REPORT ON

ENERGY, ENVIRONMENT AND GREEN AUDIT

SRI SAIRAM ENGINEERING COLLEGE

SAI LEO NAGAR, WEST TAMBARAM,

CHENNAI – 600 044.

AUDIT CONDUCTED AND REPORT PREPARED BY

NIN ENERGY INDIA PRIVATE LIMITED
JUSA COMPLEX, NEW NO 47, OLD NO 21/2
PONNIAMMAN KOIL STREET, KOTTUR,
CHENNAI-600085
TAMILNADU, INDIA.

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ACKNOWLEDGEMENT

We thank management of **SRI SAIRAM ENGINEERING COLLEGE** for awarding the Energy, Environment and Green Audit study at their facility at Sai Leo Nagar, West Tambaram, Chennai – 600 044. to NIN Energy India Private Limited. This report is the result of Energy Audit conducted at **SRI SAIRAM ENGINEERING COLLEGE** on 04/04/2022.

We wish to thank the management of **SRI SAIRAM ENGINEERING COLLEGE** for the support during the audit and for successful completion of the audit.

For NIN ENERGY INDIA PRIVATE LIMITED

(B. SENTHILKUMAR)

ACCREDITED ENERGY AUDITOR (AEA 023)

NIN ENERGY INDIA PVT. LTD. CHENNAI 600 085


CHENNAI
600 085

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ABBREVIATIONS

EE	Energy Efficiency
Dept	Department
EER	Energy Efficiency Ratio
INR	Indian Rupees
KL	Kilo Litre
kWh	Kilo Watt Hour
LED	Light Emitting Diode
LPG	Liquified Petroleum Gas
t CO2	Tonne Of Co2
FTL	Fluorescent Tube Light
TR	Ton of refrigeration
BLDC	Brushless direct current motor

1.0 INTRODUCTION ABOUT GREEN AUDIT

Green Audit is the process of assessing the environmental impact of an organization, process, project, product, etc.

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation.

2.0 OBJECTIVES

In recent time, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the present environmental problems.

The college has been putting efforts to keep our environment clean since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- To map the Geographical Location of the college
- To document the floral and faunal diversity of the college
- To record the meteorological parameter of college
- To document the ambient environmental condition of weather, air, water and noise of the college
- To document the waste disposal system
- To estimate the Energy requirements of the college
- To report the expenditure on green initiatives during the last five years

3.0 ABOUT THE COLLEGE

Sri Sairam Engineering College, Chennai, established in 1995 by MJF.Ln. Leo Muthu, Chairman of Sapthagiri Educational Trust, is a non-profit and non-minority institution. A well-defined vision, a highly committed mission, and dedicated leadership enable Sri Sairam Engineering College to be among the best educational institutions in the country. Since its inception, the institution has grown into a vast conglomerate of magnificent buildings, state-of-the-art laboratories, sophisticated internet centres, a modern digital library block, and a superlative sports complex, each a landmark in itself across 300 acres. The institution is situated on a sprawling campus with architecturally and aesthetically designed buildings, blocks, stadiums, auditoriums, hostels, gymnasiums, and sports grounds. The institution is affiliated with Anna University and approved by the All-India Council for Technical Education (AICTE), New Delhi. Imbibed with the message of Shridi Saibaba, our chairman ventured into the realm of providing quality technical education to both urban and rural students from Tamil Nadu as well as from other states, offering a flexible and real-world-based learning approach and a global ambience in pursuing education. Sri Sairam Institute of Management, also a unit of Sri Sairam Engineering College, was established in 1997 and offers an MBA programme. Our chairman has not only stopped with his vision of providing Technical Education but has also ventured into the fields of medical sciences by starting Medical Colleges for Indian medicine, namely Siddha, Ayurveda, and Homoeopathy. He was also instrumental in starting "The Academy for the Blind" and "Home for the Aged" under the community service programmes of the Lions Club.

S. No	Description	Details
1	No. of Departments & No. of Academic buildings	13 Departments & 14 Buildings
2	No. of Hostel Buildings (Both for Boys & Girls)	2
3	Availability of Sewage Treatment Plant (STP) and their Capacity	NIL
4	Availability of RO Plant and their Capacity	Yes, 4000 LPH
5	If any Solar PV installation available in the campus? If yes provide the plant capacity	75 kW F Block
6	Any other type of energy usage (Steam, LPG, Natural Gas, Firewood Etc.,)	Canteen: LPG, Firewood Chemistry Lab: LPG Physics Lab: LPG
7	No. of Departments using Chemicals/Salts/Acid	
8	No. of Matured Trees in the campus	2326 No's
9	Rainwater Harvest	6 Ft depth 4*4 Día
10	Solid Waste Management	Solid Waste tank for recycling biodegradable waste

4.0 ABOUT NIN ENERGY INDIA PRIVATE LIMITED

NIN Energy India Private Limited is providing Energy Related services like Energy Audit, Power Quality Audit, Infrared Thermography, Thermal Audit, PAT Monitoring and Verification Audit, PAT Consultancy, Green Building Commissioning, Electrical Safety Audit, Internet of Things, Carbon Foot Printing, etc. We have experienced team and helping the customers to manage and reduce their energy consumption.

We are providing complete Energy Services under one roof at a competitive price. Our team members are having more than 10 years of experience in Energy, Renewable Energy and Environmental Engineering with good Academic background.

Our Team Strength

- Accredited Energy Auditor by Bureau of Energy Efficiency, Government of India
- Certified Energy Auditors by Bureau of Energy Efficiency, Ministry of power
- Certified Measurement and Verification Professionals (CMVP) by EVO
- Certified Level II Thermographer
- Enlisted with Tamil Nādu Energy Development Agency (TEDA) as a system Integrator for Solar PV systems.
- Lead Auditors for ISO 50001 (Energy Management System)
- Lead Auditors for ISO 14064 (Green House Gas inventory and verification)
- Lead Auditors for ISO14000 (Environmental Management System)

4.1 AUDIT TEAM

The NIN Energy India private Limited team did the green audit assessment in the college. Team details are as follows.

Name	Designation
Mr. B SENTHIL KUMAR	• Accredited Energy Auditor by Bureau of Energy Efficiency • ISO 50001:2018 Lead Auditor • ISO 14064 Lead Auditor • ISO 14001 Lead Auditor
Mr. T. KARTHIKEYAN	Certified Energy Auditor by Bureau of Energy Efficiency
Mr. S. SENTHAMIL SELVAN	Sr. Engineer

4.2 INSTRUMENTS USED FOR THE AUDIT

S. No	Name of the instrument
1	Air quality meter
2	Noise meter
3	Lux meter
4	Clamp meter

5.0 LOCATION OF THE INSTITUTION

The college is located in Sai Leo Nagar, West Tambaram, Chennai – 600 044.

