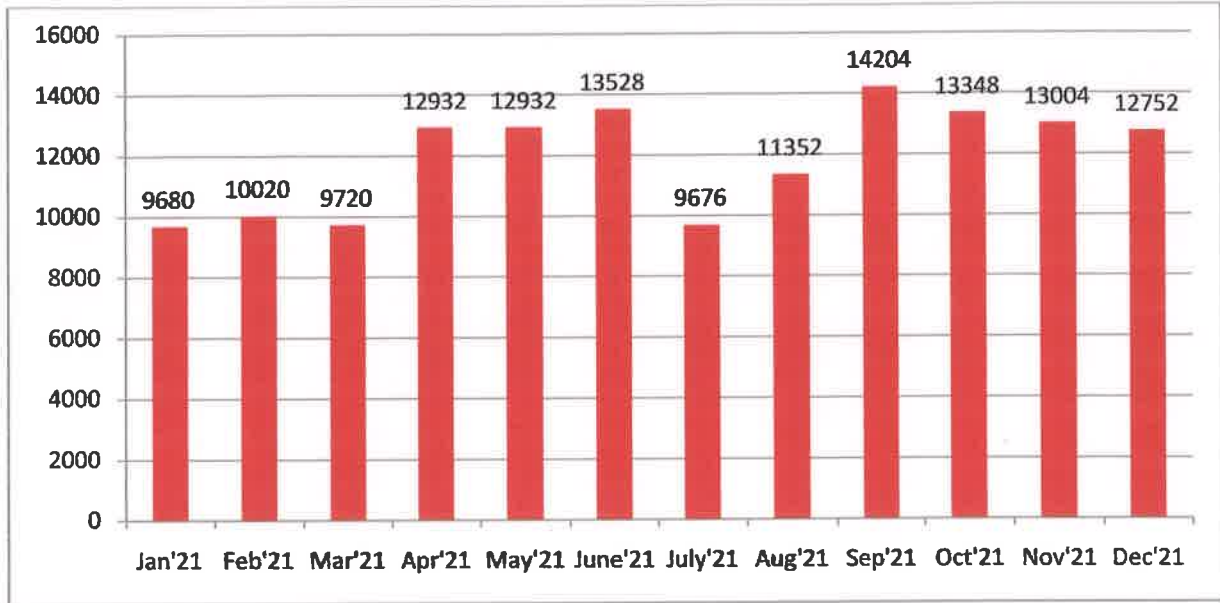
3. Executive Summary

- The common HT service is used for Colleges, Companies and schools etc.
- The sanctioned demands of **LT TNEB supply of 280 KW** are well enough to meet the connected load of **532.5 KW**. Since it is batch process service.
- Standby power source is from **250 KVA, 125 KVA and 180 KVA** generators are more than enough
- Average monthly Energy consumption is **11,929 units**
- Energy efficient lighting conversion is already in the process
- Total lighting load is **45.24 KW** and has saving potential of **12 KW**. The saving potential is **26.5%**
- Total Fan load is **109.6 KW** and has saving potential of **58.4 KW**. The saving potential is **53.3%**
- Total Air Conditioner power load is **118.08 KW** and has saving potential of **17.7 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 **71,837 units**
- The overall annual cost saving by implementing the recommendations mentioned in this report is **Rs.5,74,694 /-**

