Sarada Vilas Teachers College
K.M. Puram, Mysore-04

7.2.1 QLM DE

1. Energy Audit Report and BOLICS

Sustainability energy and environment

Report Of

SARADA VILAS TEACHERS COLLEGE

Month & Year – JULY 2024

Conducted By

RACHANA ENER CARE

Energy management Co

No555/I,13th cross,TK lay out ,Beside BSNL RTTC

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Principal
Sarada Vilas Teachers College,
K.M. Puram, Mysore-570 004

Title of project:

Green audit report
Sustainability energy and environment of
Sarada vilas teachers college-Mysore, Karnataka, India

Work order No:

P.O. NO. 156/2024-25 DATE 12-06-2024

Scope & Objective:

To conduct green auditing at the Sarada vilas teachers college, Mysuru based on the following activities; Water management, Water conservation, energy conservation, green cover, Pollution control & sustainable practices

Period of study:

June 2024 to July 2024

Report submitted on:

July 2024

Study Conducted By;

Rachana Ener Care

Contact person:

Sri. Anil kumar Nadiger

Director & Energy specialist

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Acknowledgement

We appreciate the initiation taken by Sarada vilas teachers college for taking interest to have energy environment & green audit. These will not only benefits institution, but society at large.

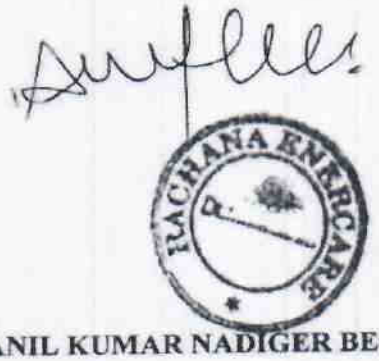
We are thankful for Sarada vilas for giving this opportunity to us. This is a great opportunity for us to serve in our passionate area of energy & environment.

We are thankful to all the staff of Sarada vilas teachers college who have supported us in data collections taking measurements during the course of audit

Sustainability in Energy & Environment is every one's need & its conservation is every one's responsibility. But practicing is a challenge. We are sure that Sarada vilas will go ahead in this regard.

Thanking you.....

For **RACHANA ENER CARE**



ANIL KUMAR NADIGER BE(E & E)M.I.E

(DIRECTOR & ENERGY SPECIALIST)

RACHANA ENERCARE

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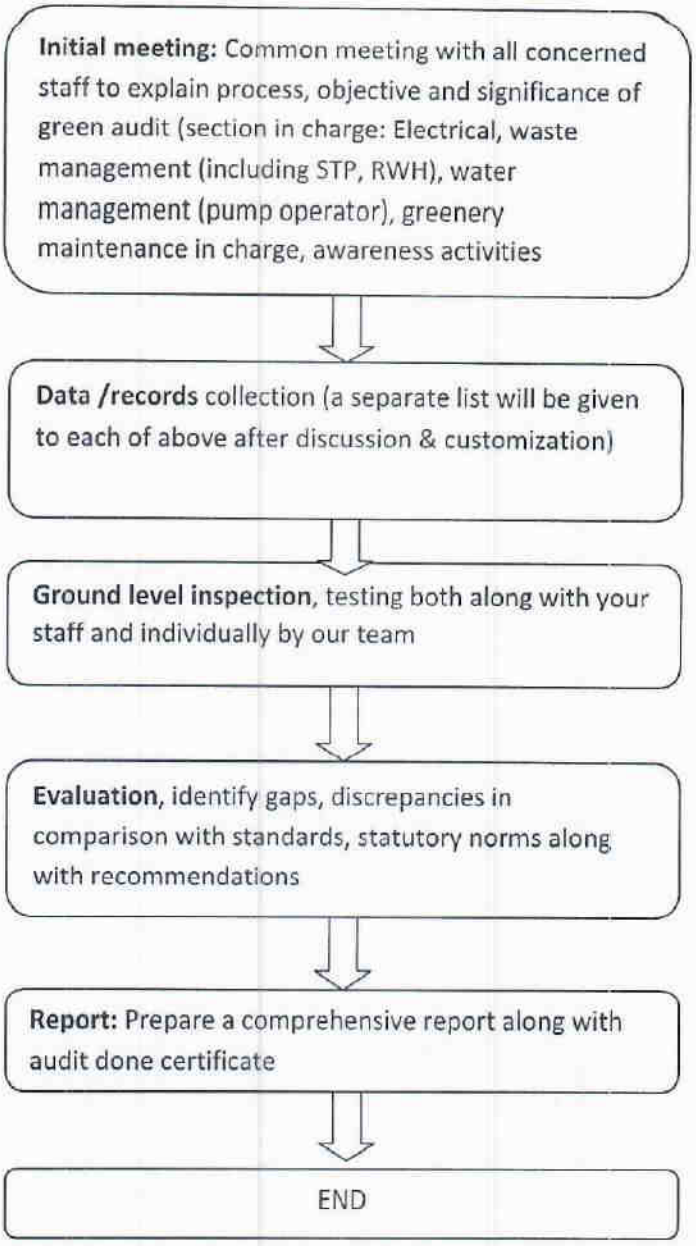
Green audit flow chart



Scope & Objective

Objective; the intention of the green audits is to upgrade the environmental condition inside and around the institution. It is performed by considering environmental parameters like water and wastewater accounting, energy conservation, waste management, air, noise monitoring, etc. for making the institution eco-friendlier.

The main objective of energy audit is to identify the end use of energy in the campus and identify Energy Conservation opportunities; and as a feasibility study leading to implementation of an energy management program

The scope covers the study of Electrical system comprising the energy sources, loading practices, power management. The study will cover an analysis of the demand side management, efficiency evaluation.

- Study present energy consumption scenario & analyse energy sources
- Record power, load ,voltage variation from grid
- Study major energy consuming loads
- Identify present energy conservation measures taken by institute
- Identify options to save energy & evaluate

Benefits of energy conservation

- Reduces dependency on fossil fuels
- Reduces global warming
- Reduces import cost
- Promotes economic growth
- Harmonises with sustainable goals

India has set a target to reduce the carbon intensity of the nation's economy by less than 45% by the end of the decade, achieve 50 percent cumulative electric power installed by 2030 from renewable, and achieve net-zero carbon emissions by 2070.

INTRODUCTION OF ORGANISATIONS

This study has been done to promote best practices in sustainability and set role model for others. Hence this effort is made with interest and involvement of Sharada vilas teachers college, Rachana Ener Care and NIE CREST. Brief introduction of three organisations is given below.

About Rachana Ener Care

Rachana Ener care headed by Mr.Anil kumar Nadiger, is team of experience and qualified engineers, BEE certified energy manager and auditors. Its team members have under gone many trainings and certification programs. Such as ECBC, ASHRAE standards, Green buildings ,etc conducted by NPC- National Productivity Council, KREDL – Karnataka Renewable Energy development ltd, ISHRAE – Indian Society for Heating Refrigeration & Air conditioning engineers, SEEM – Society for energy engineers & managers, etc It has conducted many audits to reputed clients like South Western Railways, Karnataka Urban water supply & drainage board, Central work shop, Police training centre, Teresian college, NIE, Institution of engineers India & many more. They also conduct training & workshops.

We are backed by consultancy support of NIE CREST, headed by sri Sham sunder for green technologies such as bio gas, composters, rain water harvesting, sustainable energy etc.

ABOUT NIE CREST

NIE-Centre for Renewable Energy and Sustainable Technologies (NIE-CREST) is a renowned Green technology promoting centre at the premises of The National Institute of Engineering (NIE), Mysore. The centre promotes eco- friendly energy systems, Renewable energy and sustainable technologies. The Centre itself has successfully implemented numerous projects on eco friendly and - renewable energy systems and sustainable technologies at International & National Level. NIE -CREST provides technology for, Design & Implementation of Renewable Energy Systems, Design & project execution of Solar, Biomass & Other RE Devices, Design & Implementation of Sustainable Technologies, Design & implementation of Technologies for Green Building, Design and implementation Of Rainwater Harvesting Systems and many more.

