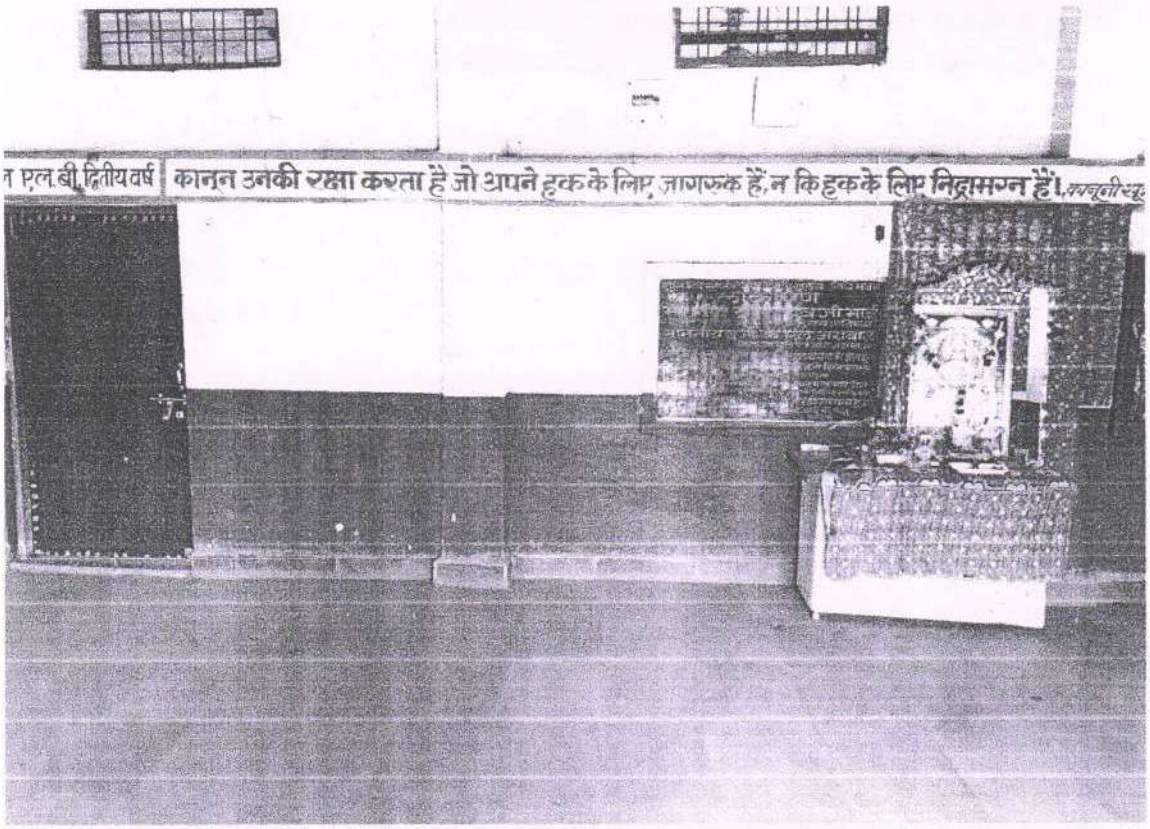
ENERGY AUDIT & GREEN AUDIT REPORT GOVT PG COLLEGE GUNA



Energy Audit & Green Audit Report

Govt PG College Guna

By

Mansi Energy Solutions

Energy Auditor
EA-2428

PREFACE

Govt PG College Guna is prominent college established in 1962.

Govt PG College is going to operate in its old building. Which offer many courses in tenure eminent professors. We have constantly evolved and understood every College need while keeping up with changing times.

College Management is very keen to incorporate energy efficiency project to save energy right from very first day of college execute

On serious note management ask our team to suggest Energy Efficiency Scheme so that they can incorporate scheme from very first day

Our in depth interaction with patient has given us powerful insights to provide an umbrella of solutions each & every type of patient.

Govt. College has 60 Permanente faculty and 24 Nonteaching Staff .

College offer B.A . B.Sc, B.com course full time 3 year in Bio Technology, Computer science, Plane and offer PG degree like M.A in 16 subject , M.Com plane , M.sc in 6 sub

College have 17000 student .

Mansi Energy Solutions

ACKNOWLEDGEMENT

"Energy Audit" is a joint venture of consultant and industry to account, monitor and control of usage of Energy without sacrificing the quality of production and human comforts at any stage. The contribution of industry's team is equally important in this venture. We sincerely acknowledge the contribution of the following dignitaries and site engineering personnel whose co-operation helped to conclude the study very smoothly.

Dr. B.K Tiwari – Hon. Principal Govt. College Guna

Mr. Nirajan Shrotriya – Senior Professor

We are also thankful to all other staff members who were actively involved while collecting the data and conducting the field trials & measurements.

We believe that the observations, findings and recommendations incorporated in the report will help & lead the Govt Degree College management to account, monitor, control and conservation of Energy in much efficient and effective manner by adopting various Energy Conservation Measures incorporated in the report.

Energy Audit Team:-

Mr. Geetesh Goyal (EA-9428) - Lead Energy Auditor (BEE certified)

Mr. Chandra Kumar Mangal - Charted Electrical Engineer

Regn. No. EA-9428

Certificate No. 4247

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. Geetesh Goyal

son / daughter of Mr. G.P Goyal

has passed the National Certification Examination for Energy Auditors held in November - 2008, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India

Date : 24th February, 2009

Controller of Examination

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Govt Degree College is going to be one of the leading college in Guna established in 1962

The energy audit has been conducted by Mansi Energy Solutions from the 07/06/22 to 10/06/22 at their college premises. The observation, measurements and trial runs are conducted during the energy audit for the performance evaluation of their utilities and identification of energy conservation measures within the facility.

There are some energy conservation measures identified by the Mansi Energy Solutions based on the observation, measurement and historic data analysis of the facility. The summary of identified energy conservation measures with saving in electricity consumption, estimated investment required for the implementation of the respective energy conservation measure and the simple payback period on the investment is calculated and tabulated in the executive summary table below;

We believe that the observations, findings and recommendations incorporated in the report will help & lead the Govt PG college Guna management to account, monitor, control and conservation of Energy in much efficient and effective manner by adopting various Energy Conservation Measures incorporated in the report.

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EXECUTIVE SUMMARY TABLE

S.No.	Particular	Performance						
S.No.	Recommendation	Annual Saving (Rs.)	Investment (Rs.)	Pay Back Period in month	Saving KWH/ Yearly			
1	Recommendation 1 : College Have to apply for two part tariff	41556	0	Immediate				
2	Recommendation 3 :- College have to go for roof top solar 40 KW	360800	4000000	66	**44000**			
3	College have to install Water alarming system in last water tank to save over flow water.	370	300	12	**45**			
4	Recommendation 4 : College have to use 5 Star rated Inverter AC instead Traditional AC (3 nos.)	44453	150000	40	**5292**			
5	Recommendation 5 :- Use PIR Sensor(87 Nos) rated load 500 W to turn auto on off in occupancy to save lighting and fan load	117684	160950	17	**14010**			

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6	Recommendation 6 :- College have to install 50W 5 Star Fan instead tradition fan (150 Nos.)	50400	112500	27	**6000**			
14	Recommendation 7 : Use Retrofit Energy Efficient LED Tube light (LT8-16W) in place of existing fluorescent tube (36/40 watts) with Electronics Ballast Lights in Hospital area (112 Nos.).		100000	22	**3780**			
	Recommendation 8:- Install Energy Efficient LED light of 12W in place of CFL 20W plant various area.(20 nos.)	5326	3600	8	**634**			
	Recommendation 9 :- Go For Rain water harvesting pipe to recharge Tube well Hole.	32000	200000	76				
	Recommendation 10:- College have to use water softening plant to save water and Tap .	24000	55000	28				
	Recommendation 11 :- Paint with heat retard paint on roof top to save room hot .	13172	20000	18				

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CHAPTER -1 INTRODUCTION

About the Govt PG College Guna

Name : Govt Degree College capacity 17000 Student in various stream

Location: Guna District Guna

Service : College activity

1.1 ENERGY AUDIT – A JOINT VENTURE

Energy is aggressively becoming one of the critical resources in industries and building today, due to rapidly increasing energy cost and interruption in availability of quality fuels and electricity, it becomes very essential & critical to account, monitor and control of energy in the industry.

An "Energy Audit" is a joint venture of consultant and industry to account, monitor and control of energy without sacrificing the quality of production and human comforts at any stage. The contribution of industry's team is equally important in this venture.

An "Energy Audit" is the first step towards the establishment of specific energy consumption per unit of product in manufacturing industry, which leads to the energy conservation and effective & efficient use of energy.