Latitude: 12.9602° N

Longitude: 80.0574° E

6.0 ENVIRONMENTAL AUDIT

Carbon footprint is the total sum of greenhouse gases (GHG) emission caused by an organization, event, product, or person. As we are aware, the increasing concentration of GHGs in the atmosphere can accelerate climate change and global warming, it is very necessary to measure these emissions from our day-to-day activities. The first step towards managing GHG emissions is to measure them. There are some standards and guidelines to measure GHG emissions like GHG protocol, ISO 14064, the more comprehensive one Life Cycle Assessment (LCA), and market-based mechanisms. Out of them, ISO 14064 is an offset protocol and independent, voluntary GHG project accounting standard helps to quantify GHG emission of the organization, event, product, or person. Our day-to-day activities are dependent on electricity which is mostly coming from coal-based power plants, Diesel and Petrol for our vehicles and LPG for cooking in our kitchen. All of the energy we use is derived from these fossil fuels which are GHG intensive. The following methodology helps you to calculate your carbon footprint resulting from the use of Electricity, Petrol, Diesel, and LPG.

Floristic status of the institution:

The Current situation of planted trees are as follows:

S. No	Type of Trees	Total No of Trees
1	No of matured trees (Age more than 10 years)	2326

1. Therefore, the carbon absorption capacity of 2326 matured trees in the campus of the Institution (2326 × 6.8 kg CO_2) = 15816.8 kg of CO_2.

The grand total of carbon absorption by the flora in the campus is 15816.8 kg per year.

Description	Unit	Values
Annual Emissions from Electricity, tCO2	tCO2 /year	746
TOTAL EMISSIONS FROM FACILITY	tCO2 /year	746
Carbon absorption by mature trees, semi mature trees, bushes, and lawns	tCO2 /year	-15.82
Net carbon emission of the campus	tCO2 /year	730
Carbon reduction opportunities by energy saving projects	tCO2 /year	295
Estimated Carbon Emissions after implementing the Energy Saving Projects	tCO2 /year	435

7.0 GREEN AUDIT

A "green audit" is another name for an environmental audit. These audits assess various facets of industrial operations. Audits determine whether a company's operations impact the air, water, waste, and soil. These audits help businesses avoid compliance issues. They also guide the minimization of a company's impact on the environment to support sustainability. Plus, audit data can be used to improve workplace safety.

7.1 LAND USE ANALYSIS

GENERAL OVERVIEW OF THE CONCEPT OF LANDUSE Land use refers to man's activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape. Remote sensing and GIS techniques are now providing new tools for advanced land use mapping and planning. The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map.

7.2 THE INSTITUTIONAL INITIATIVES FOR GREENING THE CAMPUS ARE AS FOLLOWS

8.0 WATER AUDIT

8.1 DIFFERENT SOURCES OF WATER AND QUANTITY RECEIVED ON MONTHLY BASIS AND AREAS OF UTILIZATION

There are about 11 wells and 5 sumps on our campus to cater to the needs of the people, and there is a lot of surpluses. Out of this, 9 wells are 30 feet in diameter, and the remaining 2 wells are 20 feet in diameter. The water is very clean and hygienic. The college stores the water in an overhead tank.

The water management system details are as follows.

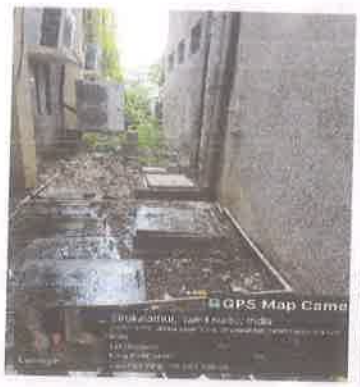
S. No	Parameters	Response
1	Source of water	Well
2	No of Wells	11
3	No of motors used	2
4	Quantity of water utilized per day (Drinking)	25000 Lit
5	Any water wastage	-
6	Water usage for gardening	well
7	Faith of wastewater from labs	-
8	Whether wastewater from labs mixed with ground water	No
9	Any treatment for lab water	No
10	Rainwater harvest available.	Yes - 16

8.2 RO PLANT

There is a great demand for water in our society to fulfil the needs of public and also various organizations. Considering this, our college has taken up rainwater harvesting system. Our Organization requires water for laboratories, drinking facilities, cleaning purposes, for gardening etc. Wells and Ponds are the two major sources for us. The Institute ensures that the water wastage is minimized at an optimal level and the leaky taps and pipes are under regular check and hence no loss of water is observed, neither by any leakages nor by overflow from overhead tanks. On an average, the total use of water in the college is around 20,000 L/day which includes 10,000 L/day for domestic purposes, 5000 L/day for gardening and 5,000 L/day for Laboratories. The college has implemented rainwater harvesting (RWH) within its campus for storing and reuse at 22 places and it has reduced its dependence on water tankers.

8.3 RAINWATER HARVESTING

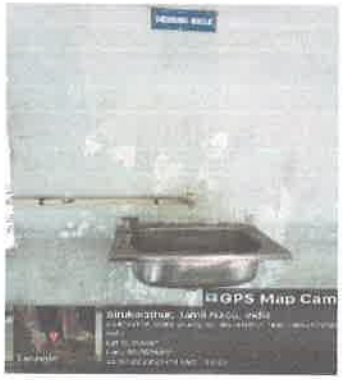
The college saves a substantial amount of water through Rainwater Harvesting and the water saved is used to water the flora in the campus. The water which is collected is led to the ground water. (Usage: Ground water). The proposed system depth is 6 Ft depth, 4*4 Dia. There are 16 buildings in the college every building has rainwater harvesting system.



9.0 WATER CONSERVATION MEASURES

9.1 REPLACEMENT OF NORMAL WATER TAPS WITH WATER EFFICIENT TAPS

At present, normal water taps are used in the wash basin and showers. It is recommended to change water efficient water taps in the campus which will save 50 % of the water consumption in taps and showers.



S. No	Description	Units	Values
1	Normal water taps flow	LPM	10
2	Water efficient taps flow	LPM	5
3	Water savings	%	50

Cost of the water taps and showers.

S. No	Description	Price
1	**Water efficient tap nozzle**	**700**
2	**Water efficient showers**	**1500**

9.2 PROPOSAL FOR INSTALLING DRIP WATER IRRIGATION SYSTEM FOR TREES AND PLANTS

In campus, there are around 2326 plants and trees were being grown. Water required for the plants and Trees about 5000 Litres per day (Approximately). It is highly proposed to install drip water irrigation system in the campus which will save more amount of water.

10.0 WASTE DISPOSAL OF COLLEGE

The college maintains garbage bins. Segregated dustbins are placed at different locations throughout the college campus. Also, garbage from different locations is collected on a daily basis in the morning. This garbage is then taken away by approved vendors.

10.1 SOLID WASTE MANAGEMENT

- The total solid waste collected in the campus is 20 Kg/day on an average, from tree droppings, cups, paper etc. The waste is segregated at source by providing separate dustbins for Bio-degradable and Plastic waste.
- Single sided used papers are reused for writing and printing in all departments. Less plastic waste (average 0.1Kg/day) is generated by few departments, office, etc., it is collected and given to the vendor on a regular basis. Metal and wooden waste is stored and given to authorized scrap agents for further processing.
- Glass bottles are reused in the laboratories. The food waste is converted into biogas and is again used for the kitchen. Sanitary napkins are disposed of using incineration process.
- E-waste from labs is properly collected and is given to the licensed recycler, reused wherever possible, donated and sold if possible. Non-working computers, monitors, and printers are discarded and scrapped on a systematic basis.
- Some parts useful for other systems are kept aside for future use. Students are also imparted awareness and education about E-Waste. Our institute has a CII E-Waste Collection centre, and they collect a considerable amount of E-Waste.