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Ref no: RECM/EA/ 3913/1

Date 23-07-2024

ENERGY, ENVIRONMENT & GREEN AUDIT CERTIFICATE

This is to certify that, All India Institute of Speech and Hearing, An autonomous institute under ministry of health and family welfare, Govt. Of India, Mysore -570006 (Karnataka India) has been audited for energy, environment & green conservation systems & practices.

Energy, environment & green audit covered the entire Sarada Vilas Teacher's College for energy consumption pattern, measures taken to conserve energy and carbon savings. Along with waste management, water management and greenery (flora & fauna)

Audit report has been prepared based on study, site visit & data collected measurements and verification done during the course of audit. Energy audit is related to connection having RR NO HT 436 Contract demand 50 KVA solar SPVRT 40kwp at Sarada Vilas teacher's College for period 2023-24

Audit has been conducted by our team of qualified and certified engineers in accordance with standards & guidelines set by, BEE- Bureau of energy efficiency - Dept of energy, ECBC – Energy Conservation Building Code, PCB- Pollution control board guidelines, ISHRAE, ASHRAE and other standards. Environment & green audit has been done in consultation with NIE CREST for best international standard practices and technologies.

Audit also considered guidelines of NAAC National Accreditation Council under institutional values related to energy, environment & green.

-ANIL KUMAR NADIGER, B E (E&E), M I E
Director & Energy Specialist
RACHANA ENER CARE
<Engineers for Energy & Environment>
BEE (Dept of energy) certified energy managers & auditors

Abbreviations & Glossary

AC – Alternating Current

AH- Ampere Hour (Used to define capacity of battery)

DC- Direct Current

BD – Billing Demand

BEE- Bureau of energy efficiency

BLDC – Brush less Direct Current

CD- Contract Demand

CFM – Cubic Feet per Minute

CHESCOM – Chamundeswari electricity Company

DG – Diesel Generator

DISCOMS- Distribution Company (electricity)

ECBC- Energy conservation building code

EER – Energy Efficiency Ratio

Efficacy – capacity to deliver desired out put

ENCON- Energy conservation

ESCOM – Electricity Company

HP - Horse power (1hp = 0.745 kw)

HT – High Tension (High voltage 11,000 Volts)

KWH – Kilo watt hour generally used as 'Units'

LED – Light Emitting Diode

LPH – Liter per hour (related to flow)

Lumens- Unit to measure total output light

LUX – Illumination level in unit area

Mains- Electricity supply point

MD- Maximum Demand

PCB – Pollution Control Board

PF – Power factor

Refrigerant- Chemical used in refrigerator

RO – Reverse Osmosis

SHCG – Solar Heat Gain Coefficient

SMF – Scaled Maintenance Free

Star label – Indication of energy efficiency of any equipment

TDS- Total dissolved salts

UPS – Uninterrupted Power Supply

VA – Volts and amps multiple

Standards

Standards and guide lines set by following professional bodies, societies and government bodies were followed in this report.

BEE – Bureau of energy efficiency

Nodal agency under department of energy, government of India

NPC – National productivity council

Star label standards – beestarlabel.com

ECBC – Energy Conservation Building Code

ISHRAE- Indian Society of Heating Refrigerating & air conditioning Engineers

ASHRAE- American Society of Heating Refrigerating & air conditioning Engineers

PCB – Pollution Control Board

SEEM – Society of Energy Engineers & Managers

UNSDG- United Nation Sustainable Development Goals - https://sdgs.un.org/goals

KREDL-Karnataka State Renewable energy development ltd

SDA - State designated agency under BEE

NBC - National Building Code

CPWD general specifications for electrical works 2023

IGBC - Indian Green Building Council

CEA -Central Electricity Authority

INSTRUMENTS USED

- Power analyzer
- Power parameter data logger
- Multi meter
- Clamp meter
- TDS meter
- Lux Meter

EXECUTIVE SUMMARY

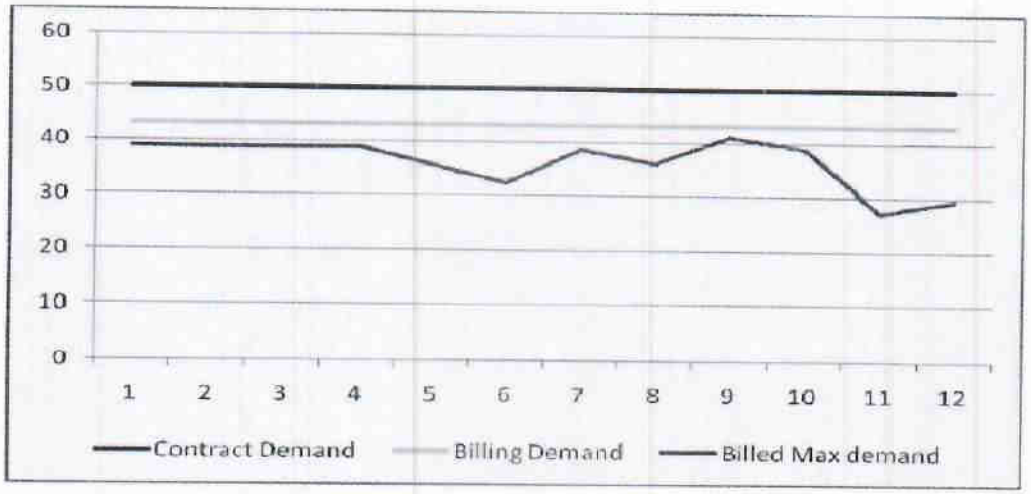
Energy Audit:

Sarada Vilas Teachers College is located within a sprawling campus that not only houses its facilities but also accommodates various other institutions and the administrative block of the Sarada Vilas Education Institute. The campus operates with an overall energy demand of 50 KVA, bolstered by a robust 40 KWP solar on-grid system. Throughout the fiscal year 2023-24, the campus imported a total of 61,396 kWh units of electricity while exporting 7,756 kWh, resulting in a net energy demand from the ESCOM (Grid) power supply amounting to 53,640 kWh. It's noteworthy that the solar system, designed to generate approximately 58,400 units annually based on standard capacity utilization factors, does not currently factor into ESCOM's billing or campus energy management systems. In addition to its solar infrastructure, the campus is equipped with a generator boasting a capacity of 62.5 KVA, primarily utilized during rare instances of minimal day power cuts, constituting less than 1% of the total energy consumption. Overall, the campus's energy profile reveals a total demand of 113,160 kWh, with 53,640 kWh drawn from the grid, 58,400 kWh generated by solar, and a supplementary 1,120 kWh from the generator. These figures highlight the institution's steadfast commitment to sustainable energy practices and the efficient management of its energy resources, reflecting a proactive approach towards environmental stewardship within its educational ecosystem.

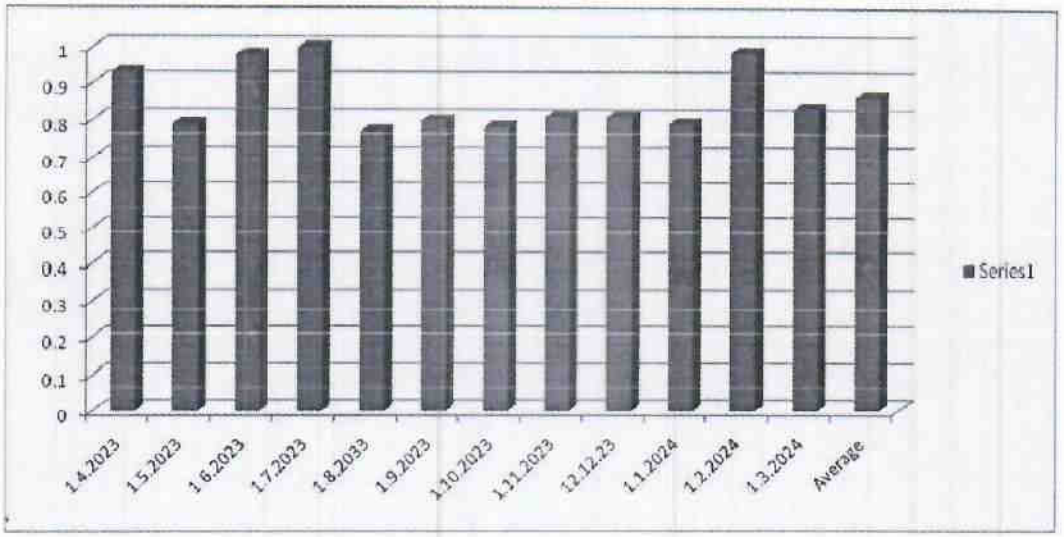
Energy share of campus

Source	Kwh 2023-24	Percentage	remark
ESCOM (mains)	53640	47%	Import- export)
Solar	58400	52%	CUF 16 % considered
DG	1120	1%	Based on power cut
Total	113160	100%	

The billed average maximum demand is 36 KVA, which is below the minimum billing demand of 40 KVA. However, the contract demand for the institution stands at 50 KVA, which is justified based on its operational requirements. Therefore, no increase or decrease in the contract demand is recommended at this time.