The Govt PG College Guna management has taken-up the initiative to study their existing energy consumption scenario in their manufacturing facility to contribute towards the energy conservation, Mansi Energy Solution respect this initiative and thankful to the management for awarding the prestigious assignment of conducting an Energy Audit.

1.2 ENERGY AUDIT – APPROACH & METHODOLOGY

Mansi Energy Solutions. has deputed below listed team of technical experts from variety of disciplines and experiences to work in close association with Govt PG College Guna management to conduct the site studies, field trials and equipment.

Mr. Geetesh Goyal (EA-9428) - Lead Energy Auditor (BEE certified)

Mr. Chandra Kumar Mangal - Senior Electrical Engineer

Mansi Energy Solutions has adopted following approach & methodology for the successful completion of the Energy Audit Study.

Sl. No.	Approach & Methodology	Details
1	Opening Meeting	Interaction with Govt PG College Guna management from various departments.
2	Walk Through Audit	To get familiar with plant operation and prepare action plan for the site study and field trials.
3	On-site Observations, Measurements & Field Trials	Conducting on-site Observations, Measurements & Field Trials
4	Concluding Meeting	Presentation on findings of the study with personnel involved in the study
5	Report Preparation	site observation & field trials and recommendation on energy saving with cost benefit analysis in presentable format.
6	Report Submission	Submission of the Energy Audit Report to the Management.

The Team has worked in close association with Govt college Kumbhraj management during the site study. Following instruments are used by Energy Audit Team during the site study and field trials at plant.

Table 01: List of Energy Audit Instruments

Sl. No.	Name of Instrument	Details
1	3Φ Power Quality Analyzer	For Measurement of Voltage, Ampere, Power, Power Factor and Power Quality for Electrical Panels
2	Digital Lux Meters	For measurement of lighting intensity level installed at plant as well as for street lighting.
3	Vane Type Anemometer	For measurement of air flow rate in Air Handling Units & 333s
4	Phychrometer	For measurement of Wet bulb temperature and humidity for air handling units and cooling towers.
5	Differential Pressure meter	For measurement of cooling water flow rate in the pipelines
6	Clamp-on Power Meter	For measurement of power consumption of electrical motors
7	Digital Thermometer	For the temperature measurement of cooling water, feed water, etc

An integrated approach was adopted to carry out Energy Audit. It helped us to identify major areas of Energy savings. Following are the major components of methodology adopted.

Historical/Base Data Collection:-
Complete data for the utility system viz. Single Line Diagram of complete Generation, Distribution and transmission network.
Complete data for water and Energy consumption in the Hospital
Detailed Discussion with College Personnel:-
Critical Loads
Peak Process hours and relative variations in loads in different sections.
Non-Liner loads and their load patterns
Major areas of Energy savings AC.Lights etc.
Duration & timing of data collection.

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Present problem areas with reference to energy costs

Actual Data Collection:-

Data logging was done for various vital equipment's for different durations.

Efforts were made to record the required parameters with their peak/minimum values or average value.

The system conditions/process conditions (power) were noted at the time of data collection.

Scrutiny & Analysis of the data received/collected:

The entire data collected was segregated in required pattern. The same was classified and analyzed to arrive on a useful conclusion.

CHAPTER-4 ELECTRICAL SYSTEM

The Client is getting Electric supply from MPEB by tariff category 2.1 category IVRS no N2419054591

Since College have to go take permanent connection based on load

Energy charges here is avg 8.4 Rs per unit and refer annexure

Avg. demand of college is 23 KVA but college have to pay for demand 37.2 KVA

College is eligible TWO part tariff i.e Demand based tariff .

Tariff: Tariff shall be as given in the following table: Sub category Energy Charge (paise/unit) Urban/ Rural areas Monthly Fixed Charge (Rs.) Urban areas Rural areas Sanctioned load based tariff (only for connected load up to 10 kW) 650 156 per kW 125 per kW Demand based tariff Mandatory for Connected load above 10 kW 650 275 per kW or 220 per kVA of billing demand 235 per kW or 188 per kVA of billing demand LV 2.2 Applicability: This tariff is applicable for light, fan and power to Railways (for purposes other than traction and supply to Railway Colonies/water supply), Shops/showrooms, Parlors, All Offices, Hospitals and medical care facilities including Primary Health Centers, clinics, nursing homes belonging to either Govt. or public or private organisations, public buildings, guest houses, Circuit Houses, Government Rest Houses,

Recommendation 1:-College Have to apply for two part tariff

Upon analyzing electricity bill we found Electric Board charge demand tariff as per fixed 90 % of connected load , but we found that college average demand goes in past months is 23 kVA

College keep on paying for 37.2 KVA amt. 9075 Rs per month

Actual demand up to 23 KVA which would be charged = 5612 Rs per month

Hence extra demand charges college have paid = 9075 – 5612 = 3463 Rs per month

Annual saving would be = 41556 Rs

Conclusion :-

Investment = nil

Saving in Rs = 41556

Payback = immediate

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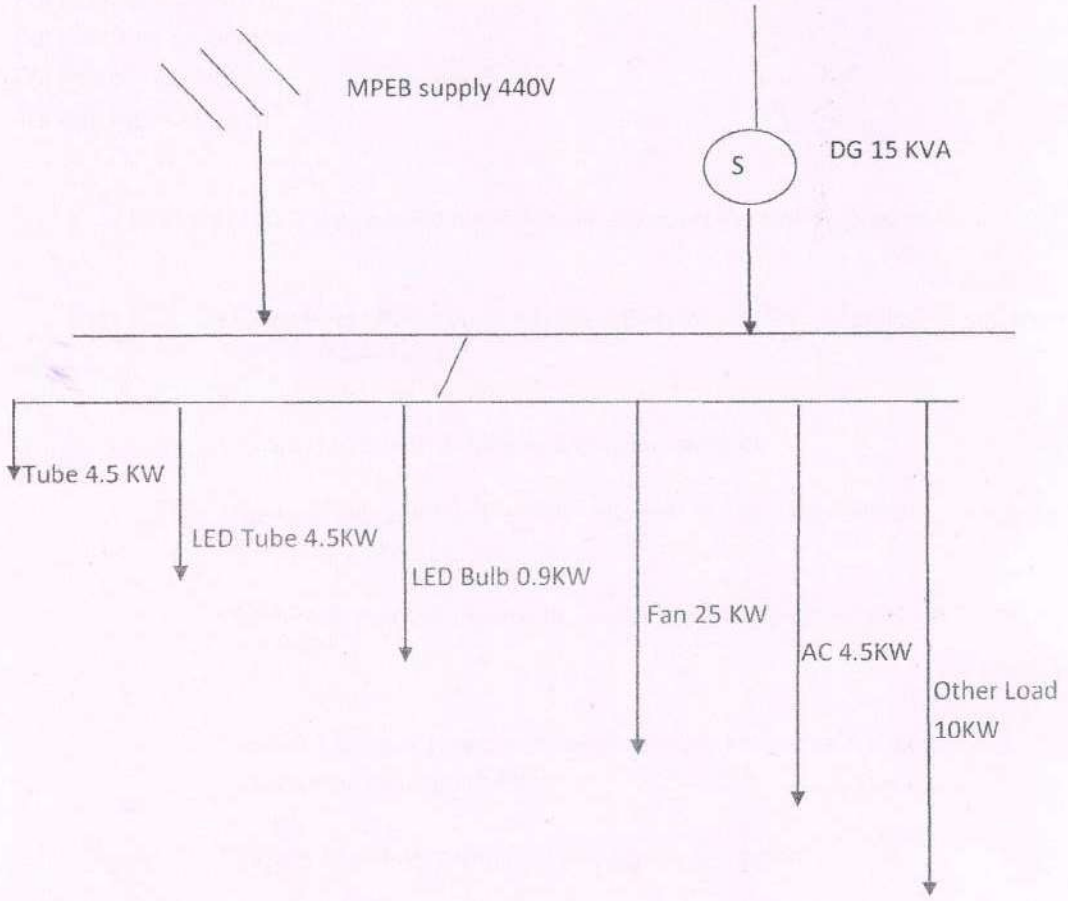

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ELECTRICAL SAFETY EARTHING

Cable size used in Premises are
For Point its 1.5 Sq mm
For Circuit its 2.5 Sq. mm
For Power 4 Sq MM
For Sub Main 6 Sq MM

Electrical Safety was carried out to specifically cover the following aspects.

- Review of Protection devices /System of the electrical installation including fuses,

  ELCB, MCB,MCCB, Master Electrical switch etc .

- Review the electrical safety aspects in the sub stations, electrical equipment, etc.

- Audit/review of compliance to statutory requirements as per the Electricity Act & the

  Indian Electricity Rules and relevant Indian standards & Codes of practice including IS 3043.

- Review of statutory electrical documents and records.

- Review of Personnel Protective Equipment.