10.2 DRY LEAVES WASTE MANAGEMENT

VERMICOMPOST:

Around 300 kg of green waste is collected from the surroundings on a regular basis and is Segregated and subjected to landfills and vermin compost, producing over 200 kg of manure. In addition to that, to make the manure more susceptible to being the best fertilizer, earthworms are used. added to the biomass. The earthworms can survive only at a specific temperature. So, to maintain the constant temperature (18 to 30), PH (6.5 to 7.5), and moisture content (50 to 60%) of the oil, a constant monitoring and control system has been adopted for the best outcome of the manure.

Impact:

The majority of the solid waste generated on campus can be reduced to quality organic manure. Can be produced that can be used for garden purposes, through which the quality of the Soil can be retained, and a 100% ecology-supported product developed. The automated process of Vermin-compost will be quite essential to meet the economic standards. The essential the thing is that vermin-compost production involves manpower to make the proper development. Progress. This helps provide work for many women, which leads to many women entrepreneurs. Thereby laying the way for women's empowerment. In the future, the backward category of people in the nearby adopted villages will be given first priority for the job opportunity to improve their standard of living.

10.3 WASTE RECYCLING SYSTEM

FLORAL WASTE TO AGARBATHI STICKS

The use of floral waste as a raw material to produce agar Bathi sticks has gained popularity in recent years as a way of reducing waste and promoting sustainability. To improve the standard of living of the women's community, they have been trained to convert flower waste into agar Bathi. With their help, it is possible to convert 1 kg of dally-generated floral waste into agar Bathi sticks. The process of converting floral waste into agar Bathi sticks involves collecting the waste material, cleaning, and drying it, grinding it into a fine powder, mixing it with other ingredients such as gums, perfumes, and essential oils, and then rolling it into sticks. The dried sticks are dried completely and packed for sale. In conclusion, converting floral waste into agar Bathi sticks is a practical and environmentally friendly solution to the problem of waste management.

11.0 AIR QUALITY OF THE COLLEGE

The Air (Prevention and Control of Pollution) Act 1981 was enacted by the Central Government with the objective of arresting the deterioration of air quality. The Air (Prevention and Control of Pollution) Act 1981 describes the main functions of the Central Pollution Control Board (CPCB) as follows:

- To Advise the Central Government on any matter concerning the improvement of the quality the air and the prevention, control, and abatement of air pollution.
- To plan and cause to be executed a nation-wide programme for the prevention, control and abatement of air pollution.
- To provide technical assistance and guidance to the State Pollution Control Board.
- To carry out and sponsor investigations and research related to prevention, control and abatement of air pollution.
- To collect, compile and publish technical and statistical data related to air pollution; and
- To lay down and annul standards for the quality of air.

Particulate Matter (PM10 & PM2.5)

A mixture of particles with liquid droplets in the air forms particulate matter. PM 10 are particles that have a size of less than or equal to 10 microns whereas PM2.5 are ultra-fine particles having a size of less than or equal to 2.5 microns.

Sources:

Particulate Matter is released from constructions, smoking, cleanings, renovations, demolitions, constructions, natural hazards such as earthquakes, volcanic eruptions, and emissions from industries such as brick kilns, paper & pulp, etc.

Related effects:

These particles, when inhaled, can penetrate deeper into the respiratory system, and cause respiratory ailments such as asthma, coughing, sneezing, irritation in the airways, eyes, nose, throat irritation, etc.

S. No	LOCATION	Air Quality level		
		PM 1.0	PM 2.5	PM 10
1	C1506_ Electric machines lab.	10	15	17
2	C1504_ Computer center II_ IT lab.	5	6	6
3	C1501_ Chemistry lab 1.	6	8	10
4	C2501_ Chemistry lab 2.	13	19	23
5	C2503_ Physics lab 2.	5	9	11
6	C2506_ P.G lab.	6	12	14
7	C2509_ Physics lab 1.	7	11	13
8	C3504_ H & S Gents staff room.	8	12	14
9	C3109_ I-CSE-B.	9	11	12
10	C3110_ I-CSE-C.	7	9	13
11	C3111_ I-IT-A.	4	7	11
12	C3506_ H & S Ladies staff room.	5	11	14
13	C3113_ I-IT-C.	7	13	14
14	A3107_ I-Civil.	9	16	18
15	A3106_ EEE-B.	1	6	6
16	A3104_ I-ECE-D.	6	11	14
17	A3502_ CSE Department.	7	9	12
18	B3103_ I-EIE-A.	8	10	11
19	B3102_ IOT.	9	12	7
20	B3502_ EIE_ CDAC IOT lab.	9	13	9
21	B3105_ I-AI & DS-C.	8	10	12
22	B2509_ VLSI design lab.	8	10	10
23	B2502_ Process control lab.	9	14	16
24	B2101_ Classroom.	10	11	13
25	B2103_ ICE Staffroom.	10	15	17
26	Artificial Intelligence & data science lab.	5	6	6
27	A2504_ Computer science & Business system.	6	8	10
28	D2104_ Philip Kotler Hall.	13	19	23
29	D2506_ BOT lab.	5	9	11
30	D2108_ FW Tayler Hall.	6	12	14
31	D2102_ hall.	7	11	13
32	D2101_ hall.	8	12	14
33	D3501_ Classroom.	9	11	12
34	D3101_ Classroom.	7	9	13
35	D3102_ hall.	4	7	11
36	D3105_ Classroom.	5	11	14
37	D4503_ MBA Library.	7	13	14
38	F4508_ lab.	9	16	18
39	E4501_ language lab.	1	6	6
40	E4502_ lab.	6	11	14
41	E4504_ Smart class I.	7	9	12
42	E4505_ Smart class II.	8	10	11
43	F4502_ lab.	5	11	13