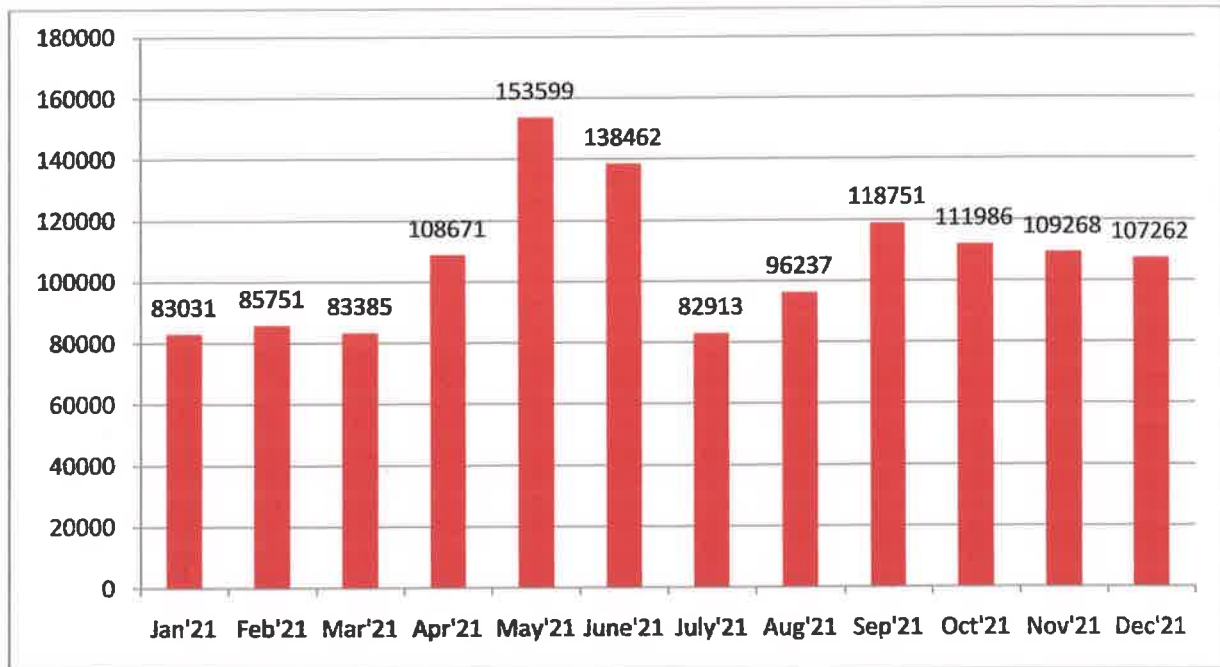


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4. TNEB Power Consumption Trend



5. TNEB Bill Trend

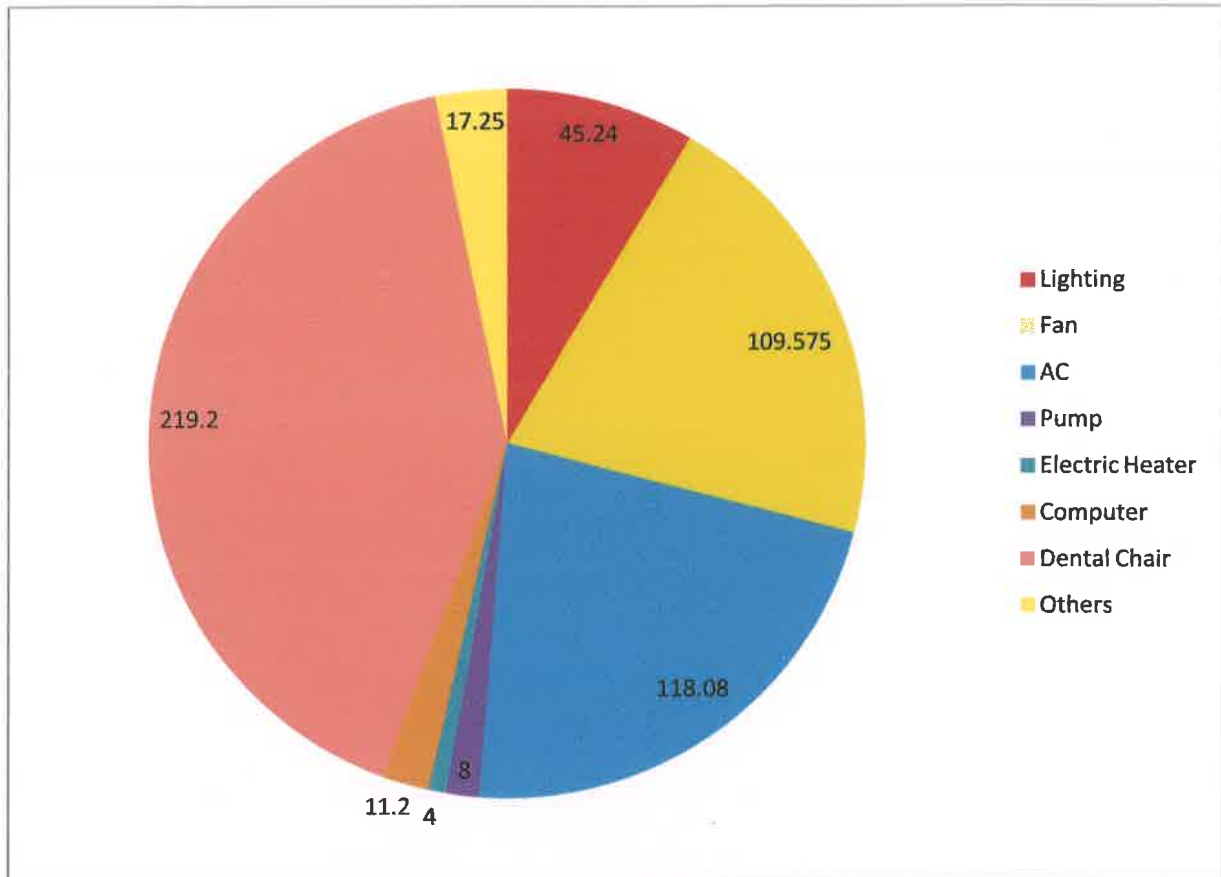


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6. Energy Consumption Analysis