- Review /Audit of protection schemes, protective devices and emergency push

  buttons of the installation.

- To Evaluate the earthing system (Installation and Maintenance) based on IS 3043 including, Availability, upkeep and testing of earth pits and to suggest recommendations.

- Review and audit of Electrical Preventive Maintenance (EPM).

- Audit of installed lighting wirings & switchgears.

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- Any other safety aspect as may be required after review.
- Physical inspection of the out let with reference to applicable Indian standards,

Indian Electricity Rules and other relevant codes of practice & identifying electrical hazards (shocks, fires, etc.).

- Review of adequacy of cables, motors, all equipment's, machines etc. based on actual load current measurements and cable current carrying capacities.
- Review of the Battery rooms as per IS: 12332.
- Review of the following test records, evaluating the test results and to suggest recommendations as per applicable standards.

1/. Transformer oil test.

2/.Insulatin Resistance Tests. 3/. Earth Resistance tests.

Recommendations:

1. Appropriate Danger board have to incorporate
2. All Cable and wire is old and in messed manner need immediate attention
3. Need to change immediate old wiring to avoid short circuit .
4. Earthing pit is not in proper manner , it should be in Pit Chamber form so that watering is to be done on proper manner
5. No earth Fault relay in system

Individual Earth Pit Resistance: Normally it is recommended to check the Earth pit resistance value in summer and winter seasons however healthiness of the exposed pits were checked randomly and values observed in the range of 2-3 Ohms.

All existing exposed earth pits should be maintained and re-constructed as per IS 3043 and it should be ensured that they are exposed, visible and easily accessible for inspection, testing, repair and maintenance.

1/. The details of earthing system were not displayed /available. It should be ensured that earthing layout drawing should be available in the premises.

2/. Periodic testing of earth pits were not carried out and not records maintained as per IE: rule of 61. As per the rule 61 of IE Rules earth pits of low and medium voltage installations should be tested for earth resistance at least once in two years and records be maintained. However, as a good industry practice, all the earth pits should be tested at least once in six months in dry period – pre-monsoon and post-monsoon.

Note: The Earthing system should be designed as per IS 3043 and following procedures be followed

- All metallic structure, pipe fittings and enclosures of electrical equipments should be connected to earth.
- For the equipment rated up to 230 V, 1-phase supply, the enclosure should be grounded at least one point.
- For the equipment rated above 400 V, 3-phase supply, the enclosure should be grounded at least at two separate

points.

- Two nos. earth pits should be provided for each of transformers/ DG sets -- one for neutral earthing and the other for the equipment earthing.
- All earthing pits except DG neutral and instrument / IT earthing should be connected through grid.

Sr. No.	Electrical Parameter	Observations	Remarks
1	Line Voltage-V	Minimum 229.30V and Maximum 238.2V observed	Voltage variation is within the prescribed limit of +/- 6% of 240V as per I.E Rules
2	Neutral Current-A	Less than 20A at full load.	Ok
3	Frequency-Hz	Minimum 49.69Hz and Maximum 50.22Hz observed	Frequency variation is within the prescribed limits of +/- 3% of 50Hz as per I.E Rules.
4	Harmonics	Maximum 2.5% Voltage THD & Maximum 4.3% CurrentTHD	Voltage & Current Harmonics are within limit

Neutral to Earth for Common Earth	Observed 0.9 V	Indicate Earthing is proper
Neutral to Phase Voltage VS Earth to Phase Voltage for Common Earth	Observed 218 V Vs 216 V	Indicate Earthing is proper
Resistivity of earthing for common Earth	Observed 1. Ohm	Indicate good earthing

CHAPTER-5 ROOF TOP SOLAR

At least 40 gigawatt was earmarked for rooftop solar by 2022 and 60 GW for utility-scale or ground-mounted projects as part of the nationwide revamped target for renewable energy installations in 2014.

Although utility-scale solar has seen tremendous progress with leading players lining up for projects, tariffs spiralling down and government agencies pushing mega projects, RTS has continued to remain neglected.

Data available on the website of the Union Ministry of New and Renewable Energy (MNRE) indicates that of the 40 GW of installed solar capacity, only 6,111 MW (15 per cent of the target) was RTS, as of November 2021.

During 2020-21, RTS accounted for 1.9 GW, compared to 3.5 GW utility-scale solar.

Net metering regulations are one of the major obstacles facing the sector. Net metering allows surplus power produced by RTS systems to be fed back into the grid.

Discoms compensate consumers for this surplus power they provide against their electricity bills.

The Union power ministry earlier mandated net metering for loads up to 10 kW and gross metering for loads greater than 10 kW in its first draft of the Electricity Rights of Consumers Rules, 2020.

5.01 SCOPE OF SOLAR ROOF TOP NET METER

It have good potential to have Roof top Solar with net metering.

By having this system college would be generate own Energy sufficient for self lighting and Fan consumption

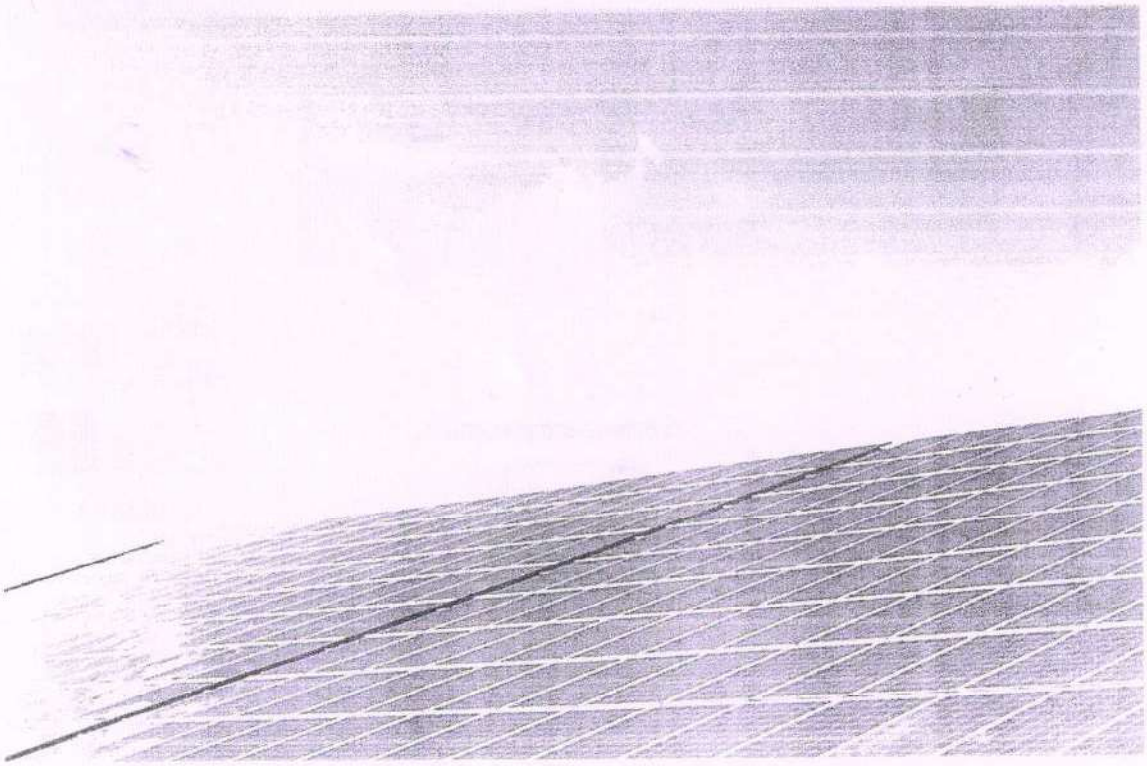
Generally MPEB allow 80 % of solar panel capacity of demand load

Here college is going to have 12KW load so we recommend to install 10KVA Solar panel with net metering

In net metering policy Discom allow you to generate Energy total energy generated by Solar

panel balanced by Unit purchased by Grid and adjust unit, MPEB charged only excess unit that college used in that month

If Solar panel generate extra unit that inhouse consumed , MPEB give credit in month March for whole year which they purchased @ rate of 1.85 Rs/unit (tentative figure) on rate fix at the time of agreement .