The HT meter has recorded a minimum power factor of 0.77 and an average power factor of 0.862. According to regulations, the minimum acceptable power factor is 0.9, with a recommended target of 0.95 to achieve unity power factor. To address this, it is advisable to install a power factor corrector (PFC). Implementing a PFC will prevent penalties associated with low power factor and additionally reduce losses in the transformer.



There is currently no energy meter designated for each individual building within the campus. The Teacher's College (B.Ed) exhibits a typical power consumption of approximately 2 kW during a standard working day. Utilizing this measurement, the estimated energy consumption amounts to 8,500 kWh annually, factoring in 10% for night-time usage. This assessment is crucial for understanding and optimizing energy usage patterns within the institution. Implementing dedicated energy meters for each building could provide more accurate insights into consumption trends, enabling targeted strategies to enhance energy efficiency and reduce overall operational costs. Such initiatives align with sustainable practices and support the institution's commitment to responsible energy management and environmental stewardship.

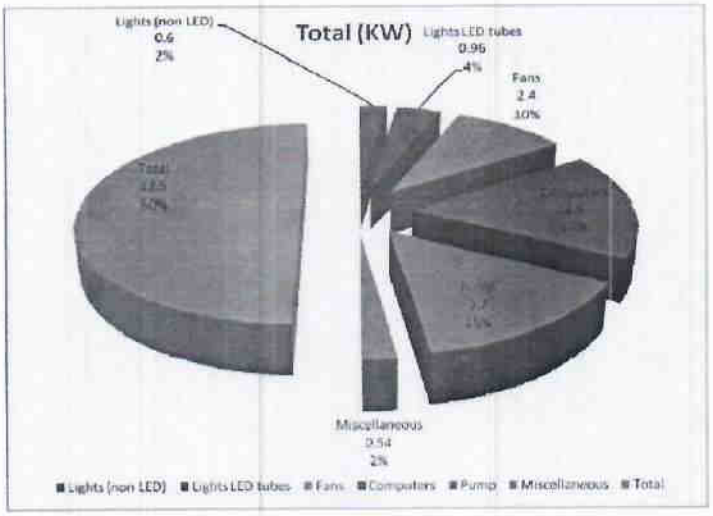
Energy Share of B Ed College

Source	Kwh 2023-24	remark
ESCOM (mains)	3995	Import- export)
Solar	4420	CUF 16 % considered
DG	85	1% of power cut
Total	8500	

By the use of solar energy the B Ed College has reduced carbon emission of 3624.4kgs during 23-24 (Emission factor as per CEA 0.82kgs per kwh of energy)

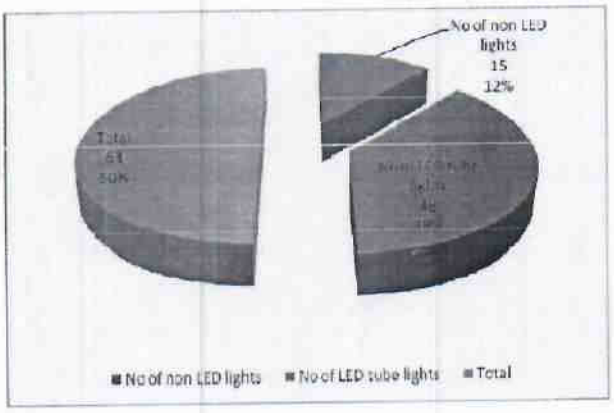
The institution connected load is 12.5kw. This includes lights, fans, computers, pumps & miscellaneous.

Type of load	nos	KW	Total (KW)
Lights (non LED)	15	0.04	0.6
Lights LED tubes	48	0.02	0.96
Fans	30	0.08	2.4
Computers	43	0.1	4.3
Pump	1	3.7	3.7
Miscellaneous	1	0.54	0.54
Total		4.48	12.5



The institution has undertaken a significant initiative to enhance energy efficiency by converting the majority of fluorescent lamps to LED lamps. Out of the 63 different lights on campus, 48 fluorescent lamps have been successfully replaced with LED tube lights. This transition has resulted in substantial energy savings, amounting to a maximum of 1920 kWh per year, while also significantly reducing the institution's carbon footprint by approximately 1575 kg annually. Each fluorescent lamp typically contains about 10 mg of mercury, and with the replacement of these 48 units with LED lights, the institution has effectively curtailed the generation of mercury waste by 480 mg. This proactive approach not only contributes to cost savings and energy conservation but also underscores the institution's commitment to sustainable practices and environmental responsibility.

No of non LED lights	15
No of LED tube lights	48
Total	63



The institution is currently in the process of systematically replacing old fans with super energy-efficient BLDC technology fans. With approximately 30 fans throughout the campus, this phased upgrade aims to significantly enhance energy efficiency and reduce operational costs over time. Additionally, after measuring the electrical parameters of the water pump, it has been confirmed that they are within acceptable limits. To further optimize water usage and energy consumption, it is recommended to implement automatic controls for the pump. This automation will help prevent water wastage and energy loss during potential overflow situations, while also minimizing the need for manual intervention.

Regarding power backup systems, the institution maintains two UPS units: one with a capacity of 5 KVA equipped with six batteries and another 1.5 KVA UPS with two batteries. Both UPS systems are in good condition and the batteries are well-maintained. Operating on offline technology, these UPS units achieve an overall efficiency of more than 90% during normal working conditions, meeting the efficiency standards outlined by the Bureau of Energy Efficiency (BEE) in the Energy Conservation Building Code (ECBC). Each battery connected to the UPS has a capacity of 100 Ah.

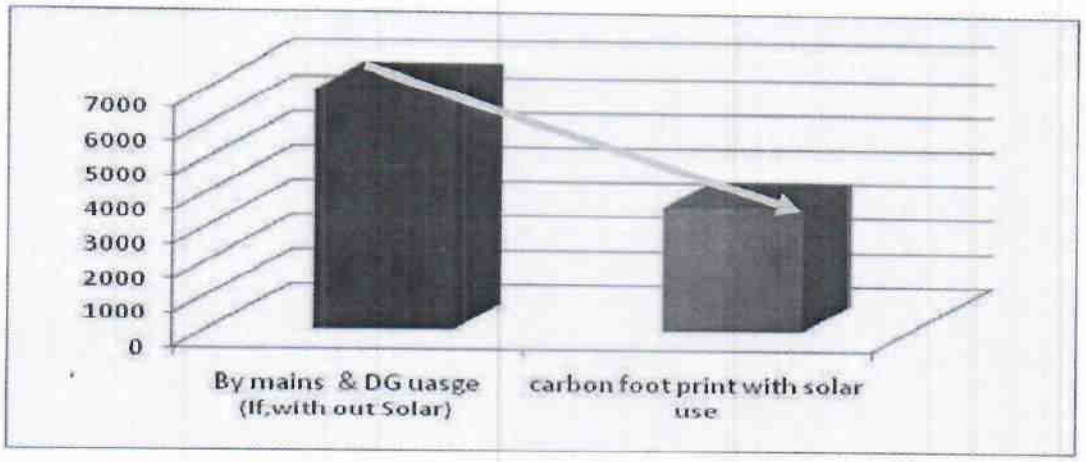
Moreover, the institution's auto-on/off generator system ensures quick activation within a minute when needed. Upon review, it has been observed that the batteries currently installed in the UPS units exceed the required capacity. Therefore, it is recommended to replace these batteries with 60 Ah capacity units during the next replacement cycle. This adjustment not only aligns with the institution's energy efficiency goals but also promises cost savings and improved operational sustainability in the long term.