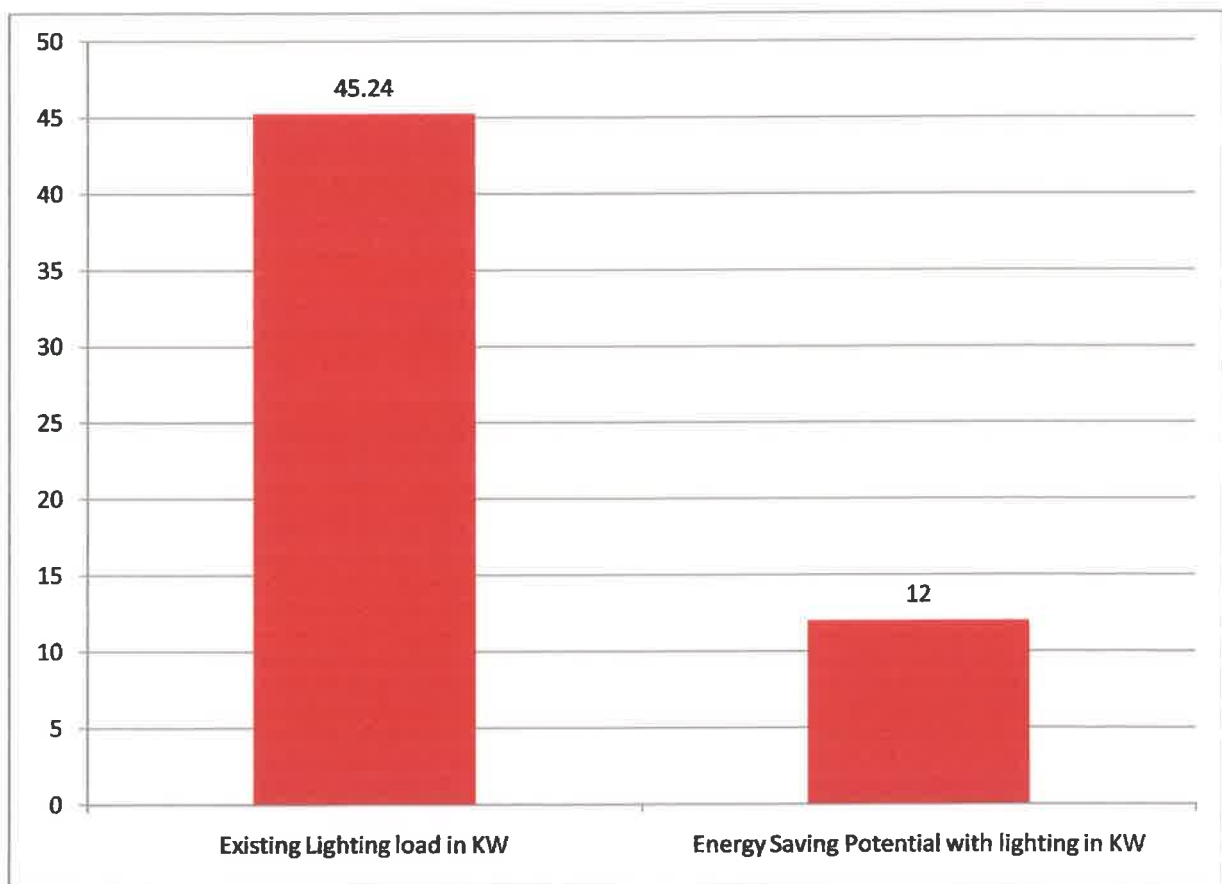
Load Type	Load In KW
Lighting	45.24
Fan	109.575
AC	118.08
Pump	8
Electric Heater	4
Computer	11.2
Dental Chair	219.2
Others	17.25
Total	532.545



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7. Lighting Power Consumption Analysis

Item	Population	Existing Light in Watts	Proposed LED Light in Watts	ES Potential in watts	Energy saving in KWH
Tube Light	383	40	20	20	7.66
Night Lamp	312	15	3	12	3.74
Compound Light	30	50	30	20	0.6
Total					12