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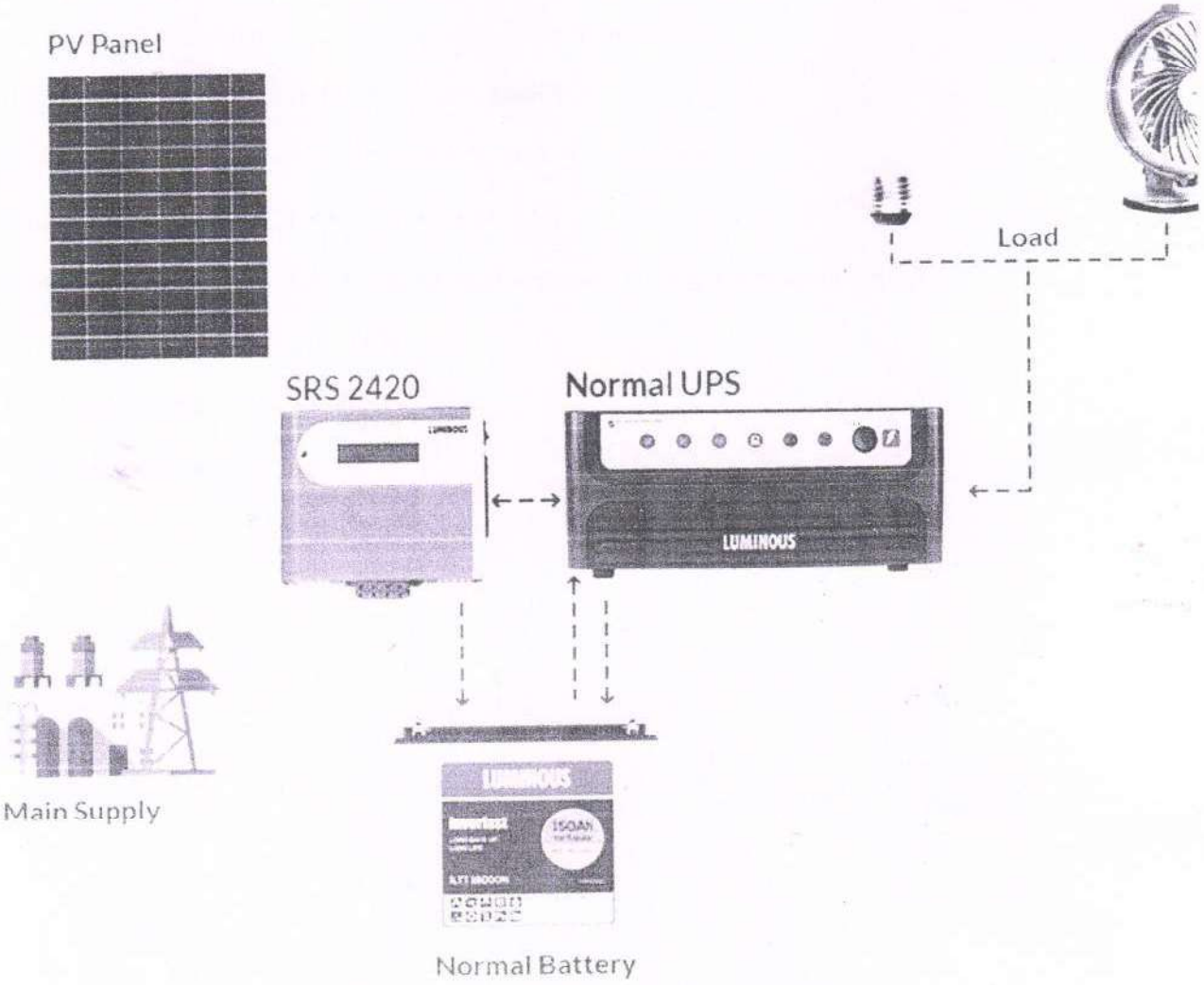


Recommendation 2:-

College have to go for roof top solar 40 KW

College connected load is 41.3 KW and Bill Demand is 37.2 KW

College average load is 23 KW

Average unit generation by 40 kW solar plant = 4000 unit per month for 8 month

And 2000 unit per day for 2 month

Average unit consumption 4488 per month

Hence annual unit needed inhouse = 53860

Unit generated by solar plant average annually = 44000

Hence college have to only for 488 Unit annually

Expected Total Power cost saving @8.2 Rs/KW = 360800 Rs

Cost roof top 40 kw with net meeting = 20 lakh

Conclusion :- College have to go for roof top solar with net metering 40 kw

Expected investment = 20 Lakh

Expected Saving = 360800 RS

Payback = 66 Month

College have 2000 Lit one tank and 1000 lit 2 nos. tank, hence total 4000 Lit Capacity

Water is lift by 1Hp motor which take 15 min to lift water but there is no macanism to check that water will not flow out hence there is always water if overflowed then operator switched off

Recommendation 3:- College have to install Water alarming system in last water tank to save over flow water.

College do not have plan to put alarming system when tank get full ,

Consider 600 LPM flow rate of water spread 600 Lit. in one minute delay.

Water lifting capacity of pump is 4000 Lit/15 min = 266 lit/min

Operator take 5 to 10 min to stop motor after filling Tank

Hence water flow out in quantity is 1800 Lit

Cost of power lost = 1 Hp =0.75 KWH =0.0125 KW Min

For 10 min power lost = 0.0125*10 = 0.125 KWH

Hence Monthly power lost = 45 KWH

Annually = 45 KWH

Cost of power saving @ 8.2 Rs/KWH = 370 Rs

Investment = 300 Rs

Conclusion :-

Investment = 300 Rs

Saving = 370 RS

Payback =12

Refrigeration deals with the transfer of heat from a low temperature level at the heat source to a high temperature level at the heat sink by using a low boiling refrigerant.

Co. install various AC 1.5 ton and 2 ton for comfort in office. Install A.C are 2 star rating which consume more power for same cooling than 5 Star rating & Inverter A.C

The latest and the most efficient technology that is available in market today is the Inverter Technology for air conditioners. Inverter technology is designed in such a way that it can save 30-50% of electricity (units consumed) over a regular air conditioner

	0.75 ton	1 ton	1.5 ton	2 ton
3 Star Non Inverter	627	828	1235	1548
5 Star Non Inverter	576	760	1130	1412
3 Star Inverter	550	726	1077	1344
4 Star Inverter	499	658	972	1208
5 Star Inverter	421	557	815	1005

Recommendation 3 : College have to use 5 Star rated Inverter AC instead Traditional AC (3 nos.)

College is using traditional AC , we recommended to use 5 Star Inverter AC

Traditional AC COP = 2.4

EER =8.3

KW/TON = 1.432

Capacity of A.C = 1.5 Ton

Proposed Inverter 5 Star AC has

EER = 14

COP =3.8

KW/Ton = 0.82

Hence net saving in power for 1,5 ton AC equal

= (1.432 -0.82)*1.5 = 0.92 kW

For 8 Hr office run power saving would be for 3 AC

= 8*0.92*3 = 22.08 kW

Annual Power saving = 22.08 *240 day = 5292 kW

Conclusion:-

Expected Annual power saving for 3AC = 5292 kW

Expected Value of Power saving @ 8.4 Rs/kW = 44452.8 Rs

Investment on new 3 AC @ 50000 Rs /unit = 150000 Rs

Payback = 40 Month

CHAPTER-7 LIGHTING SYSTEM

Introduction Lighting is provided in industries, commercial buildings, indoor and outdoor for providing comfortable working environment. The primary objective is to provide the required lighting effect for the lowest installed load i.e highest lighting at lowest power consumption.

Purpose of the Performance Test Most interior lighting requirements are for meeting average illuminance on a horizontal plane, either throughout the interior, or in specific areas within the interior combined with general lighting of lower value. The purpose of performance test is to calculate the installed efficacy in terms of lux/watt/m² (existing or design) for general lighting installation. The calculated value can be compared with the norms for specific types of interior installations for assessing improvement options. The installed load efficacy of an existing (or design) lighting installation can be assessed by carrying out a survey as indicated in the following pages.

Performance Terms and Definitions Lumen is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen.

Light sources are labeled with an output rating in lumens. Lux is the metric unit of measure for illuminance of a surface.

One lux is equal to one lumen per square meter. Circuit Watts is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

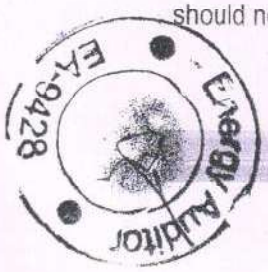
Installed Load Efficacy is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m²)

Lamp Circuit Efficacy is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear.

Unit: lumens per circuit watt (lm/W) Installed Power Density. The installed power density per 100 lux is the power needed per square metre of floor area to achieve 100 lux of average maintained illuminance on a horizon .

Lighting is a major energy consumer in commercial buildings. Heat generated from electrical lighting also contributes significantly to the energy needed for cooling of buildings. ECBC prescribes the amount of power for lighting, specifies types of lighting controls, and defines situations where daylighting must be used

Lighting is a very significant aspect from utility as well as from aesthetic point of view for any project whether industrial or commercial buildings. The efficiency, comfort factors and the quality of lighting should not be compromised at any cost.