Carbon foot print of B Ed College by solar usage:

Description	Energy per annum kwh	Carbon foot print Kgs
Total energy demand (including mains, solar and generator	8500	6970
By mains usage * (47%)	3995	3276
By diesel usage 35 ltrs# (1%)	88	235
Reduced by solar use of 52%	-4420	-3624
Net carbon emission		3511 per annum

Emissivity factor).82 kgs per kwh by CEA (central electricity authority) is considered

 # 2.67 Co2 per liter of diesel and SEGR of 2.5 for DG is considered



Review of energy conservation measures adopted

- Use of Solar on grid system to an extent of 52%
- Use of LED lights 48nos, energy saved 1920kwh
- Energy efficient UPS systems, with efficiency rating more than 90%
- The overall power demand is lesser than contract demand

Review proposed energy conservation measures

- Improve power factor by APFC settings & repair
- A move towards 100% LED lighting
- Replacing regular fans by BLDC fans in phased manner
- Battery capacity optimization from 100 ah to 60 ah during next cycle of replacement.
- Enhance Solar capacity by adding "zero export" or "off grid systems"
- Maintenance, monitoring and recording solar generation. It is observed during audit, some of the panels are damaged.
- A sub energy meter for the institution, Preferably with Multi function meter with communication port.
- Auto control system for water pump

ENERGY AUDIT

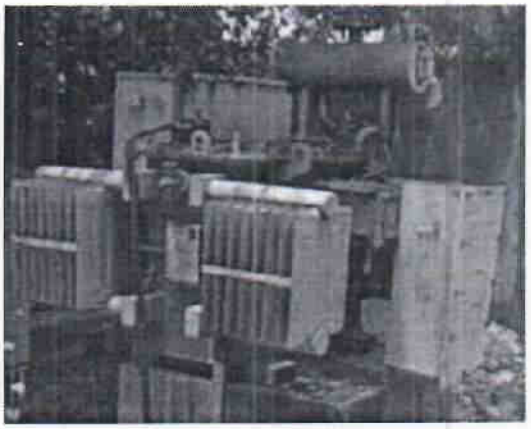
Energy sources

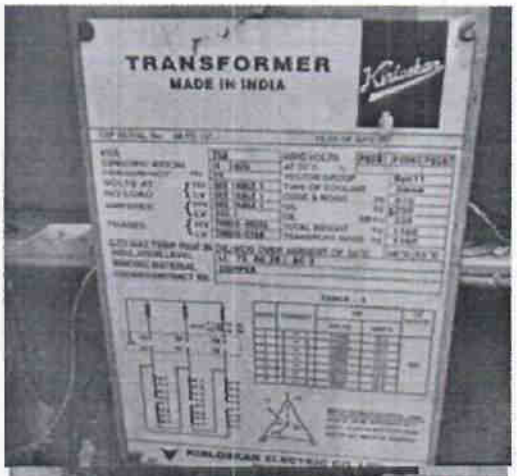
There are three energy sources in the campus. They are

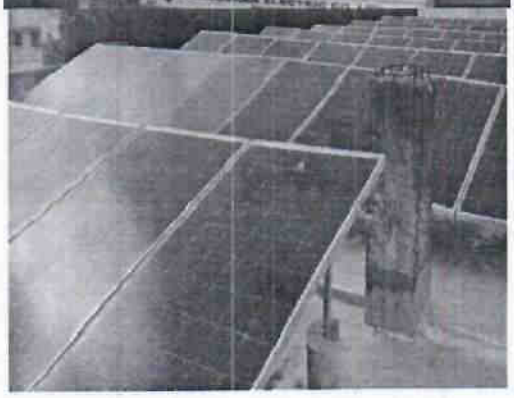
Source	EB
RRNO	HT436
CD	50KVA
TARIFF	HT2Ci
Solar	40kw
unit charge	7.50+9% tax
kva charge	300+9% tax

Source	Solar
Capacity	40kwp
technology	on grid
Mtering	net metering

Source	DG
capacity	62.5
make	Cummins



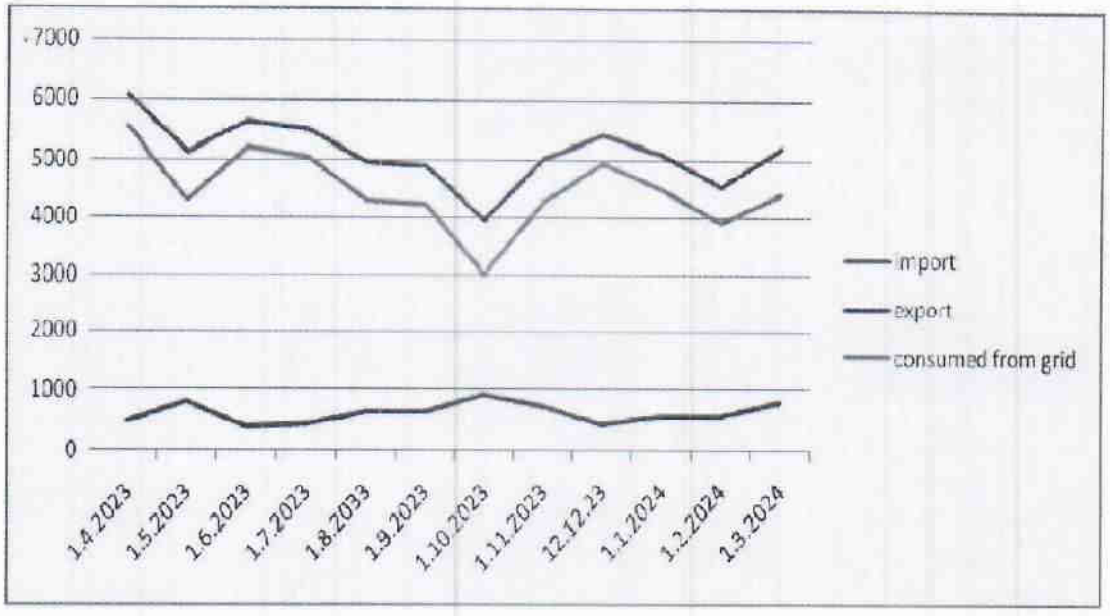




Electrical bill analysis

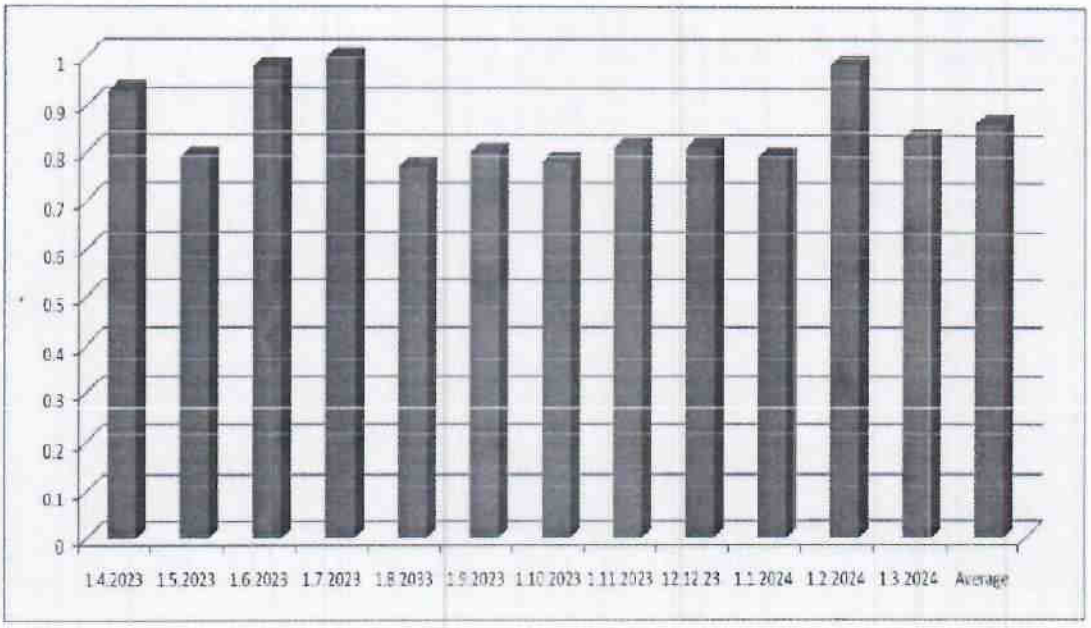
Energy import & export data

Date	IMPORT	EXPORT	Consumption
1.3.2024	52145.5	813.5	51332
1.2.2024	4523.5	612	3911.5
1.1.2024	5097	598.25	4498.75
12.12.23	5398	462.25	4935.75
1.11.2023	5020.5	758.75	4261.75
1.10.2023	3948.25	932.75	3015.5
1.9.2023	4891.75	668	4223.75
1.8.2033	4965.25	673.5	4291.75
1.7.2023	5509.25	464.75	5044.5
1.6.2023	5639.75	426.25	5213.5
1.5.2023	5127.25	831.75	4295.5
1.4.2023	6061	514.25	5546.75
1.3.2023	3606.25	945.25	2661
Total	61396	7756	53640