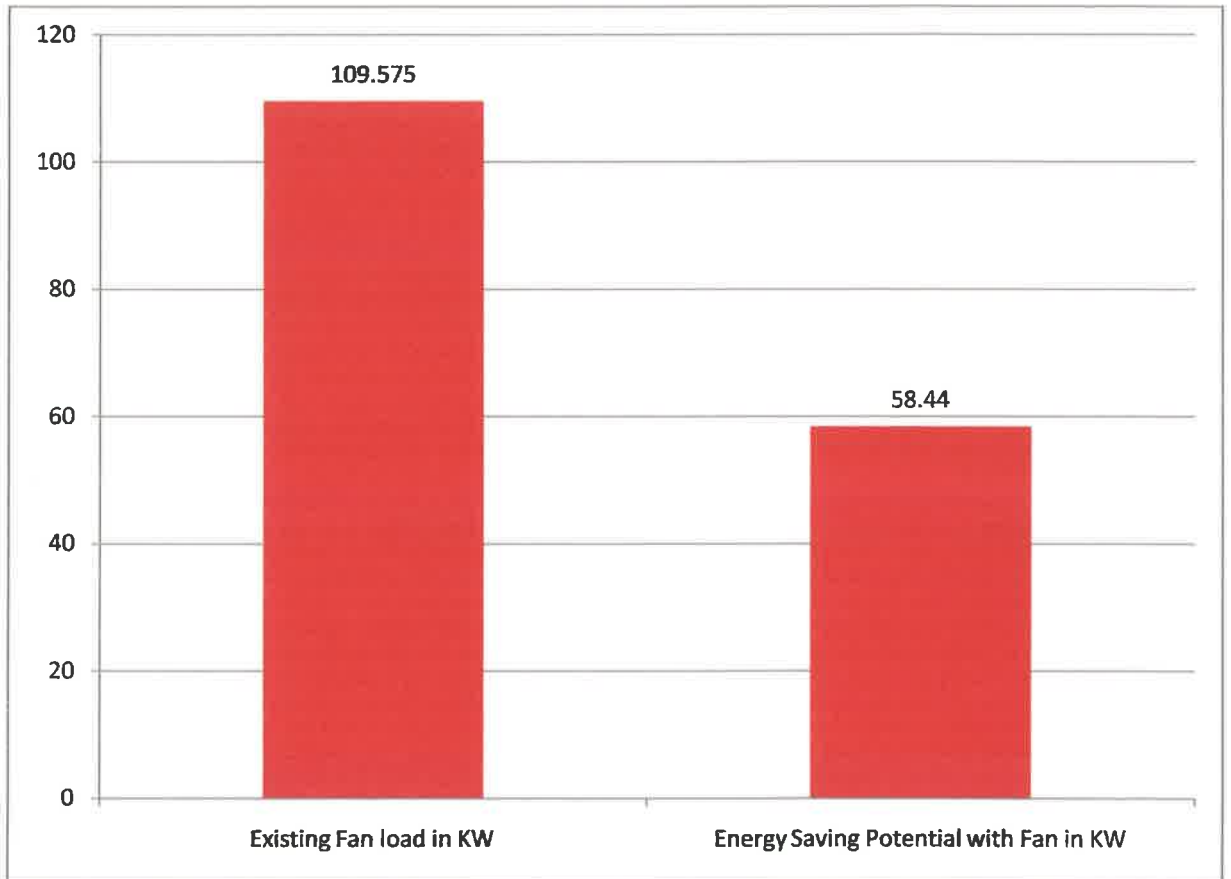
Power consumption indicated in KW



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8. Fan Power Consumption Analysis

Particulars	Load in KW
Existing Fan load in KW	109.575
Energy Saving Potential with Fan in KW	58.44



Power consumption indicated in KW

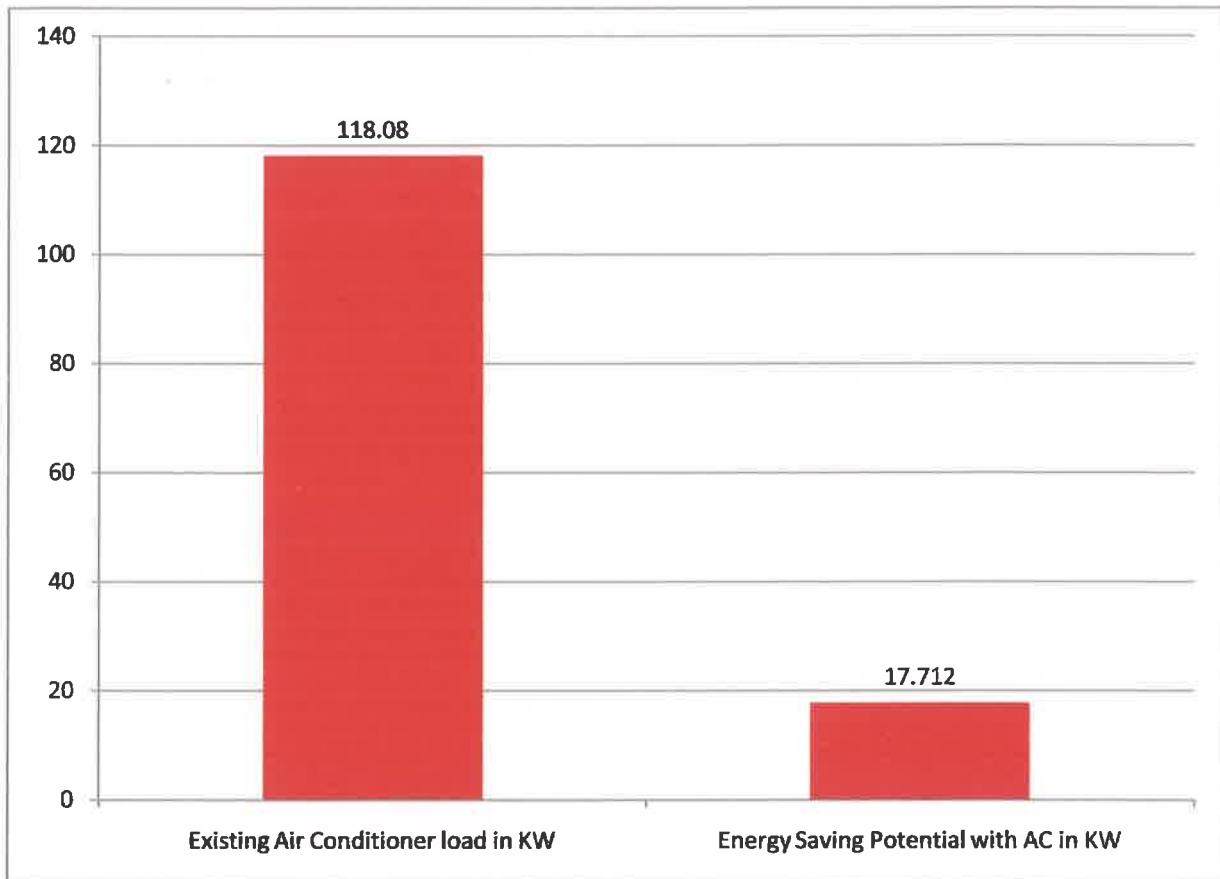
By replacing existing induction motor based ceiling fan with BLDC fan, we can achieve the above said energy saving potential.