S. No	LOCATION	Air Quality level		
		PM 1.0	PM 2.5	PM 10
44	F4503_ lab.	6	12	14
45	F4504_ lab.	7	11	12
46	F4505_ lab.	5	12	14
47	F4506_ Research lab	7	10	11
48	F3503_ Hod office classroom.	8	11	13
49	F3502_ classroom.	8	9	12
50	F3504_ classroom.	9	10	13
51	F1101_ classroom.	9	11	12
52	F5505_ drawing hall.	8	12	14
53	G5505_ lab.	8	11	14
54	G5503_ lab.	9	10	12
55	G5504_ lab.	5	8	12
56	H Block_ COE Office.	6	8	11
57	G6507_ drawing hall.	6	9	15
58	G6508_ lab.	8	9	12
59	G5501_ lab.	7	10	12
60	Alpha hall.	8	11	13
61	Beta hall.	9	10	12
62	Gamma hall.	7	9	11
63	H Block_ Dr. Kalam library hall.	8	10	11
64	H Block_ Dr. Kalam library hall_ first floor.	8	10	12
65	I1501_ Manufacturing technology lab.	8	9	9
66	K2501_ mechatronics lab.	7	8	9
67	F3104_ classroom.	8	9	12
68	F3105_ classroom.	9	10	12
69	F3106_ classroom.	9	11	12
70	F3506_ I year exam cell.	8	11	14
71	F3507_ Exam cell	9	10	12
72	E3101_ classroom.	5	8	12
73	E3102_ classroom.	6	8	11
74	E3103_ classroom.	6	9	15
75	E3104_ classroom.	8	9	12
76	E3105_ classroom.	7	10	12
77	E3106_ classroom.	7	9	11
78	E3107_ classroom.	8	10	11
79	E3108_ classroom.	8	10	12
80	E3501_ EIE HOD room & Gents staff room.	8	9	9
81	F5501_ Metallurgy lab.	7	8	9
82	F5502_ Drawing Hall.	8	9	12
83	F5503_ Drawing Hall.	9	10	12
84	F5504_ Drawing Hall.	9	11	12
85	F5505_ Drawing Hall.	8	9	11
86	F5506_ Drawing Hall.	9	10	12

S. No	LOCATION	Air Quality level		
		PM 1.0	PM 2.5	PM 10
87	F5507_ Drawing Hall.	9	10	11
88	F5508_ Drawing Hall.	8	9	11
89	F5509_ Drawing Hall.	8	9	12
90	F5510_ Drawing Hall.	5	8	10
91	F5512_ Media center.	6	7	9
92	F5513_ Drawing Hall.	9	10	12
93	J1501_ Manufacturing technology lab-II.	6	8	9
94	K1501_ Strength of materials lab.	6	8	7
95	L1501_ Fluid mechanics & Machinery lab.	6	9	11
96	M1501_ Internal combustion engines lab.	7	10	12
97	K2502_ Metrology lab.	5	8	9
98	L2501_ Dynamics lab.	5	8	8
99	M2501_ Heat & mass transfer lab.	9	12	13
100	J2501_ Basic workshop-I.	7	10	10
101	I2501_ Basic workshop-II.	8	12	13
102	K3501_ Mechanical HOD room.	9	11	12
103	M3104_ classroom.	8	13	13
104	M3103_ classroom.	9	11	12
105	M3102_ classroom.	9	12	14
106	M3101_ classroom.	8	11	11
107	K3502_ CAD lab-I.	7	8	8
108	K3503_ CAD lab-II.	8	9	11
109	K3504_ CAD lab-III.	8	14	15
110	L3501_ Staffroom.	9	11	14
111	L3101_ Classroom.	9	12	14
112	L3102_ Classroom.	7	12	13
113	L3103_ Classroom.	8	11	14
114	J3104_ Classroom.	9	11	14
115	J3103_ Classroom.	7	9	11
116	J3102_ Classroom.	6	8	8
117	J3101_ Classroom.	4	9	12
118	I3101_ Classroom.	9	8	10
119	I3102_ Classroom.	9	12	13
120	I3103_ Classroom.	7	10	10
121	I3104_ Classroom.	8	12	13
122	K4501_ Materials research center.	9	11	12
123	K4502_ Staffroom.	8	13	13
124	K4503_ Mechanical dept library.	9	11	12
125	K4504_ Clean energy center.	9	12	14
126	L4501_ Robotics lab.	8	11	11
127	L4502_ Project display lab-I.	7	8	8
128	L4503_ Project display lab-II.	5	8	10
129	L4504_ Solar research center.	8	11	8

S. No	LOCATION	Air Quality level		
		PM 1.0	PM 2.5	PM 10
130	M4101_ Classroom.	6	11	7
131	M4102_ Classroom.	9	12	7
132	M4103_ Classroom.	9	13	9
133	M4104_ Classroom.	5	8	8
134	J4101_ Classroom.	8	9	12
135	J4102_ Classroom.	8	11	14
136	J4103_ Classroom.	7	12	12
137	J4104_ Classroom.	7	9	9
138	I4101_ Classroom.	9	8	8
139	I4102_ Classroom.	8	9	12
140	I4103_ Classroom.	6	5	7
141	I4104_ Classroom.	6	7	12

12.0 NOISE LEVEL IN THE SURROUNDING OF COLLEGE

THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.

Ambient Air Quality Standards in respect of Noise

Area Code	Category Of Area/Zone	Limits In dB(A) Leq*	
		Day Time	Night-time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note: -

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night-time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places, or any other area which is declared as such by the competent authority.

4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
5. * dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
6. A "decibel" is a unit in which noise is measured.
7. "A", in dB(A) Leq, denotes the frequency weighting in the measurement of
8. noise and corresponds to frequency response characteristics of the human ear.

S. No	LOCATION	Noise Level dB
1	C1506_ Electric machines lab.	64
2	C1504_ Computer center II_ IT lab.	61
3	C1501_ Chemistry lab 1.	65
4	C2501_ Chemistry lab 2.	64
5	C2503_ Physics lab 2.	62
6	C2506_ P.G lab.	63
7	C2509_ Physics lab 1.	68
8	C3504_ H & S Gents staff room.	59
9	C3109_ I-CSE-B.	60
10	C3110_ I-CSE-C.	64
11	C3111_ I-IT-A.	61
12	C3506_ H & S Ladies staff room.	65
13	C3113_ I-IT-C.	64
14	A3107_ I-Civil.	62
15	A3106_ EEE-B.	63
16	A3104_ I-ECE-D.	68
17	A3502_ CSE Department.	59
18	B3103_ I-EIE-A.	60
19	B3102_ IOT.	63
20	B3502_ EIE_ CDAC IOT lab.	65
21	B3105_ I-AI & DS-C.	66
22	B2509_ VLSI design lab.	64
23	B2502_ Process control lab.	65
24	B2101_ Classroom.	63
25	B2103_ ICE Staffroom.	64
26	Artificial Intelligence & data science lab.	59
27	A2504_ Computer science & Business system.	57
28	D2104_ Philip Kotler Hall.	55
29	D2506_ BOT lab.	62.3
30	D2108_ FW Tayler Hall.	64
31	D2102_ hall.	65
32	D2101_ hall.	65
33	D3501_ Classroom.	66
34	D3101_ Classroom.	68
35	D3102_ hall.	65