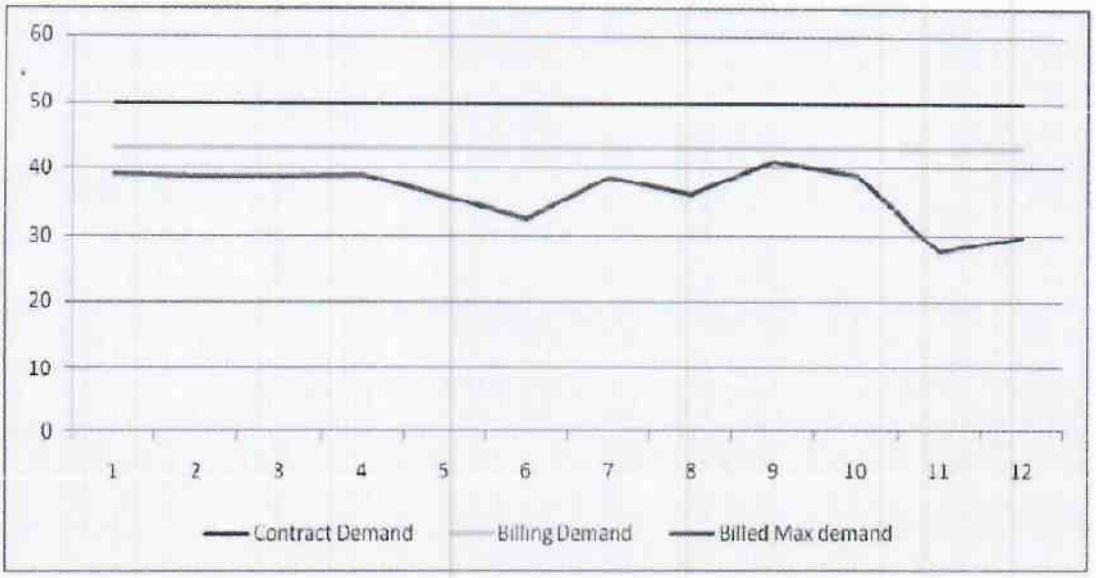
Power factor

month	PF
1.4.2023	0.93
1.5.2023	0.79
1.6.2023	0.98
1.7.2023	1
1.8.2033	0.77
1.9.2023	0.8
1.10.2023	0.781
1.11.2023	0.81
12.12.23	0.81
1.1.2024	0.79
1.2.2024	0.985
1.3.2024	0.83
Average	0.862



Contract demand

month	Contract Demand	Billing Demand	Billed Max demand	Billed Max demand
1.4.2023	50	43	39	39
1.5.2023	50	43	38.7	38.7
1.6.2023	50	43	38.7	38.7
1.7.2023	50	43	38.975	38.975
1.8.2033	50	43	35.6	35.6
1.9.2023	50	43	32.375	32.375
1.10.2023	50	43	38.6	38.6
1.11.2023	50	43	36	36
12.12.23	50	43	41.05	41.05
1.1.2024	50	43	38.925	38.925
1.2.2024	50	43	27.425	27.425
1.3.2024	50	43	29.675	29.675
average			36.05769231	36.05769231



Observation and Remarks

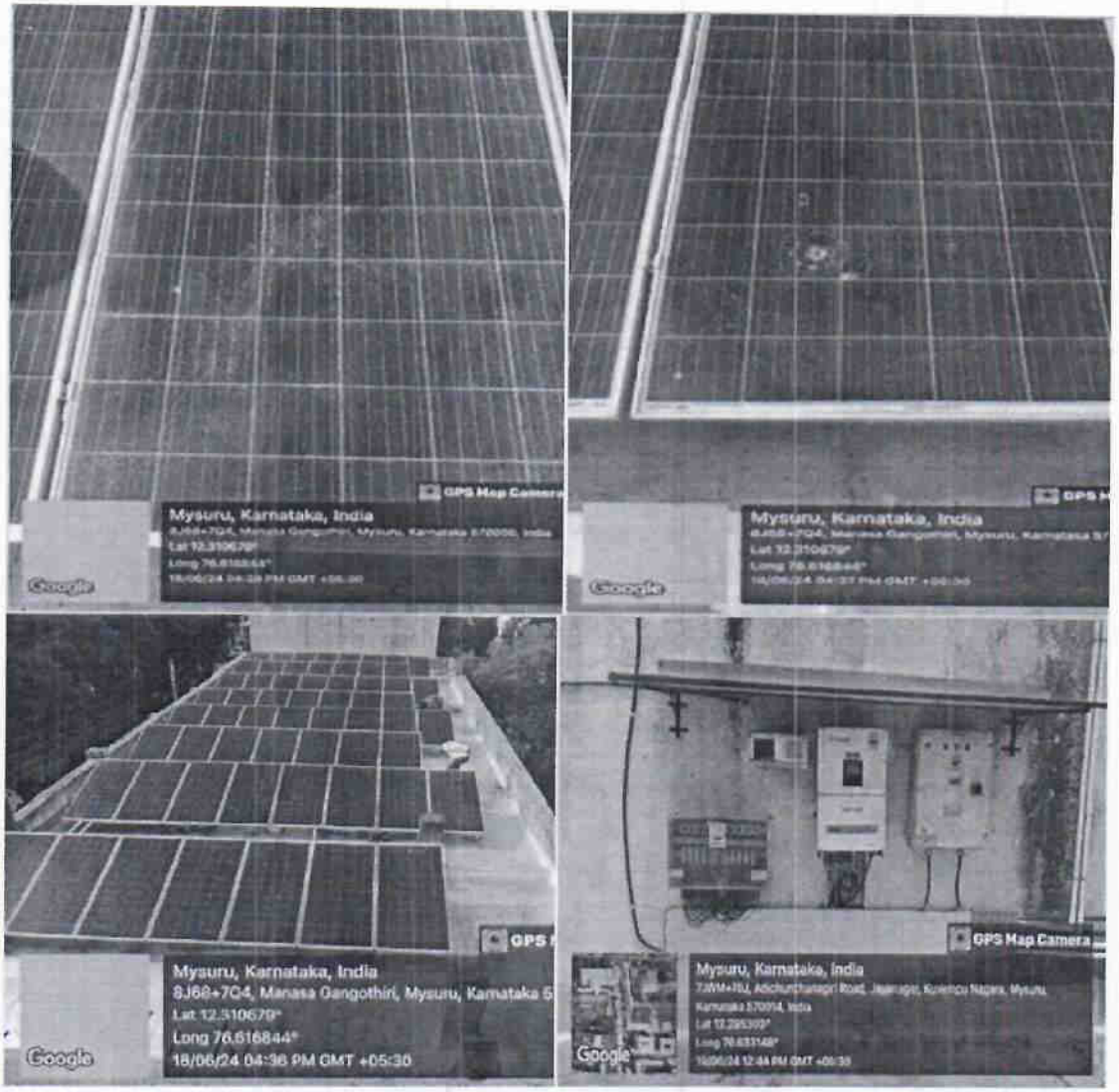
- Billed max demand has not exceeded contract demand in any month
- Power factor is below in nine months of expected power factor of 0.9 and above. Has
- The energy import from grid is 61396, export from is 7756 and the net consumption is 53640

Renewable energy utilization

Solar plant capacity 40kwp, technology on grid, net metering system, generation based on 4kwh/day/kw*kwp*365 calculation is 58400kvh

Remarks

Periodic monitoring of these solar and taking appropriate measures if necessary is essential.