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9. AC Power Consumption Analysis

Particulars	Load in KW
Existing Air Conditioner load in KW	118.08
Energy Saving Potential with AC in KW	17.712



Power consumption indicated in KW

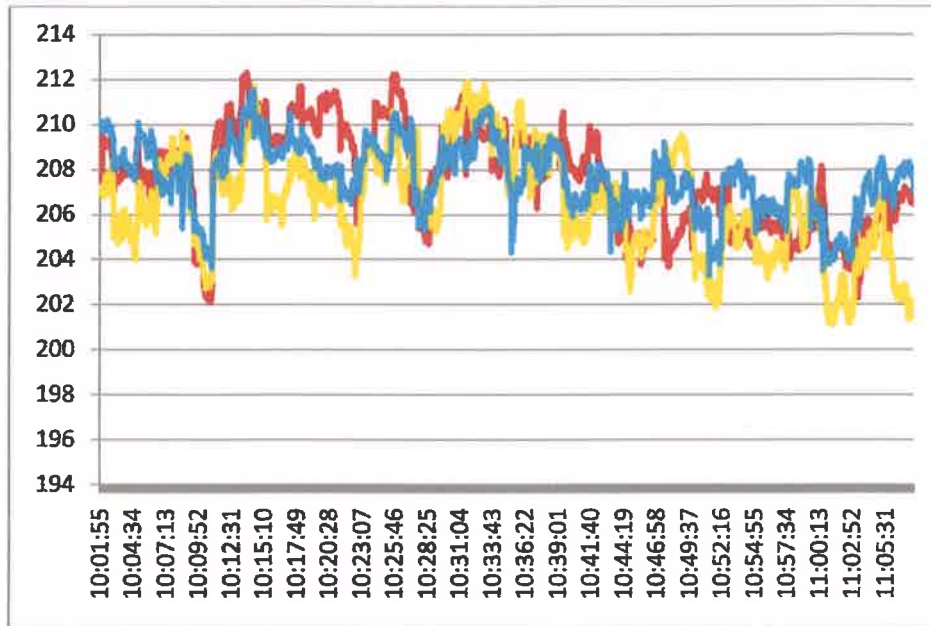
By installing energy saver with all your air conditioner, we can achieve the above said energy saving potential.