S. No	LOCATION	Noise Level dB
36	D3105_ Classroom.	63
37	D4503_ MBA Library.	63
38	F4508_ lab.	65
39	E4501_ language lab.	65
40	E4502_ lab.	64
41	E4504_ Smart class I.	63
42	E4505_ Smart class II.	64
43	F4502_ lab.	55
44	F4503_ lab.	59
45	F4504_ lab.	57
46	F4505_ lab.	55
47	F4506_ Research lab.	65
48	F3503_ Hod office classroom.	66
49	F3502_ classroom.	67
50	F3504_ classroom.	67
51	F1101_ classroom.	65
52	F5505_ drawing hall.	65
53	G5505_ lab.	66
54	G5503_ lab.	65.8
55	G5504_ lab.	60.1
56	H Block_ COE Office.	72.1
57	G6507_ drawing hall.	67
58	G6508_ lab.	67
59	G5501_ lab.	67
60	Alpha hall.	64
61	Beta hall.	74
62	Gamma hall.	69
63	H Block_ Dr. Kalam library hall.	64
64	H Block_ Dr. Kalam library hall_ first floor.	67
65	I1501_ Manufacturing technology lab.	65
66	K2501_ mechatronics lab.	66
67	F3104_ classroom.	68
68	F3105_ classroom.	67
69	F3106_ classroom.	66
70	F3506_ I year exam cell.	64
71	F3507_ Exam cell.	66
72	E3101_ classroom.	65.8
73	E3102_ classroom.	60.1
74	E3103_ classroom.	72.1
75	E3104_ classroom.	67
76	E3105_ classroom.	67
77	E3106_ classroom.	67
78	E3107_ classroom.	64
79	E3108_ classroom.	74

S. No	LOCATION	Noise Level dB
80	E3501_ EIE HOD room & Gents staff room.	69
81	F5501_ Metallurgy lab.	64
82	F5502_ Drawing Hall.	67
83	F5503_ Drawing Hall.	65
84	F5504_ Drawing Hall.	66
85	F5505_ Drawing Hall.	68
86	F5506_ Drawing Hall.	67
87	F5507_ Drawing Hall.	66
88	F5508_ Drawing Hall.	64
89	F5509_ Drawing Hall.	66
90	F5510_ Drawing Hall.	65.8
91	F5512_ Media Centre.	60.1
92	F5513_ Drawing Hall.	72.1
93	J1501_ Manufacturing technology lab-II.	67
94	K1501_ Strength of materials lab.	67
95	L1501_ Fluid mechanics & Machinery lab.	67
96	M1501_ Internal combustion engines lab.	64
97	K2502_ Metrology lab.	74
98	L2501_ Dynamics lab.	69
99	M2501_ Heat & mass transfer lab.	64
100	J2501_ Basic workshop-I.	67
101	I2501_ Basic workshop-II.	65
102	K3501_ Mechanical HOD room.	66
103	M3104_ classroom.	68
104	M3103_ classroom.	67
105	M3102_ classroom.	66
106	M3101_ classroom.	64
107	K3502_ CAD lab-I.	66
108	K3503_ CAD lab-II.	65.8
109	K3504_ CAD lab-III.	60.1
110	L3501_ Staffroom.	72.1
111	L3101_ Classroom.	67
112	L3102_ Classroom.	67
113	L3103_ Classroom.	67
114	J3104_ Classroom.	64
115	J3103_ Classroom.	74
116	J3102_ Classroom.	69
117	J3101_ Classroom.	64
118	I3101_ Classroom.	67
119	I3102_ Classroom.	65
120	I3103_ Classroom.	66
121	I3104_ Classroom.	68
122	K4501_ Materials research center.	67
123	K4502_ Staffroom.	66

S. No	LOCATION	Noise Level dB
124	K4503_ Mechanical dept library.	64
125	K4504_ Clean energy center.	66
126	L4501_ Robotics lab.	65.8
127	L4502_ Project display lab-I.	60.1
128	L4503_ Project display lab-II.	72.1
129	L4504_ Solar research center.	67
130	M4101_ Classroom.	67
131	M4102_ Classroom.	67
132	M4103_ Classroom.	64
133	M4104_ Classroom.	65.8
134	J4101_ Classroom.	60.1
135	J4102_ Classroom.	72.1
136	J4103_ Classroom.	67
137	J4104_ Classroom.	67
138	I4101_ Classroom.	67
139	I4102_ Classroom.	64
140	I4103_ Classroom.	74
141	I4104_ Classroom.	69

13.0 LUX LEVEL

The lux level survey is carried out in various location of campus by using lux meter and details are as follows.

S. No	LOCATION	Average Lux level
1	C1506_ Electric machines lab.	241
2	C1504_ Computer center II_ IT lab.	127
3	C1501_ Chemistry lab 1.	153
4	C2501_ Chemistry lab 2.	14
5	C2503_ Physics lab 2.	244
6	C2506_ P.G lab.	116
7	C2509_ Physics lab 1.	117
8	C3504_ H & S Gents staff room.	134
9	C3109_ I-CSE-B.	121
10	C3110_ I-CSE-C.	142
11	C3111_ I-IT-A.	143
12	C3506_ H & S Ladies staff room.	163
13	C3113_ I-IT-C.	190
14	A3107_ I-Civil.	104
15	A3106_ EEE-B.	128
16	A3104_ I-ECE-D.	138
17	A3502_ CSE Department.	153

S. No	LOCATION	Average Lux level
18	B3103_ I-EIE-A.	165
19	B3102_ IOT.	152
20	B3502_ EIE_ CDAC IOT lab.	137
21	B3105_ I-AI & DS-C.	350
22	B2509_ VLSI design lab.	257
23	B2502_ Process control lab.	241
24	B2101_ Classroom.	127
25	B2103_ ICE Staffroom.	153
26	Artificial Intelligence & data science lab.	471
27	A2504_ Computer science & Business system.	475
28	D2104_ Philip Kotler Hall.	547
29	D2506_ BOT lab.	285
30	D2108_ FW Tayler Hall.	509
31	D2102_ hall.	461
32	D2101_ hall.	476
33	D3501_ Classroom.	453
34	D3101_ Classroom.	241
35	D3102_ hall.	127
36	D3105_ Classroom.	153
37	D4503_ MBA Library.	144
38	F4508_ lab.	88
39	E4501_ language lab.	116
40	E4502_ lab.	117
41	E4504_ Smart class I.	134
42	E4505_ Smart class II.	121
43	F4502_ lab.	142
44	F4503_ lab.	143
45	F4504_ lab.	163
46	F4505_ lab.	190
47	F4506_ Research lab.	104
48	F3503_ Hod office classroom.	128
49	F3502_ classroom.	138
50	F3504_ classroom.	153
51	F1101_ classroom.	165
52	F5505_ drawing hall.	152
53	G5505_ lab.	137
54	G5503_ lab.	350
55	G5504_ lab.	257
56	H Block_ COE Office.	232
57	G6507_ drawing hall.	121
58	G6508_ lab.	123
59	G5501_ lab.	164
60	Alpha hall.	284