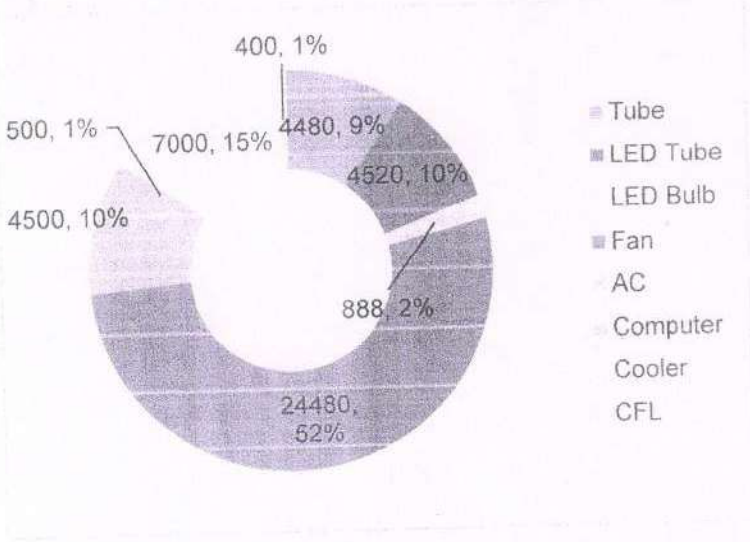


An efficient lighting system is one, which provides illumination of sufficient quantity and quality for the task being performed at the lowest cost. This depends upon the elements constituting the lighting system i.e. lamps, ballasts, fixtures – lamp holders, starters. From economic point of view our focus should be at lamp life and its performance.

Govt college Kumbhraj is going to install various lighting fixtures in their premises. They are using mostly LED 18 W , LED 20 W and in street light 60 W for lighting, street lighting & other applications.

LIGHTING MEASUREMENT IN EACH CLASS ROOM IS ANNEXURE

Type of Light	Tube	LED Tube	LED Bulb	Fan	AC	Computer	Cooler	CFL
Total Wattage	4480	4520	888	24480	4500	500	7000	400
No. of Light	112	226	74	306	3	5	14	20



1 Principal Room

Fan 2 Nos. Led tube 6 nos ,Fridge 1 Computer -1 , Printer-1

Prone for Good Sunlight , no need to run tube in day time

Measured Lux = 160

2 Account Section

Tube -5

LED Tube -2

Fan-3

Cooler-1

Computer-1

Printer -1

Measured Lux = 157

2 Corridor Account Section

Tube -0

LED Tube -4

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 220

Prone for Good Sunlight , no need to run tube in day time

Measured Lux = 330

Conclusion : Good Day Light

3 Corridor Account Sec.

Tube -0

LED Tube -4

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 220

Conclusion : Good Day Light

4 Lab Physics G.F-1

Tube -1

LED Tube -3

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 138

5 Lab Physics G.F-2

Tube -1

LED Tube -3

Fan-4

Cooler-0

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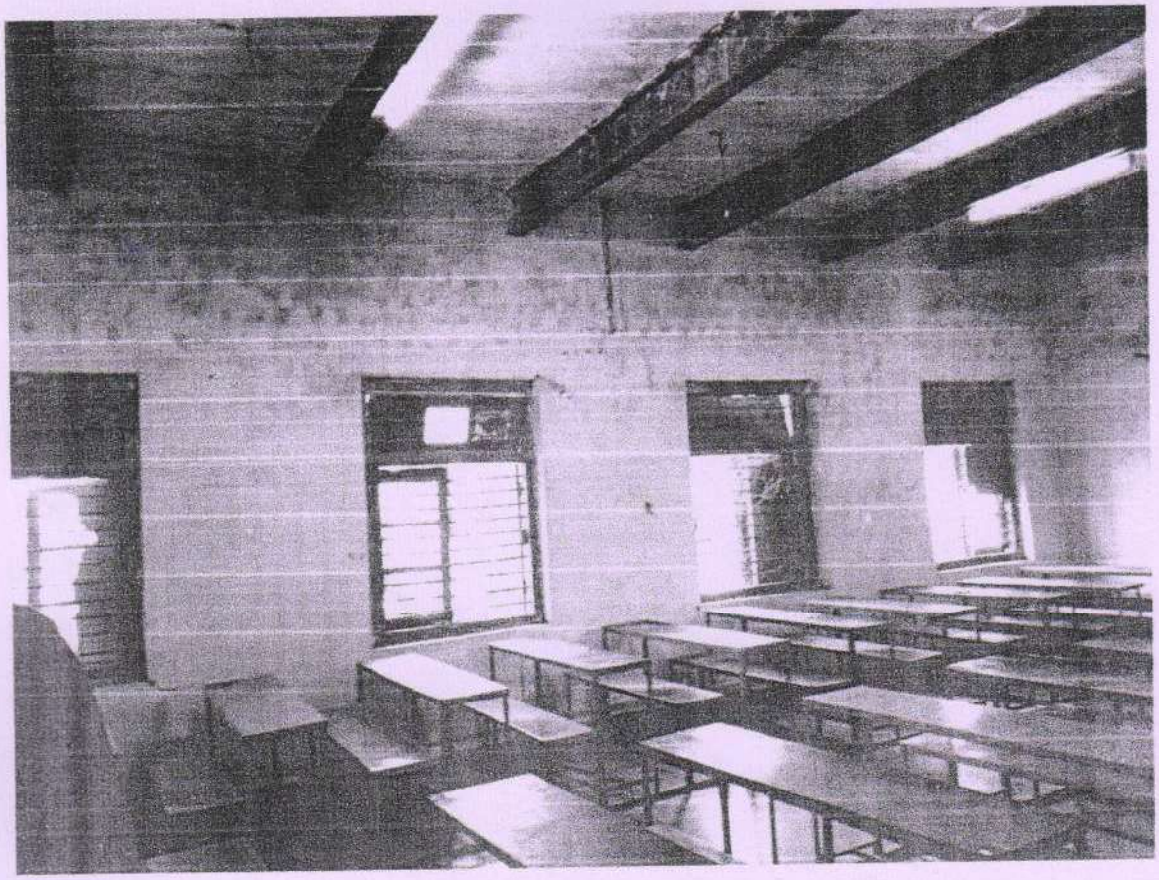
Computer-0

Printer -0

Measured Lux = 139



6 Lab Physics G.F-3

Tube -1

LED Tube -3

Fan-4

Cooler-0

Computer-0

Printer -0

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Measured Lux = 140

7 Seminar Hall old

Tube -5

LED Tube -0

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

Good Day Light

8 HOD Room

Tube -5

LED Tube -0

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 140

9 Registrar Office

Tube -2

LED Tube -0

Fan-1

Cooler-0

Computer-0

Printer -0 .