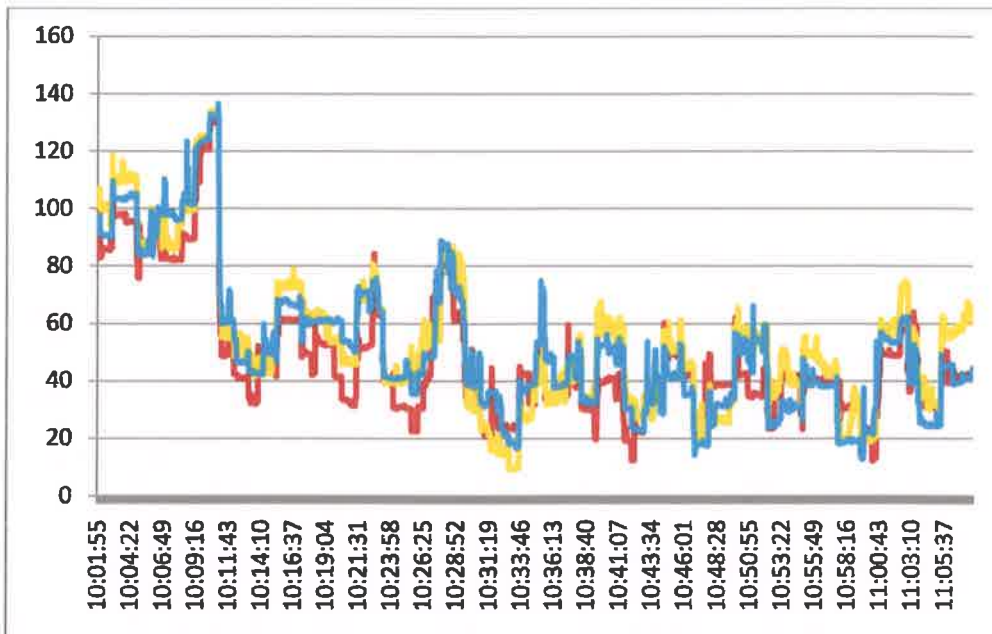
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10. Main Incoming Trends