S. No	LOCATION	Average Lux level
61	Beta hall.	388
62	Gamma hall.	398
63	H Block_ Dr. Kalam library hall.	169
64	H Block_ Dr. Kalam library hall_ first floor.	166
65	I1501_ Manufacturing technology lab.	79
66	K2501_ mechatronics lab.	368
67	F3104_ classroom.	148
68	F3105_ classroom.	165
69	F3106_ classroom.	168
70	F3506_ I year exam cell.	171
71	F3507_ Exam cell.	177
72	E3101_ classroom.	168
73	E3102_ classroom.	169
74	E3103_ classroom.	159
75	E3104_ classroom.	168
76	E3105_ classroom.	178
77	E3106_ classroom.	169
78	E3107_ classroom.	171
79	E3108_ classroom.	178
80	E3501_ EIE HOD room & Gents staff room.	182
81	F5501_ Metallurgy lab.	187
82	F5502_ Drawing Hall.	169
83	F5503_ Drawing Hall.	184
84	F5504_ Drawing Hall.	180
85	F5505_ Drawing Hall.	179
86	F5506_ Drawing Hall.	218
87	F5507_ Drawing Hall.	238
88	F5508_ Drawing Hall.	203
89	F5509_ Drawing Hall.	244
90	F5510_ Drawing Hall.	242
91	F5512_ Media center.	175
92	F5513_ Drawing Hall.	175
93	J1501_ Manufacturing technology lab-II.	168
94	K1501_ Strength of materials lab.	179
95	L1501_ Fluid mechanics & Machinery lab.	171
96	M1501_ Internal combustion engines lab.	146
97	K2502_ Metrology lab.	168
98	L2501_ Dynamics lab.	168
99	M2501_ Heat & mass transfer lab.	170
100	J2501_ Basic workshop-I.	173
101	I2501_ Basic workshop-II.	181
102	K3501_ Mechanical HOD room.	179
103	M3104_ classroom.	183

S. No	LOCATION	Average Lux level
104	M3103_ classroom.	178
105	M3102_ classroom.	181
106	M3101_ classroom.	174
107	K3502_ CAD lab-I.	182
108	K3503_ CAD lab-II.	185
109	K3504_ CAD lab-III.	194
110	L3501_ Staffroom.	198
111	L3101_ Classroom.	193
112	L3102_ Classroom.	178
113	L3103_ Classroom.	135
114	J3104_ Classroom.	138
115	J3103_ Classroom.	123
116	J3102_ Classroom.	137
117	J3101_ Classroom.	178
118	I3101_ Classroom.	174
119	I3102_ Classroom.	178
120	I3103_ Classroom.	133
121	I3104_ Classroom.	438
122	K4501_ Materials research center.	447
123	K4502_ Staffroom.	163
124	K4503_ Mechanical dept library.	149
125	K4504_ Clean energy center.	146
126	L4501_ Robotics lab.	228
127	L4502_ Project display lab-I.	170
128	L4503_ Project display lab-II.	156
129	L4504_ Solar research center.	219
130	M4101_ Classroom.	234
131	M4102_ Classroom.	203
132	M4103_ Classroom.	155
133	M4104_ Classroom.	172
134	J4101_ Classroom.	155
135	J4102_ Classroom.	113
136	J4103_ Classroom.	124
137	J4104_ Classroom.	123
138	I4101_ Classroom.	135
139	I4102_ Classroom.	138
140	I4103_ Classroom.	123
141	I4104_ Classroom.	137

14.0 ENERGY AUDIT

14.1 PRESENT ELECTRICAL ENERGY SYSTEM AND ELECTRICAL BILL ANALYSI

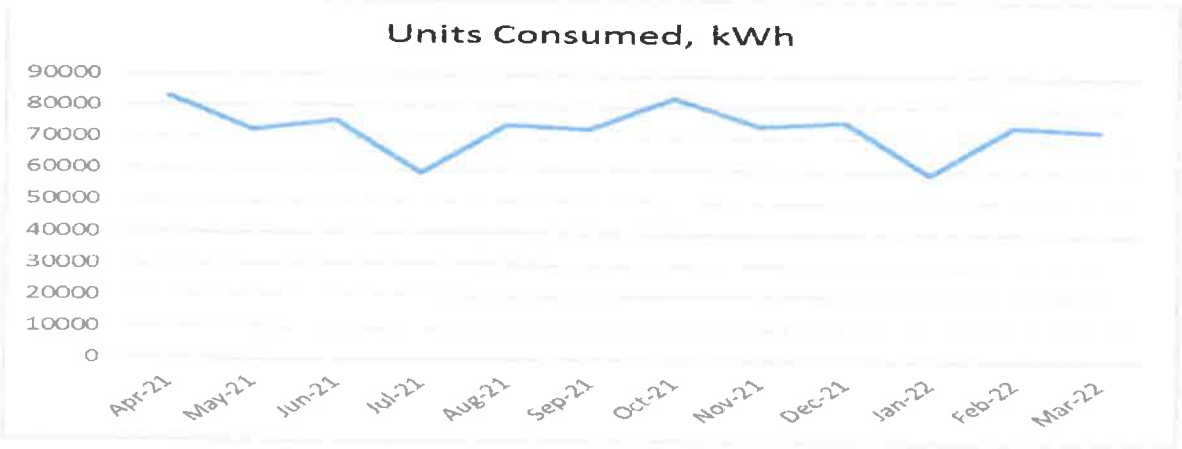
The Campus receives electricity supply from TNEB through HT connections, details of the supply are as follows,

Source Of Power Supply	:	**TNEB**
Electric Power Supply is received from TANGEDCO	:	HT supply
Service number	:	09-909-400-0488
Sectional load	:	1000
Annual Electricity Consumption, kWh	:	877,253
Avg. Annual Power factor		0.94
Unit charges, INR/kWh	:	6.35

Month	Sanctioned demand, kVA	Recorded Maximum Demand, kVA	% Demand Utilisation	Units Consumed, kWh	Electricity consumption charges, INR	PF	E-Tax, INR	Total bill paid, INR	Unit cost, INR/kWh
Apr-21	1000	448	45%	82895	526383	0.93	15204	592593	6.35
May-21	1000	298	30%	72457	460102	0.98	2211	332229	6.35
Jun-21	1000	309	31%	75560	479806	0.95	31508	917432	6.35
Jul-21	1000	322	32%	59030	374841	0.94	24017	555606	6.35
Aug-21	1000	448	45%	74468	472872	0.94	31915	831472	6.35
Sep-21	1000	309	31%	73211	464890	0.94	29133	825526	6.35
Oct-21	1000	340	34%	82895	526383	0.93	32353	889328	6.35
Nov-21	1000	342	34%	74468	472872	0.93	29069	815829	6.35
Dec-21	1000	333	33%	75560	479806	0.94	29490	837604	6.35
Jan-22	1000	322	32%	59030	374841	0.94	26243	768363	6.35
Feb-22	1000	448	45%	74468	472872	0.95	25114	768256	6.35
Mar-22	1000	309	31%	73211	464890	0.94	31378	860490	6.35