Measured Lux = 140

11 Fee Collection Room

Tube -2

LED Tube -0

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 165

12 Corridor

Tube -0

LED Tube -4

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 181

Conclusion : - Good Day Light

13 Hall G.F

Tube -0

LED Tube -8

Fan-7

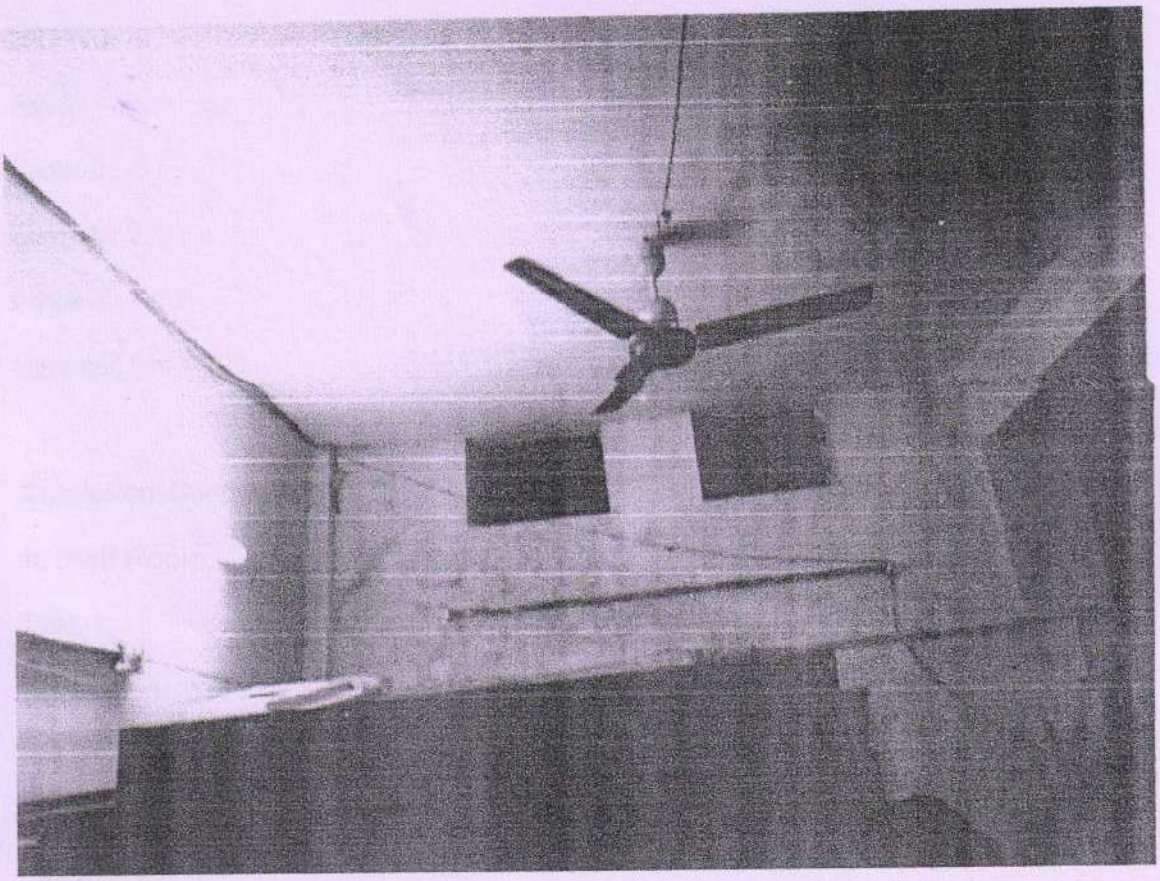
Cooler-0

Computer-0

Printer -0

Measured Lux = 210

Conclusion : - Good Day Light



14 Political Science Dept.

Tube -2

LED Tube -1

Fan-2

Cooler-0

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Computer-0

Printer -0

Measured Lux = 175

Conclusion: Good day Light

15 Notice BOARD

Tube -4

LED Tube -0

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 220

Conclusion: Good day Light

16 Staff Room

Tube -1

LED Tube -4

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 150

Conclusion: Good day Light

17 Hindi Dept.

Tube -1

LED Tube -2

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux =140

Conclusion: Good day Light

18 Class Room-1

Tube -2

LED Tube -2

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 136

Conclusion: Good day Light

19 Class Room-2

Tube -2

LED Tube -2

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 140

Conclusion: Good day Light

20 Class Room-3

Tube -2

LED Tube -2

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 144

Conclusion: Good day Light

21 GCR

Tube -1

LED Tube -42

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 267

Conclusion: Good day Light

22 Computer Room

Tube -1

LED Tube -2

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 215

23 Corridor outside Computer room

Tube -0

LED Tube -3

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 210

Conclusion: Good day Light

24 Control Room

Tube -0

LED Tube -6

Fan-06

Cooler-0

Computer-0

Printer -0

Measured Lux = 150

25 Control Room2

Tube -0

LED Tube -4

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 220

26 English Dept

Tube -0

LED Tube -6

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 170

27 Seminar Hall New

Tube -6

LED Tube -4

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 175

28 Corridor opposite Seminar Hall

Tube -1

LED Tube -0

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 170

29

Tube -3

LED Tube -0

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 202

Conclusion :- Good Sunlight

30 Lecture-2

Tube -0

LED Tube -4

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

Conclusion :- Good Sunlight

31 Detailed Chemistry lab

Tube -1

LED Tube -1

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 160

32 Main Lab

Tube -0

LED Tube -2

Fan-1

Cooler-0

Computer-2

Printer -0

Measured Lux = 160

33

Tube -0

LED Tube -2

Fan-1

Cooler-0

Computer-2

Printer -0

Measured Lux = 161

34 Outskirt BSc. Lab

Tube -2

LED Tube -1

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

Conclusion: Good day Light

35 Botany Lab

Tube -0

LED Tube -2

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 171

36 Botany Department

Tube -2

LED Tube -4

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 165

37 Botany Lab 2

Tube -0

LED Tube -2

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

38 Botany Department

Tube -1

LED Tube -2

Fan-5

Cooler-0

Computer-0

Printer -0

Measured Lux = 181

39 Bsc Botany

Tube -3

LED Tube -3

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 178

40 Class Room -7

Tube -1

LED Tube -1

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 185

Good Day light

41 Class Room-8

Tube -1

LED Tube -1

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 190

Conclusion: Good day Light

42 Commerce Dept.

Tube -1

LED Tube -1

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

43 Computer Room

Tube -0

LED Tube -1

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 150

44 Class room-9

Tube -1

LED Tube -1

Fan-0

Cooler-0

Computer-0

Printer -0

Measured Lux = 160

Good Day light

45 Class room-10

Tube -0

LED Tube -2

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 160

Good Day light

46 Computer Room

Tube -0

LED Tube -42

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

47 Library

Tube -0

LED Tube -8

Fan-1

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

48 Outside Room-32,31

Tube -0

LED Tube -0

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

Good Day light

49 Room-34

Tube -0

LED Tube -9

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 180

Good Day light

50 Room-35

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

51 Room-36

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

52 Room-37

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

53 Room-38

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

54 Room-39

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

55 Room-40

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

56 Room-41

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

57 Room-42

Tube -0

LED Tube -6

Fan-9

Cooler-0

Computer-0

Printer -0

Measured Lux = 182

Good Day light

58 Law Corroiordor

Tube -0

LED Tube -0

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 185

59 Library

Tube -1

LED Tube -1

Fan-5

Cooler-0

Computer-0

Printer -0

Measured Lux = 170

Good Day light

60 LLB room-1

Tube -3

LED Tube -2

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 162

Good Day light

61 LLB room-2

Tube -3

LED Tube -2

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 162

Good Day light

62 LLB room-3

Tube -3

LED Tube -2

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 156

Good Day light

63 LLB Staff room

Tube -2

LED Tube -0

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 153

Good Day light

64 Corriordor LLB room

Tube -3

LED Tube -0

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 158

Good Day light

65 Court Room

Tube -0

LED Tube -5

Fan-10

Cooler-0

Computer-1

Printer -0

Measured Lux = 167

Good Day light

66 Principal LLB

Tube -1

LED Tube -1

Fan-0

Cooler-0

Computer-1

Printer -0

Measured Lux = 158

Good Day light

67 1st Floor

Tube -6

LED Tube -2

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 168

Good Day light

68 Zology Department

Tube -2

LED Tube -1

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 165

Good Day light

69 Maths Separtment

Tube -1

LED Tube -0

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 162

Good Day light

70 Class Room-17

Tube -4

LED Tube -0

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 166

Good Day light

71 Class Room-18

Tube -4

LED Tube -0

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 166

Good Day light

72 Class Room-19

Tube -4

LED Tube -0

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 166

Good Day light

73 Class Room-20

Tube -4

LED Tube -0

Fan-4

Cooler-0

Computer-0

Printer -0

Measured Lux = 166

Good Day light

74 Zoology Lab

Tube -4

LED Tube -1

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 148

Good Day light

75 Bio Technology Department

Tube -2

LED Tube -1

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 160

Good Day light

76 BSc. Department

Tube -0

LED Tube -6

Fan-6

Cooler-0

Computer-0

Printer -0

Measured Lux = 16 2

Good Day light

77 Room-28

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 161

Good Day light

78 Room-29

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 161

Good Day light

79 Msc office

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 162

80 Room-1

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 147

Good Day light

81 Room-2

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 156

Good Day light

82 Room-3

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 149

Good Day light

83 Room-4

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 151

Good Day light

84 Room-5

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 149

Good Day light

85 Room-6

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 141

Good Day light

86 Room-11A

Tube -0

LED Tube -3

Fan-3

Cooler-0

Computer-0

Printer -0

Measured Lux = 144

Good Day light

87 Economics Dept

Tube -1

LED Tube -2

Fan-2

Cooler-0

Computer-0

Printer -0

Measured Lux = 147

Good Day light

Recommendation 5 :-

Use PIR Sensor(87 Nos) rated load 500 W to turn auto on off in occupancy to save lighting and fan load

To deal with light and Fan in absent of human auto on off , there is one incredible solution PIR sensor

Which auto off if there is on one and auto on if find occupancy.

New type sensor have ability to handle 500 W load .

Generally, if class room empty or partial occupied it works able to save 20 % of Light and Fan Load

At present Single Phase lighting load is 46.78 KW

Suppose 50 % load is in operation at a time

Hence running load is 23.4 KW

We get 20 % Energy efficiency by having PIR sensor

Hence we get 4.67 KW power saving every day

For 300 days and 10 hr power saving would be 14010 KWH

Conclusion:

Power saving would be 14010 KWH&Value of Power saving @ 8.4 Rs/KWH = 117684 RS

PIR sensor cost(87 No.) 1850/unit = 160950 RS

Payback = 17 Month

Recommendation 6 :- College have to install 50W 5 Star Fan instead tradition fan (150 Nos.)