Voltage Trend

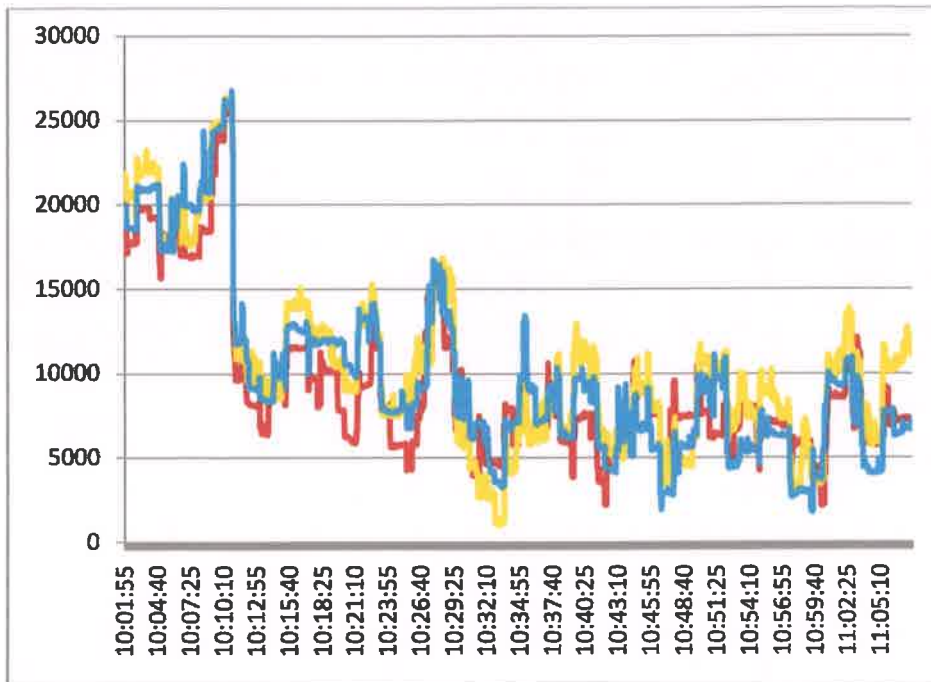


Current Trend

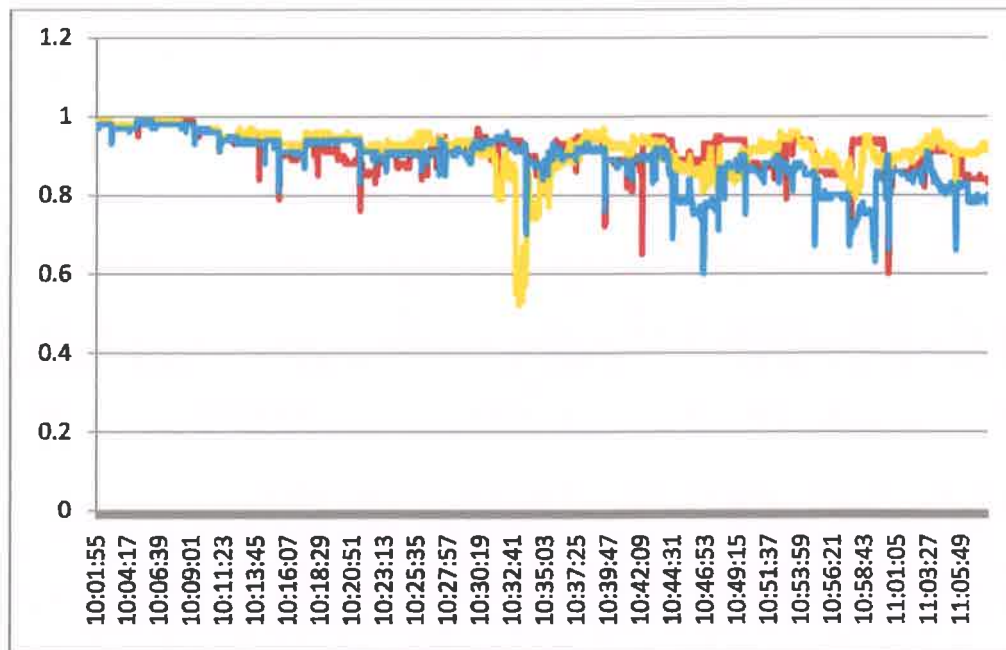


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Power Trend

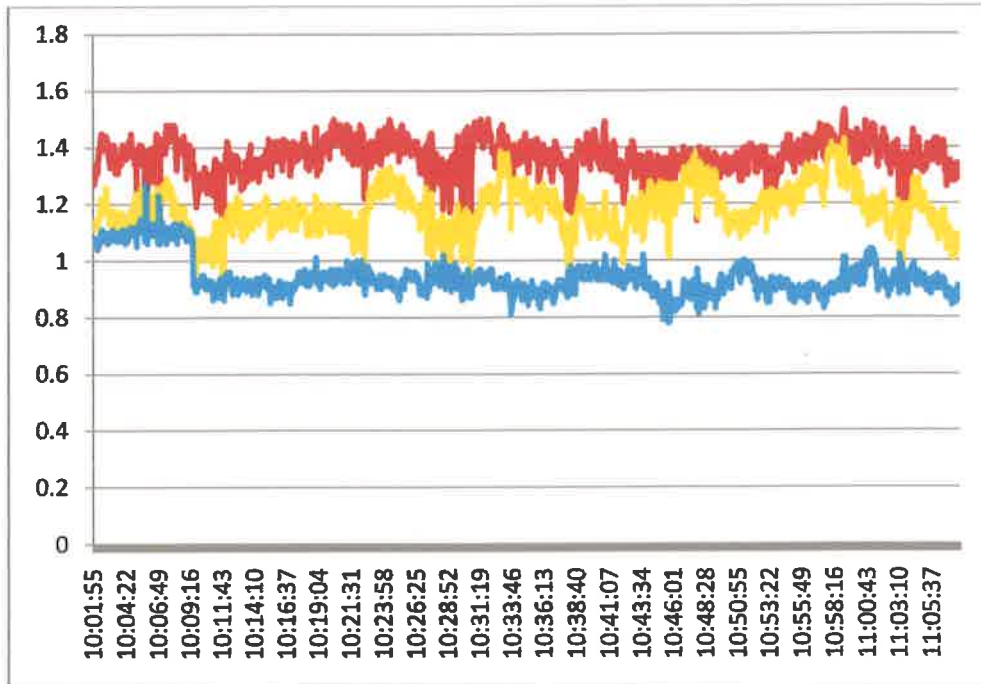


Power Factor Trend

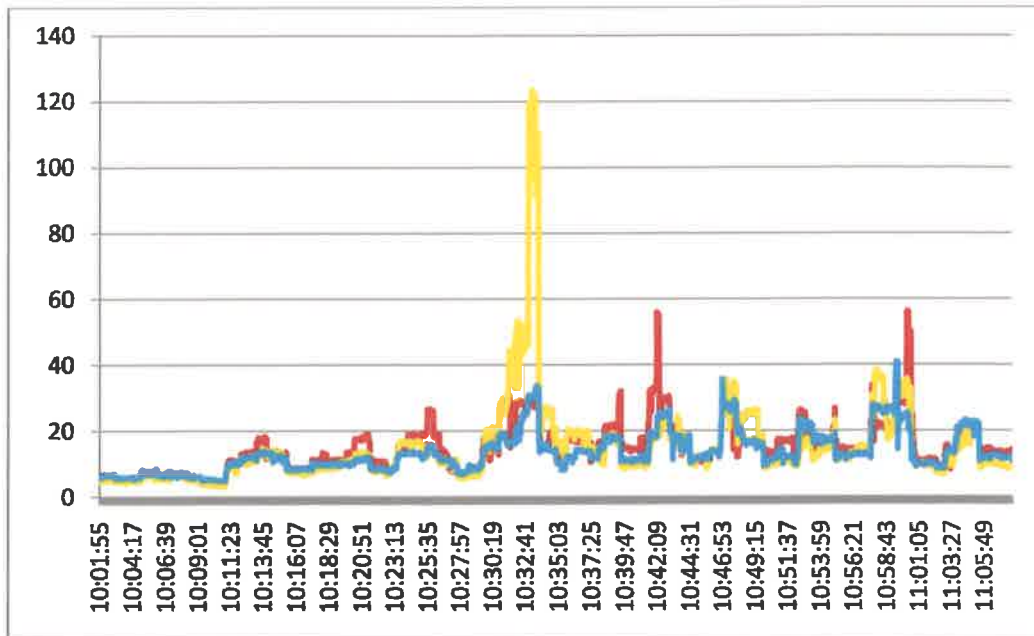


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Voltage Harmonics Trend

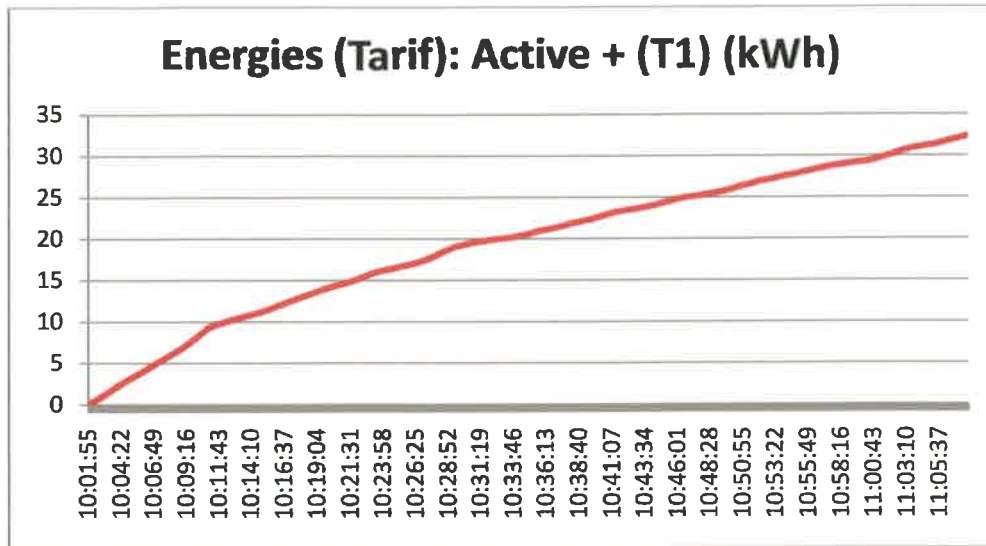


Current Harmonics Trend



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Active Energy Consumption



Key Points

- Average energy consumption is 32 KWH per hour in day time
- Both voltage harmonics and current harmonics are on higher side requires harmonics mitigation equipments at all UPS and Lighting Circuits
- Isolated earthing is needed for all UPS and Lighting Circuits
- Some portion of the tube lights are conventional 40W bulbs and the same should be replaced with 20W 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 which saves 15% energy bill.
- We are utilising 50 KW solar power plant which is reducing the day time TNEB 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 atleast once in a month.



11. Solar Power Plant

The maximum power consumption is between 9AM to 3 PM. College has 50 KW of Solar Power Plant. This solar power plant is reduces our TNEB power consumption and supports our green initiative. M/s.Adhiparasakthi Dental science and hospital maintains the solar power plant very effectively.