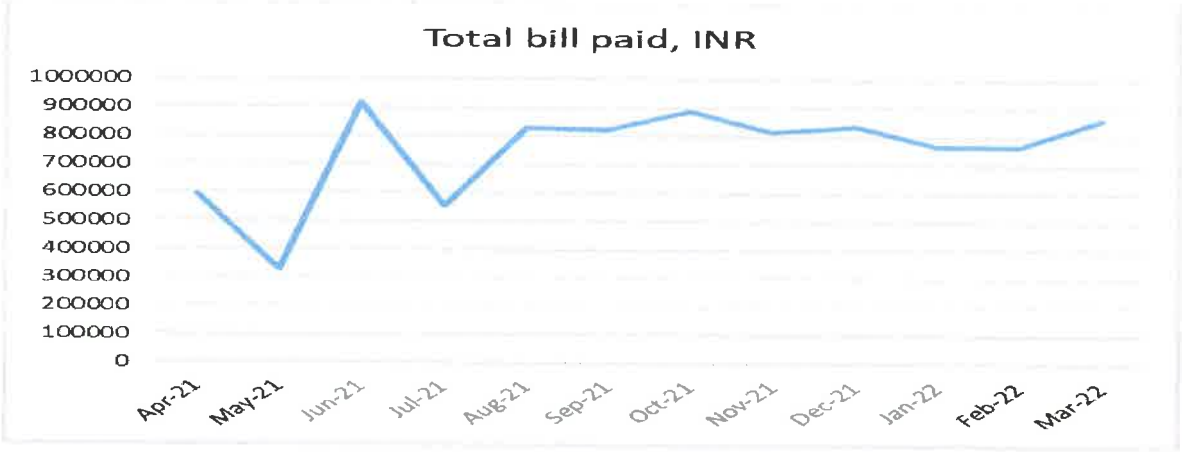
- The college has maintained the average power factor of 0.94, it is recommended to maintain the power factor close to unity.
- The college has maintained the average Demand utilisation of 35%.

The graphical representation of Consumed units and months are as follows.



The maximum unit is consumed in the month of October 2021 and minimum in the month of June 2021.

The graphical representation of consumption charges and months as follows.



The maximum bill is paid in the month of June 2021 and minimum in the month of May 2021.

14.2 CONNECTED ELECTRICAL LOAD

S.NO	Equipment	Type of Equipment	A BLOCK				POWER, W	TOTAL POWER, kW
			Ground Floor	I Floor	II Floor	Total Quantity		
1	Light	Fluorescent Light	206	94	71	**371**	36	13.4
		CFL	5	1	0	**6**	18	0.1
2	Fan	Ceiling Fan	29	35	77	**141**	70	9.9
		Pedestal Fan	6	5	4	**15**	70	1.1
		Wall mounted Fan	1	5	1	**7**	60	0.4
3	Air Conditioner	Split AC	22	11	1	**34**	1408	47.9
		Window AC	7	0	0	**7**	1400	9.8
TOTAL POWER, kW								**82.5**

S.NO	Equipment	Type of Equipment	B BLOCK				POWER, W	TOTAL POWER, kW
			Ground Floor	I Floor	II Floor	Total Quantity		
1	Light	Fluorescent Light	78	51	49	**178**	36	6.4
		CFL	26	16	12	**54**	18	1.0
2	Fan	Ceiling Fan	4	49	47	**100**	70	7.0
		Pedestal Fan	6	4	2	**12**	70	0.8
		Wall mounted Fan	0	0	0	**0**	60	0.0
3	Air Conditioner	Split AC	16	6	6	**28**	1408	39.4
TOTAL POWER, kW								**54.6**

S.NO	Equipment	Type of Equipment	C BLOCK				POWER, W	TOTAL POWER, kW
			Ground Floor	I Floor	II Floor	Total Quantity		
1	Light	Fluorescent Light	107	51	78	**236**	36	8.5
		CFL	0	8	0	**8**	18	0.1
2	Fan	Ceiling Fan	51	52	85	**188**	70	13.2
		Pedestal Fan	2	0	1	**3**	70	0.2
		Wall mounted Fan	0	0	1	**1**	60	0.1
		Exhaust Fan	4	0	0	**4**	60	0.2
3	Air Conditioner	Split AC	10	4	1	**15**	1408	21.1
TOTAL POWER, kW								**43.4**

S.NO	Equipment	Type of Equipment	D BLOCK					POWER, W	TOTAL POWER, kW
			Ground Floor	I Floor	II Floor	III Floor	Total Quantity		
1	Light	Fluorescent Light	31	36	44	24	135	36	4.9
		CFL	62	63	24	142	291	18	5.2
2	Fan	Ceiling Fan	25	47	50	10	132	70	9.2
		Pedestal Fan	1	0	0	0	1	70	0.1
		Wall mounted Fan	18	0	10	4	32	60	1.9
		Exhaust Fan	0	0	0	1	1	60	0.1
3	Air Conditioner	Split AC	14	12	4	29	59	1408	83.1
TOTAL POWER, kW									104.5

S.NO	Equipment	Type of Equipment	I BLOCK					POWER, W	TOTAL POWER, kW
			Ground Floor	I Floor	II Floor	III Floor	Total Quantity		
1	Light	Fluorescent Light	42	29	16	16	103	36	3.708
		LED	1	15	4	3	23	20	0.46
2	Fan	Ceiling Fan	70	15	24	24	133	70	9.31
TOTAL POWER, kW									13.5

S.NO	Equipment	Type of Equipment	J BLOCK					POWER, W	TOTAL POWER, kW
			Ground Floor	I Floor	II Floor	III Floor	Total Quantity		
1	Light	Fluorescent Light	42	30	16	8	96	36	3.456
		LED	1	15	4	19	39	20	0.78
2	Fan	Ceiling Fan	17	15	24	6	62	70	4.34
3	Air Conditioner	Window AC	0	0	0	4	4	1400	8.6
TOTAL POWER, kW									13.7

K BLOCK									
S.NO	Equipment	Type of Equipment	Ground Floor	I Floor	II Floor	III Floor	Total Quantity	POWER, W	TOTAL POWER, kW
1	Light	Fluorescent Light	41	0	0	16	**57**	36	2.052
		LED	2	18	58	18	**96**	20	1.92
2	Fan	Ceiling Fan	17	15	6	24	**62**	70	4.34
		Pedestal Fan	0	0	1	0	**1**	80	0.08
		Wall mounted Fan	0	0	1	1	**2**	60	0.12
3	Air Conditioner	Split AC	0	6	14	1	**21**	1408	29.568
TOTAL POWER, kW									**38.1**

L BLOCK									
S.NO	Equipment	Type of Equipment	Ground Floor	I Floor	II Floor	III Floor	Total Quantity	POWER, W	TOTAL POWER, kW
1	Light	Fluorescent Light	41	0	16	12	**69**	36	2.484
		LED	2	18	4	11	**35**	20	0.7
2	Fan	Ceiling Fan	17	17	24	26	**84**	70	5.88
		Pedestal Fan	0	0	1	0	**1**	80	0.08
		Wall mounted Fan	0	0	1	1	**2**	60	0.12
3	Air Conditioner	Window AC	0	0	14	0	**14**	1400	19.6
TOTAL POWER, kW									**28.9**

M BLOCK									
S.NO	Equipment	Type of Equipment	Ground Floor	I Floor	II Floor	III Floor	Total Quantity	POWER, W	TOTAL POWER, kW
1	Light	Fluorescent Light	41	40	16	3	**100**	36	4
		LED	1	40	4	14	**59**	20	1
2	Fan	Ceiling Fan	17	17	24	17	**75**	70	5
		Pedestal Fan	0	0	1	0	**1**	80	0.08
		Wall mounted Fan	0	0	1	1	**2**	60	0.12
3	Air Conditioner	Split AC	0	6	0	0	**6**	1408	8
TOTAL POWER, kW									**13.9**

15.0 ALTERNATE SOURCES OF ENERGY

15.1 SOLAR ENERGY

Solar panel survey has been carried out and details as follows:

Name of the block	SEC (All the blocks in the College)
Wattage of each panel, W	275
Total Capacity, kW	75
Availability of Net Metering	Yes

In nearby future they planned to expand the solar panel capacity of 500 kW.