Presently college have planning to install tradition 306 nos. fan

Half of fan run occasionally

We recommended college have to plan to go for 50 W 5 Star rated Fan instead

Present Fan Load = 10.5 KW for 150 Fan

Expected saving on each fan = 20 W

Anticipation Half of Fan run for 200 Days for 10 Hr.

Hence saving would be on 150 Fan = 6000 KWH

College have to sell old fan in exchange of purchase of new fan

Addition expense on each fan = 750 Rs

Conclusion :- Additional Investment on 150 Fan =112500 Rs

Saving on 150 fan = 6000 KWH

Saving in term of RS = 50400 Rs

Payback = 27 Month

Recommendation 7 :-

Use Retrofit Energy Efficient LED Tube light (LT8-16W) in place of existing fluorescent tube (36/40 watts) with Electronics Ballast Lights in Hospital area (112 Nos.).

Installing Energy efficient LED Tube lights In existing fixtures, will reduce the power consumption to the tune of 45% and give an operating life of 50000 Hrs (i.e.11 years of life as per present operating 12hrs/day).

Savings By Use Retrofit Energy Efficient LED Lights (LT8-16W) in place of existing fluorescent tube (36/40 watts) with Electronic Ballast lights.

Refer following table for benefits with LT8-18W:

Sr. No	Particulars	Units	Installed Fixtures	Suggested Fixtures	Benefits
1	Fixtures Details		Std FTLs-36 W	LED 16W	
2	Power Consumption	Watts	51	18	35
3	Min Power Factor		0.5 to 0.7	0.95	0.45
4	Working Life	Hours	8000	50000	42000
5	Harmonics Level	%	30	10	20
6	Cost of Single Fixture	Rs.	50	2400	Nil
8	Cost of Ballast	Rs.	100	0	0
9	Average Efficacy	Lm/watts	60	100	40
10	Total light output	Lumens	2200	1600	-600

11	Color Rendering Index	%	80	80	0

Total FTL 36 w lighting fixtures in the total Plant = 112Nos

Annual Energy savings = 18 W x 10 hrs days *330* 112 no.s/1000

= KWH per annum

Value of Energy Savings = 6653kWh * Rs.8.4/-
Rs. 55885 per annum

Apart from savings in above - mentioned categories, it also saves lamp replacement cost due to delayed replacements of the LED based system whose estimated life is about 50000 burning hours. Burning hours are only 8000 hrs for the existing FTL with EB based system.

Particulars	Present FTL-36W (with EB)	Proposed Energy Efficient LED
Life Burning hrs.	8000	50000
Actual Operating Hrs.	4380	4380
Usage in years	1.82	11.4
Bulb & ballast cost	350	Nil
Replacement cost/Year (Rs.)	112	Nil

Total replacement cost savings for all fixtures/annum =112*112 = Rs. /-annum

Total Energy and Replacement cost savings = 12544 +62405

= Rs 74949 /-annum

Estimated Investment = 280 x 112nos.

= Rs. 31360 /-

Payback = 5 Months.

Recommendation- 8:- Install Energy Efficient LED light of 12W in place of CFL 20W plant various area.(20 nos.)

Company using CFL of 20W in various area in plant (detail annexure 8.1), we recommend to use LED of 12W in place 20 W CFL

Present Energy Consumption of Fixture = 20 W

Proposed Fixture of LED = 12 W

Energy saving per fixture = 8 W

Annual Energy savings = 8 W x 12 hrs days *330* 20 nos./1000

= 634 KWH per annum

Value of Energy Savings = 634 kWh * Rs.8.4/-
Rs. 5325.6 per annum

Estimated Investment per Fixture = 180 Rs
For 20 Nos. investment = 3600 Rs

Conclusion :-
Power saving annually = 634 KWh
Value of Power saving = 5326 Rs
Estimated investment = 3600 Rs
Payback = 8 Month

GREEN BUILDING AUDIT

A building which can function using an optimum amount of energy, consume less water, conserve natural resources, generate less waste and create spaces for healthy and comfortable living, as compared to conventional buildings, is a green building.

Services are distributed over three different phases of construction. These are:

MEASURES TAKEN BEFORE CONSTRUCTION

- Site selection
- Soil and landscape conservation
- Health and well being
- Conservation and efficient utilization of energy and resources
- Waste management.

MEASURES TAKEN DURING CONSTRUCTION

- Soil and landscape conservation
- Conservation and efficient utilization of energy and resources
- Waste management
- Health and well-being
- Green auditing is systematic assessment of day to day activity with reference to resource utilization and
- waste management. It will assist to find out the ecofriendly and non ecofriendly practices on the
- campus.
- The main objective of green audit varies with the operational activities of the organization. In case of higher educational institutes like universities; green audit is an internal requirement.
- It is a path for management of environment to make the alterations in ongoing practices. It also promotes a good
- environmental management system and raises the awareness about the environmental conservation and its long term benefits.

OBJECTIVE

Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can

be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus.

- other high reflective materials). Reflective materials / surfaces shall have a minimum SRI value of 78.
- Shall use eco-friendly landscaping practices, by using 'Organic Fertilizers'

To use water efficiently plumbing fixture whose flow rates shall be less than threshold value

Fixture type	Maximum flow rate	Duration	Estimate per person use
Water closet	6 LPF	1 flush	1 for male , 3 for Female
Faucets	8 LPM	0.25 Min	4
Urinals	4 LPF	1 Flush	2 for male

The areas of eco/environmental/green auditing to be followed/practiced by participating institutions:

i. Waste Minimization and Recycling
ii. Greening
iii. Energy Conservation
iv. Water Conservation
v. Clean Air
vi. Animal Welfare
vii. Environmental Legislative
viii. General Practices

What is the total permanent population of the Institute?

Particular	Quantity
Students	**17000**
Teaching Staff	**60**
Visitor/year	**1000**
Working days	**300**

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WHICH OF THE FOLLOWING ARE AVAILABLE IN YOUR INSTITUTE?

1 Garden area	Available
2 Play Ground	Available
3 Kitchen	Not available
4.Toilets	Available
5.Garbage & Waste Stored Yard	Available
6.Laboratory	Available
7.Canteen	Available
8.Hostel	Available (But Student not stayed)

WHICH OF THE FOLLOWING ARE FOUND NEAR YOUR INSTITUTE?

Municipal dump yard	Not Available
Public Conveince	Not Available
Sewer line	Not in Vicinity
Stagnant water	Not occur
Open Drainage	No , all covered
Bus ,Railway station	Within 5 KM
Market , Public hall	Not in Vicinity

WASTE MANAGEMENT AND ECO POINTS

Do your institute generate any waste , if so what they are	Yes	Solid Waste, Canteen Waste, Horticulture waste
What is Approx Amt .	Waste Generate per day	Biodegradable – 10 kg Non Bio degradable – 5 Kg Other 1 kg
How Waste managed by Institute	1. Composting 2. Recycling 3. Reusing	1 Composting Biodegradable waste convert into manure useful in nursery 2 Printing is done on both side so, paper waste save

Energy Auditor

		in this manner 3 Vermicomposting is initiate by institution for organic compost 4. non biodegradable waste is transferred to municipal vehicle
Do you Recycled paper in you institute	No	
How would you spread message to community for waste management		By raise interaction among teachers and students
Can you achieve zero garbage in your institute		Not Yet achieved
Is any resolution passed in institute to avoid pollution	Yes	Last day of moth consider no vehicle day , every one supposed to come institute by vehicle not run by petrol, diesel, CNG

GREENING THE CAMPUS

Is there a garden in campus	Yes	About 4000 Sq feet
Do student spent time in garden	Yes	2-4 Hr in a day
Is any other activity run in garden	Yes	Student use to play there
No. of staff for garden		2 gardener are there
Is Plant waste compost program are there	Yes	Plant waste compost system are there where organic manure prepare which use in nursery

WATER AND SEWAGES MANAGEMENT

Water used area		Toilets Drinking Water Gardening Mopping and Washing
No of tap for drinking water		20

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Is Ro water using for drinking purpose		No
No of Toilets	12 Urinal 4 Commode	Ladies and Gents
Is Flushing system is automatic	No	Need to do automatic flush system
What is the water source for drinking washing , gardening	Tube well pump	Water over flowed then switched off pump

ENERGY MANAGEMENT

Types of energy use	2 types	Electricity from MPEB By DG set in absence of power
Area of Uses of energy		Electricity in Class room Administration block Principal chamber , LAB Etc
Is Kerosin of LPG used in any area		No use , not in Canteen too
How much percentage Energy saving LED used		60% use of LED Planning to replace rest soon
Any other Energy saving equipment	No	AC's are 2 and 3 star Fan also not star lable
Has roof top Solar plant installed here		Not yet , but in planning

GREEN SHAD

Is Pathway is shaded by green tree		No
Is parking is done in green shad		No , but small tin shad is there

Area with Improvements

- Metering and analysis of Energy Consumption at different uses should be done.
- Water Meter should be installed at different sources & uses and maintain the inventory of water resource.
- Regular Internal inspection system should be developed extensively for various equipment available in campus.
- Domestic Waste Management plan should be prepared for the campus.
- Environmental drills for response against spillage and leakage of chemicals in the campus
- Plastic usage should be reduced in university campus.
- The monthly inventory of e-waste and hazardous is required to be maintained in formats on regular basis.
- Fire Safety System should be strengthened.
- Storage of chemicals like; paints, gums resins, oils, lubricants, acids etc. in designated place and safety/warning signs should be displayed.
- Water Quality Monitoring Frequency should be increased.
- Auto switch off system should be installed at street light.
- Shaded Pathway should be planned
- Energy saving Fan, AC, LED should be planned
- Automation in flushing should be done
- Automation in Water lifting should be done
- Auto switch off system should be installed at street light.
- Rain water system should be installed
- Water softener should be incorporated
- Paint roof top with heat retarding paint

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Recommendation 9 : Go For Rain water harvesting pipe to recharge Tube well Hole.