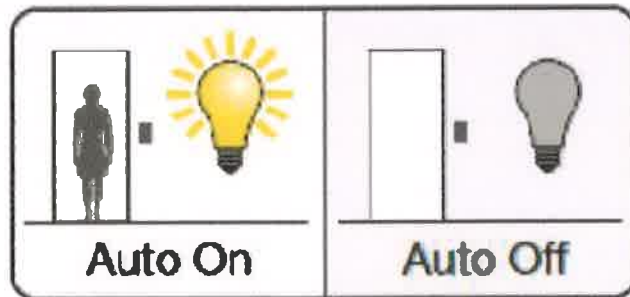
Capital cost required to install 50 KW solar power Plant	=	23,89,800
Depreciation benefit of 80% for first two years	=	5,04,726
Capital cost after deducting depreciation benefit	=	18,85,074
Annual TNEB Energy bill reduction with solar power plant	=	4,94,606
Pay back of remaining capital cost in years	=	3.8 years
Energy cost saving with solar power plant in life cycle	=	1,03,86,726

We considered solar power plant life cycle is 25 years and hence we will get free current from 5th year onwards. So we can enjoy 104 lakhs throughout power plant life.



12. Points for Improvement

- Provide double earth to all the motors and panel boards as a safety measures.
- 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



13. 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 12 KWH per hour at 100% loading, which is 26.52%
- The energy saving potential in Fan circuit is 58.44 KWH per hour at 100% loading, which is 53.3%
- The energy saving potential in Air conditioner circuit is 17.712 KWH per hour at 100% loading, which is 15%
- The energy consumption from TNEB grid reducing by utilising 50 KW solar Power Plant and Solar water heater well.

For Sri Energy Solutions,



M.Rameshkumar

BEE Certified Energy Auditor – EA 22303



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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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