Energy share

Energy share of campus

Source	Kwh 2023-24	Percentage	remark
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Solar	58400	52%	CUF 16 % considered
DG	1120	1%	Based on power cut
Total	**113160**	**100%**	

Energy Share of B.Ed College

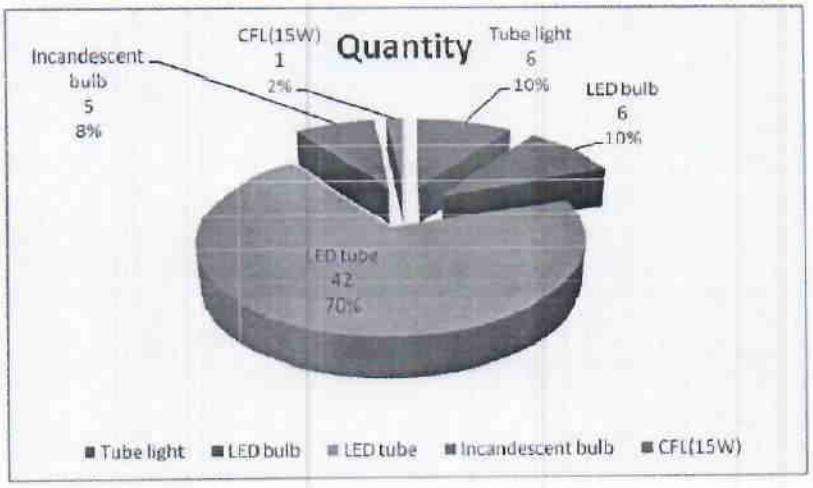
Source	Kwh 2023-24	remark
ESCOM (mains)	3995	Import- export)
Solar	4420	CUF 16 % considered
DG	85	1% of power cut
Total	**8500**	

Observations & recommendations

By the use of solar energy the B.Ed College has reduced carbon emission of 3624.4kgs during 23-24 (Emission factor as per CEA 0.82kgs per kwh of energy)

Lighting system

Lights	Quantity (nos)
Tube light	6
LED bulb	6
LED tube	42
Incandescent bulb	5
CFL(15W)	1
Total	**60**



Observations & recommendations

- The institution has a total of 60 different lights.
- Of these, 48 tube lights have been replaced with LED lights.
- This replacement results in an annual energy saving of 50% and a reduction of 1,575 kg in carbon footprint.
- It is recommended that another 15 different lights be replaced.

The payback period calculation is given below:

Proposal:

Replacing 15 non LED lights(tube lights, bulbs, etc.) used for more than 8 hrs a day,

Present energy consumption: 15 Nos X 8Hrs X 0.04KW X 300days = 1440KWH per annuam

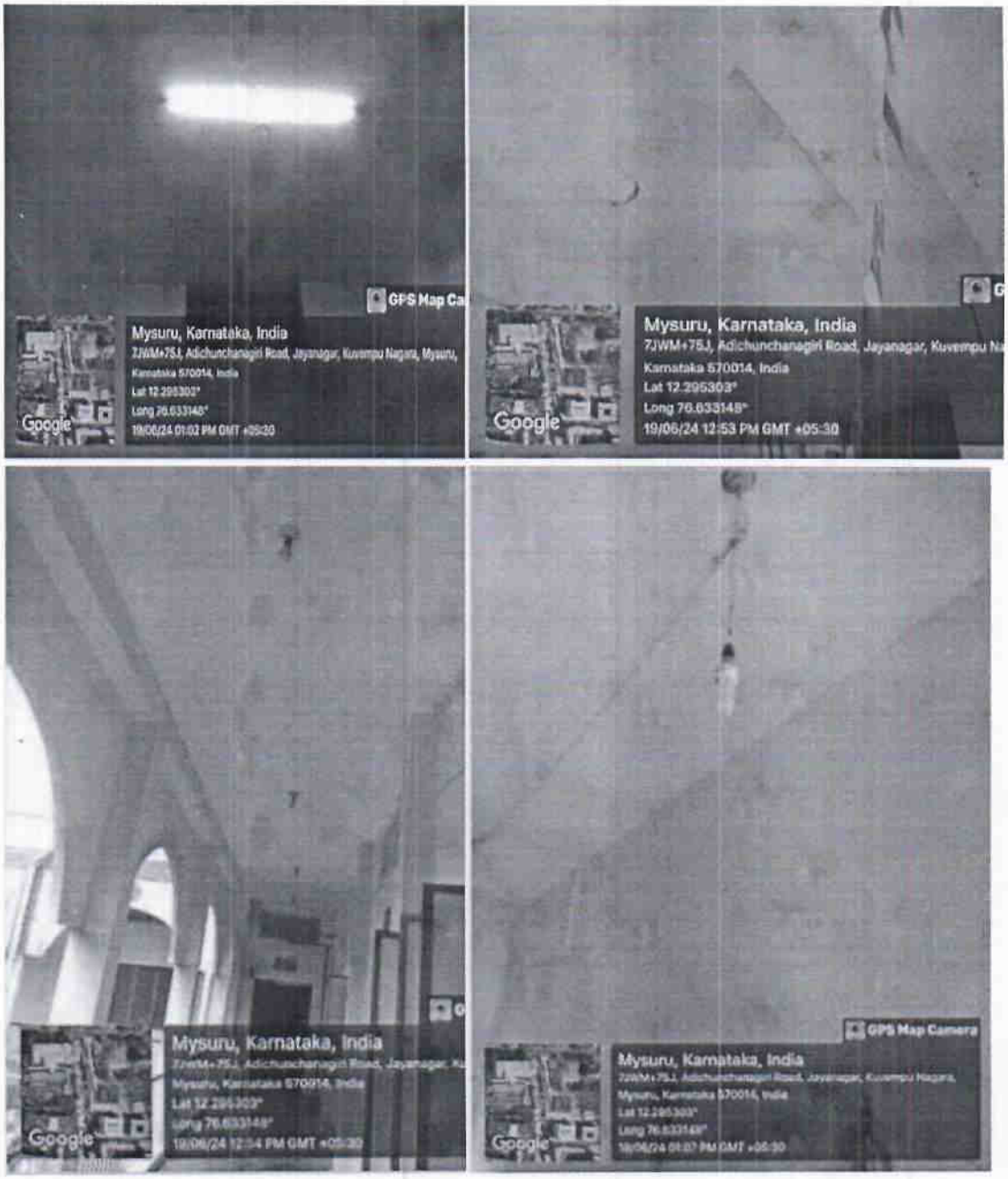
Energy consumption by proposed LED change: of 20W capacity = 720 (15x8x0.02x300)

Energy savings = 720 KWH

Cost savings at 8.20rs.(including tax) per unit:5904 /- per anuam

Investment at Rs.250 per LED: 3750/- (250 x 15)

Payback period = 3750/5904 = 0.635 years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Lat 12.295303°
Long 76.633148°

Fans

There are approximately 28 ceiling fans, 1 wall fan, and 1 table fan in the institution. They are in the process of replacing the old fans with super energy-efficient BLDC technology fans in a phased manner.

Location	Ceiling fans	Wall fan	Table fan
Staff room	2	0	
S2	2		
Auditorium	3		
F6	1		
F5	3		
F4	2		
FD3	1		
F2	4		
Library	5		
G8	2		
Office	2	1	
Principal room	0	0	1
IQAc	1		
Total	**28**	**1**	**1**

The payback period calculation is given below:

Proposal: Replacing 30 fans (Ceiling, wall fan & table fan) used for more than 8 hrs a day,

Present energy consumption: 30 Nos X 8Hrs X 0.075KW X 275days = 4950KWH PA

Energy consumption by proposed LED change: of 0.035KW capacity = 2310 (30x8x0.035x275)

Energy savings = 2640KWH

Cost savings at 8.15rs.(including tax) per unit: 21,516 /- PA

Investment at Rs.3000 per LED: 90,000/-

Payback period = 90,000/21516 = 4.18 years

Observations & recommendations

- There are approximately 30 fans in the institution.
- This replacement is expected to result in an annual energy saving of 2,640 kWh.