This process get ampule amount of water as roof is 4000 Sq ft on library in area

This water is very useful to recharge bore , tube well can useful in summer month from March to June

Expected existing tube well give water for 8 month and for 4 month college have to depend on Private vendor

Present water holding capacity of college is 2000lit *1 +1000*2

= 4000 Lit

Private Vendor Tank capacity = 5000 lit

Hence 1.5 tanker needed to fill all water tank

Price would be = 800 Rs one tanker

Expected water consumed in 3 days

Hence water cost would be= 800*10*4 = 32000 Rs

Expected Investment on water harvesting = 2 lakh

Conclusion:-

Investment on relocating of pipe = 2 Lakh

Saving in water would be= 32000 Rs

Payback = 76 Month

Recommendation 10 :- College have to use water softening plant to save water and Tap

College have no planning to install Water softener for tap water , we know Tube well water is hard as it dig out from depth from earth , so its necessary to have water softener to make safe Tap and reduce leakages extra water use

Without softening Tap may disfunction with in year

Here in college 20 tap is in working ,

Cost of tap is approx. 800 Rs

Expected half of tap will disfunction over the year hence

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Replacement cost would be = 10*800

And Plumbing charge would be = 8000 Rs

Hence total Replacement cost is = 16000 Rs

Cost of water softener = 50 Thousand

Yearly maintenance = 5 Thousand

Conclusion :-

Investment = 55 Thousand

Saving = 24000 Rs

Payback = 28 Month

Recommendation 11 :Paint with heat retard paint on roof top to save room hot .

College have to Paint heat retard paint on roof top to save room get heated by sun.

College floor building roof direct contact of sun , if it repaint by heat retarding paint , temp. of room can be reduced by 4 Degree than atmosphere.

Above recommendation may reduce practice of turning fan on in partial heat days.

Building 70 fans of 80 W can be directly affected by this , fan running practice reduced by 10 %

Hence power saving for 8 hr. running practice is

=70*80*8*350*0.1

= 1568 KW

Value of power @ 8.4 Rs/kw = 1568*8.4=13172 Rs

Conclusion :-

Investment in paint 4000 Sq ft roof= 20000 RS

Saving = 13172 RS

Payback = 18 Month

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HEAT REFLECTIVE PAINT & HEAT INSULATION PAINT – COOL ROOF PAINT

It is a heat insulation paint and works as heat reducing paint which can be applied to all types of roof. The solar reflective coating property of It aims to achieve better heat reduction results. It is a thermal reflective paint & stops excessive solar heat to enter the roof.

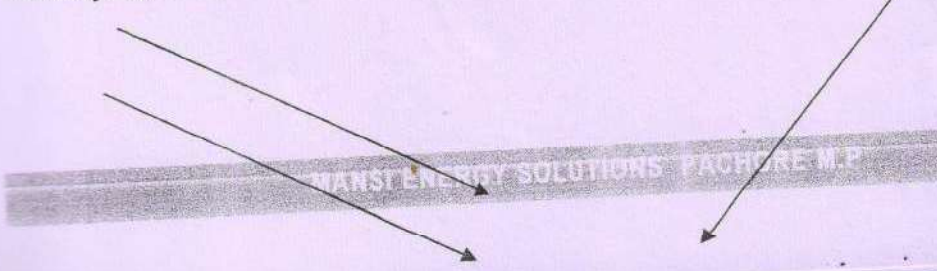
Indian Insulation and Engineering is a manufacturer and supplier of COOLROOF® coating which is used as a summer cool paint, thermal insulation paint, waterproof coatings all over India. We specialize in roof heat solutions. Roof temperature can be reduced up to 20°C with the application of CoolRoof® coating.

We are a proud member of the US Green Building Council (USGBC) which is committed to transforming the way Green Buildings are certified through third-party LEED verification system.

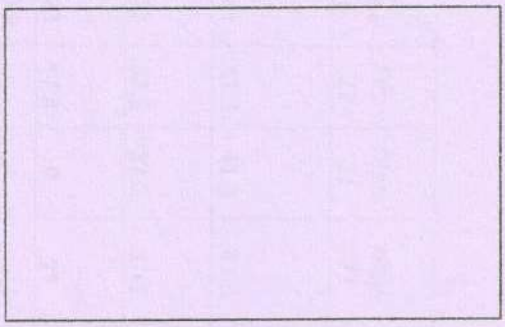
Indian Insulation and Engineering are Proprietors of Brand COOLROOF® Heat Reflective Paint and are committed to high-quality SRI Coating which is recommended by all types of Green Building rating systems as High SRI Roof Coatings.

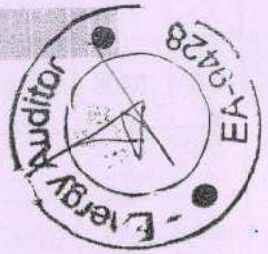
These solar reflective Coatings are approved SRI coatings tested as per LEEDS, ASTM standards.

This product is a high Albedo coating of High quality and Eco-Friendly in nature which helps to reduce roof heat flux.



Heat Reflective Paint **Reflected Sun Rays**





ANNEXURE -1

Govt PG College Guna

Electricity Bill Analysis Con. N2419054596

	Unit	Max.	Min.	Avg.	Feb-21	Mar-21	May-21	June-21	July 21	August 21	Oct 21	Nov-21	Dec-21	Apr-22	Jun-22	Jul-22	Aug-22	Dec-21	Apr-22	Jun-22	Jul-22	Aug-22
Contract Demand KW	HP	41	41	41	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41
Bill Demand	HP	37	37	37	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37
Maximum demand		37	0	23	17.4	0	21	12	17	21.68	20.36	22.16	27.72	27.72	36.68	34.08	27.96	27.72	27.72	36.68	34.08	27
Billed PF		0.99	0.80	0.97	0.97	0.98	0.95	0.96	0.8	0.98	0.99	0.99	0.99	0.98	0.97	0.97	0.98	0.99	0.98	0.97	0.97	0
Calculated PF		0.99	0.80	0.97	0.970	0.980	0.950	0.960	0.800	0.980	0.990	0.990	0.990	0.980	0.970	0.970	0.980	0.990	0.980	0.970	0.970	0
Total Unit Consumption	KWH	6907	2211	4488	3020.2	4733	5932	2211.2	2551.6	4416.8	3594.8	3775.2	4733	4733	5770.6	6907.2	5477.8	4733	4733	5770.6	6907.2	5
Demand	Rs.	9350	9075	9093	9075	9075	9075	9075	9075	9075	9075	9075	9075	9075	9075	9350	9075	9075	9075	9075	9350	9

charges																				
PF Rebate	Rs.	3625	0	2368	1575.00	2755.00	3279.00	3028.00	0.00	3253.00	2230.00	2389.00	1593.00	2755.00	3028.00	3625.00	3253.00	0.00	2755.00	3028.00	3625.00
PF Penalty	Rs.	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Charges	Rs.	44897	14151	28928	19692	30291	40694	14151	16330	27384	22303	23897	30291	30291	37508	44897	35606	30291	30291	37508	44897
Total Gross Bill	Rs.	61531	23259	36745	31338	37843	61531	23259	25405	24779	28944	30345	37843	36940	45001.72	51113.8	42043.66	37843	36940	45001.72	51113.8
Rate per unit	Rs./Kwh	11	5.6	8.4	10.38	8.00	10.37	10.52	9.96	5.61	8.05	8.04	8.00	7.80	7.80	7.40	7.68	8.00	7.80	7.80	7.40
Total Penlty		0	0	0	0	0	0	0	0	0	0	0	0	0				0	0		
% Penlty		0	0	0	0	0															

Thank you

Energy Auditor
EA-9428