- The institution is currently in the process of replacing old fans with super energy-efficient BLDC technology fans in a phased manner.

Regular fan	BLDC Fan
Run on AC current	Run on DC current
Wattage required - 70-80W	Wattage required - 28-32W
Produces more noise	Produces lesser noise
Higher energy consumption	Lower energy consumption
High maintenance	Low maintenance

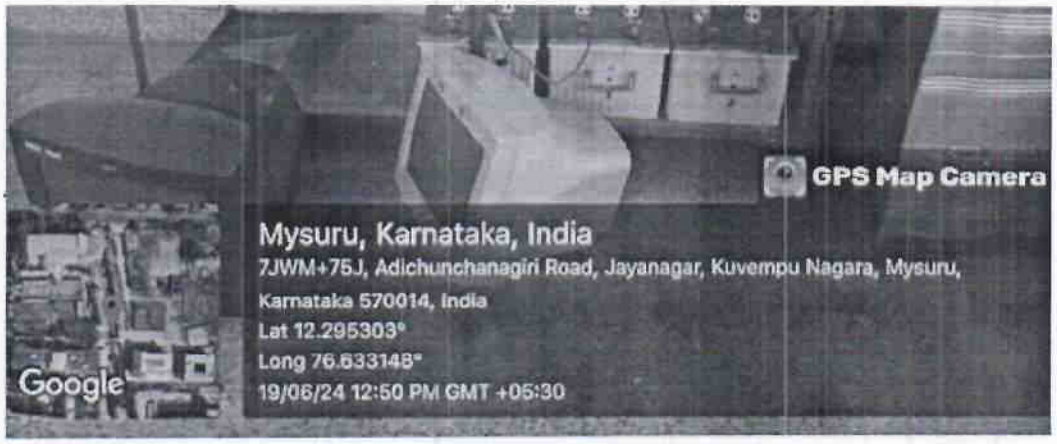
Computers

In the institution, the computer lab has 43 computers.

Location	Computer lab
Computers(nos)	22
F5	1
F4	1
F2	3
Library	7
Office	6
Principal room	1
IQAC Room	2

Observation & Recommendation

All CRT monitors are replaced with flat panel monitors i.e. LCD and LED display monitors



UPS systems

The institution has two UPS units: one with a capacity of 5 kVA and six batteries, and another with a capacity of 1.5 kVA and two batteries. Both UPS units are in good condition, and the batteries are well-maintained. As both use offline technology, their overall efficiency during normal operating conditions exceeds 90%. All batteries connected to the UPS have a capacity of 100 Ah.

Data Collection

UPS1	
Location	Computer lab
Make	silicon
Capacity	5kva, 72vdc
IPV	245
IP current	10A
OP	245
OP current	9.5A
DCV	84.1
DC current	1A
Connected loadd	22computer
Battery type	tubler
battery AH	100

Measurements and Calculations

input voltage	245
input current	10
Input VA	2450
output voltage (1ph)	245
output current (1ph)	9.5
output VA	2327
Charging voltage (DC)	83
charging current (DC)	0.5
input VA	2450
output VA	2327.5
Output DC	41.5
Efficiency(out VAAC+output VADC)/input VAAC	96.69

Data Collection

UPS 2	
Location	Computer lab
Make	silicon
Capacity	1.5kva,24vdc
IPVA	245
IP current	3A
OPVA	245
OP current	2.5A
DCV	24.9
DC current	2A
Connected loadd	-
Battery type	tubler
battery AH	100

Measurements and Calculations

input voltage	245
input current	3
Input VA	735
output voltage (1ph)	245
output current (1ph)	2.75
output VA	673.75
Charging voltage (DC)	28
charging current (DC)	0.5
input VA	735
output VA	673.75
Output DC	14
Efficiency(out VAAC+output VADC)/input VAAC	93.57

Observation & Recommendation

- Considering Generator backup & solar, we observe that battery used in ups is more than required.

  Present capacity: 100ah x 6nos

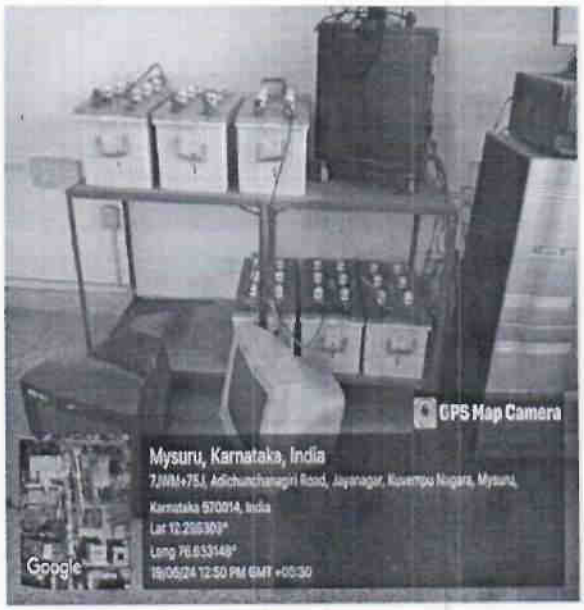
  Proposed capacity 60ah x 6nos

  Cost savings: 4000/- x 6nos: 24000/-

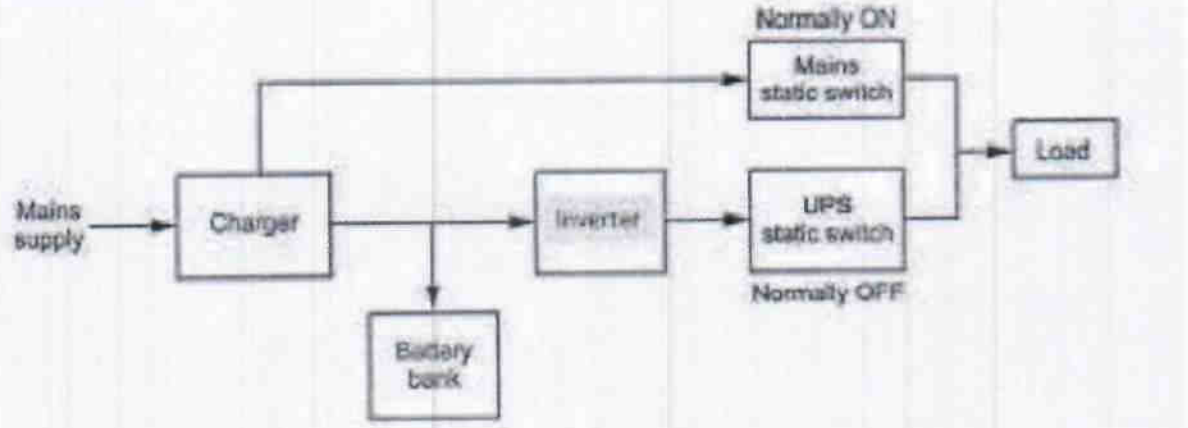
  Lead waste reduction: 12kgx 6nos: 72 KGS

  This measure is recommended to implement during next cycle of battery replacement

- The institution has an auto on/off generator that starts within a minute.
- The current batteries are of greater capacity than required.
- It is recommended to replace the batteries with 60 Ah units during the next replacement cycle.
- Both UPS units use offline technology, resulting in an overall efficiency of more than 90% during normal operating conditions.
- This efficiency meets the standards recommended by the Bureau of Energy Efficiency (BEE) in the Energy Conservation Building Code (ECBC).



Block diagram of offline UPS



Pumping system

Location	Sharadhavilas
Capacity	5HP
type	Borewell
Make/model	submursable
year of use	-
Stage(sub pump)	-
Repairs/rebound	-
water flow from - to	bore to tank
suction head	0
delivery head	240ft
length of pipe	-
diameter of pipe	2"
usage per day	2 hour
current - R	9
current - Y	10.17
current - B	10.03
PF	0.9
Voltage - R	245
Voltage - Y	250
Voltage - B	247
Voltage - RY	415
Voltage - YB	420
Voltage - BR	429
water TDS	-
power input (0^0.5) VICOSO	5.88
energy/year(power input/day*365)	3528

Observation & Recommendation

- The electrical parameters of the water pump were measured and found to be within the limits.
- We recommend implementing an auto-control system for the pump to reduce water and energy wastage during overflow.
- This system will also minimize the need for human intervention.

Automation controls

- The institution has not implemented automation for any systems.
- It is recommended to install an automated control system for the water pump.
- An automated control system is also suggested for the yard lighting.

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End of Energy audit

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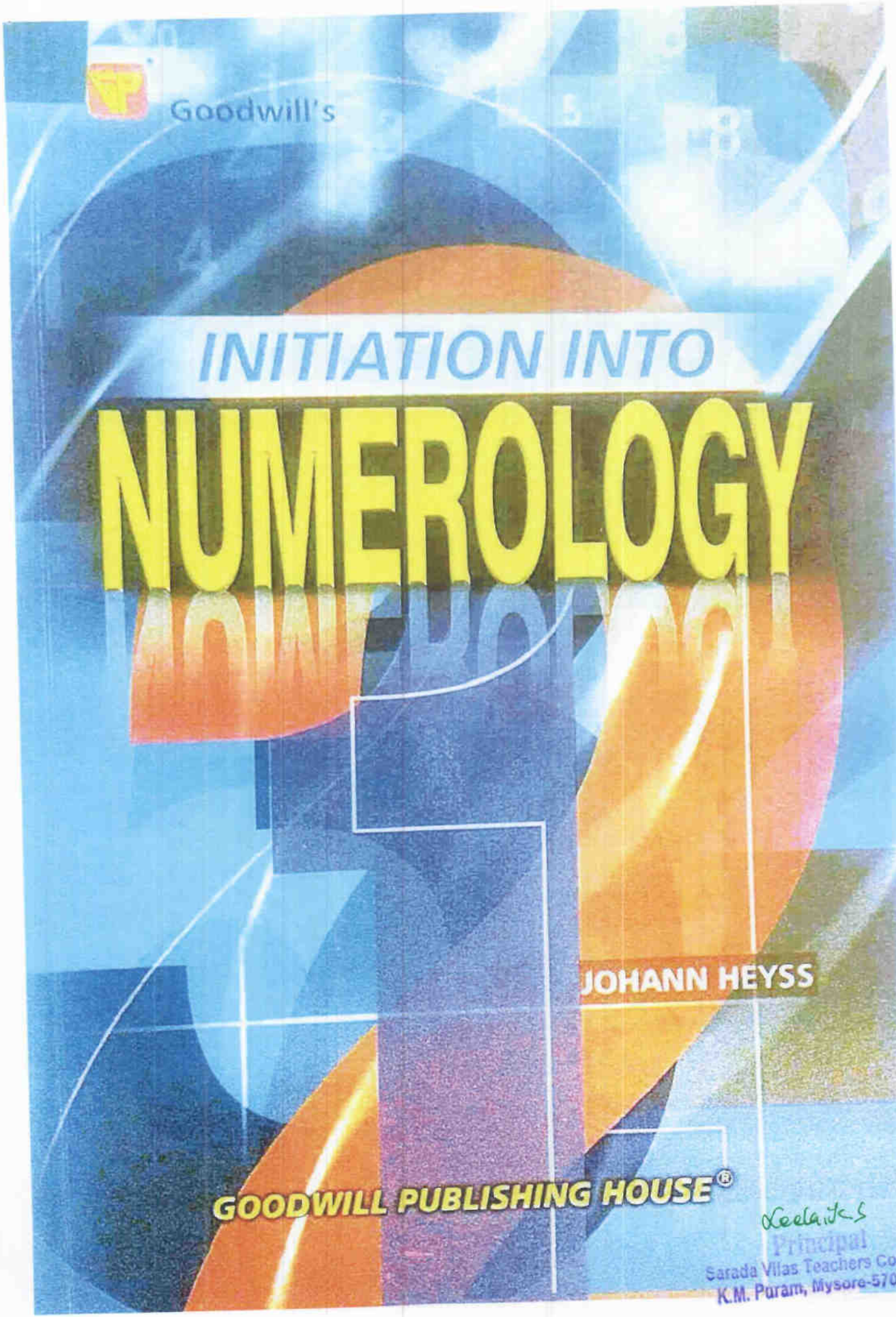

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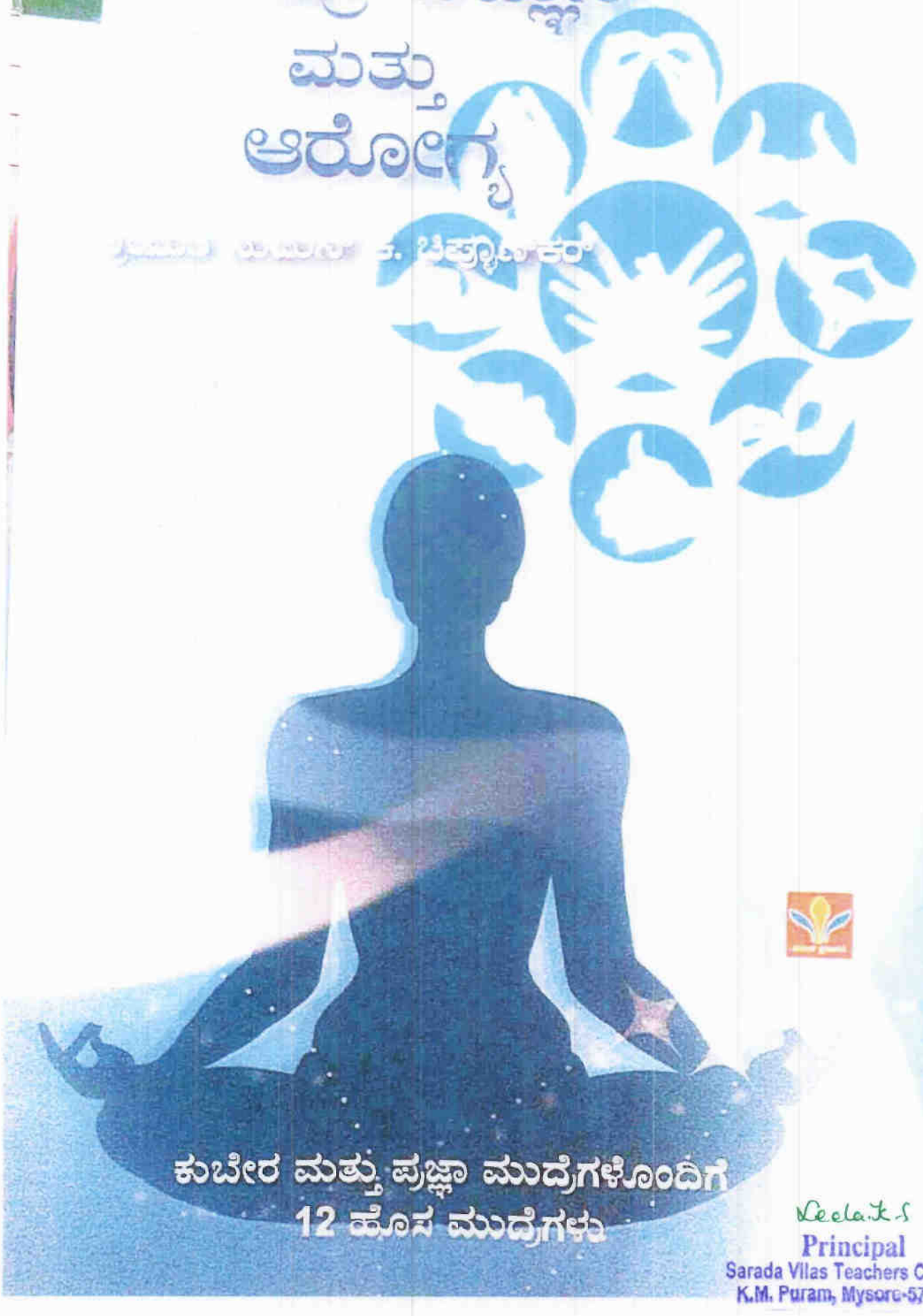

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