15.2 BIOGAS PLANT

It is generated by the hostels and kitchen. These wastes are used to generate biogas. The solid waste from the toilet is diverted to the biogas plant via septic tanks. The unique feature of the bio-gas plant is that it is installed to link the toilet. The bio-gas usage reduces the LPG cost. The digested sludge is used as a menu for the garden, and the Water is used for gardening. Biogas plants rely on anaerobic digestion, a fermentation process in which waste is digested by microbes to produce methane gas (biogas).


SAI RAM ENGINEERING COLLEGE
RESEARCH AND DEVELOPMENT CELL
BIO GAS PLANT
Capacity 40m³
Feed Kitchen waste
Gas produced Methane
Funded by Sapthagiri Educational Trust
Project Cost ₹18.0 Lakhs
An innovative project to upcycle the food waste. The edible remains from college mess is fed into the biogas plant resulting in production of biogas which is then used as fuel in the mess for cooking purpose.

16.0 EXECUTIVE SUMMARY

S. No	Energy Efficiency Measures	Estimate annual Energy Savings, kWh/Annum	Estimated Investment, INR	Monetary Savings, INR	payback Period, months	Emission Reduction, t CO2/Annum
1	Replace 1345 no's existing Fluorescent Tube light to 1345 no's LED Tube Light	45192	807000	286969	34	38
2	Replace 977 no's existing Conventional fan to 977 no's BLDC Fan	71810	3712600	455990	98	61
3	Replace 54 no's existing wall mounted fans to 54 no's BLDC wall mounted Fans	2835	205200	18002	137	2
4	Replace 34 no's existing Pedestal Fans to 34 no's BLDC Pedestal Fans	3213	136000	20403	80	3
5	Replace 177 no's existing 1.5 TR 3-Star Split AC to 1.5 TR 5 - Star Invertor Split AC	197051	7080000	197051	68	167
6	Replace 25 no's existing Window AC to 1.5 TR 5 - Star Invertor Split AC	26460	1000000	168021	71	22
		346560	**12940800**	**1146436**	**81**	**295**

Annual Electrical Energy consumption, kWh/Annum	**8,77,253**
Annual Electrical Energy Savings, kWh/Annum	346560
Electrical Energy Savings, %	**39.5**

17.0 ENERGY CONSERVATIVE MEASURES

17.1 Replace 1345 No's Existing Fluorescent Tube Light To 1345 No's LED Tube Light

Observation:

During audit, it was observed that few FTL lights were used for illumination purpose. FTL lights consumes high power than LED Lights.

Recommendation:

It is recommended to replace those FTL lights to energy efficient LED lights for better lumens and to lower the power consumption. The lumens of FTL light are 63 per watt whereas the lumens of LED light are 120 per watt.

Estimated Savings:

Replace existing Fluorescent Tube light to LED Tube Light		
Description	**Units**	**Values**
Quantity of existing Fluorescent Tube light	Nos	1,345
Wattage of Fluorescent Tube light	W	36
Present operating hours	Hours/Annum	2,100
Average unit cost	INR/kWh	6.35
Energy Consumption by existing Fluorescent Tube light	kWh/Annum	1,01,682
Wattage of LED Tube Light	W	20
Energy Consumption by LED Tube Light	kWh/Annum	56,490
Cost of one LED Tube Light	INR	600
Energy savings	kWh/Annum	45,192
Cost Savings	INR/Annum	2,86,969
Investment	INR	8,07,000
Payback Period	Months	34

17.2 Replace 977 No's Existing Conventional Fan To 977 No's BLDC Fan

Observation:

During audit it was observed that conventional ceiling fans were used for ventilation purposes.

Recommendation:

It is recommended to replace those conventional ceiling fans with Energy efficient BLDC fans to observe the following energy savings.

Estimated Savings:

Replace existing Conventional fan to BLDC Fan		
Description	**Units**	**Values**
Quantity of existing Conventional fan	Nos	977
Wattage of Conventional fan	W	70
Present operating hours	Hours/Annum	2,100
Average unit cost	INR/kWh	6.35
Energy Consumption by existing Conventional fan	kWh/Annum	1,43,619
Wattage of BLDC Fan	W	35
Energy Consumption by BLDC Fan	kWh/Annum	71,810
Cost of one BLDC Fan	INR	3,800
Energy savings	kWh/Annum	71,810
Cost Savings	INR/Annum	4,55,990
Investment	INR	37,12,600
Payback Period	Months	98

17.3 Replace 54 no's existing wall mounted fans to 54 no's BLDC wall mounted Fans!

Observation:

During audit it was observed that wall mounted fans were used for ventilation purposes.

Recommendation:

It is recommended to replace the wall mounted fans to BLDC wall mounted Fans to reduce energy consumption.

Estimated Savings:

Replace existing wall mounted fans to BLDC wall mounted Fans		
Description	**Units**	**Values**
Quantity of existing wall mounted fans	Nos	54
Wattage of wall mounted fan	W	60
Present operating hours	Hours/Annum	2100
Average unit cost	INR/kWh	6.35
Energy Consumption by existing wall mounted fan	kWh/Annum	6,804
Wattage of BLDC wall mounted Fan	W	35
Energy Consumption by BLDC wall mounted Fan	kWh/Annum	3,969
Cost of one BLDC wall mounted Fan	INR	3,800
Energy savings	kWh/Annum	2,835
Cost Savings	INR/Annum	18,002
Investment	INR	2,05,200
Payback Period	Months	137

17.4 Replace 34 no's existing Pedestal Fans to 34 no's BLDC Pedestal Fans

Observation:

During audit it was observed that Pedestal Fans were used for ventilation purposes.

Recommendation:

It is recommended to replace the Pedestal Fans to BLDC Pedestal Fans to reduce energy consumption.

Estimated Savings:

Replace existing Pedestal Fans to BLDC Pedestal Fans		
Description	**Units**	**Values**
Quantity of existing Pedestal Fans	Nos	34
Wattage of Pedestal Fan	W	80
Present operating hours	Hours/Annum	2100
Average unit cost	INR/kWh	6.35
Energy Consumption by existing Pedestal Fan	kWh/Annum	5,712
Wattage of BLDC Pedestal Fan	W	35
Energy Consumption by BLDC Pedestal Fan	kWh/Annum	2,499
Cost of one BLDC Pedestal Fan	INR	4,000
Energy savings	kWh/Annum	3,213
Cost Savings	INR/Annum	20,403
Investment	INR	1,36,000
Payback Period	Months	80

17.5 Replace 177 no's existing 1.5 TR 3- Star Split AC to 1.5 TR 5 - Star Invertor Split AC

Observation:

During audit it was observed 3-star Air Conditioners that were used for ventilation purposes.

Recommendation:

It is recommended to replace those Air Conditioners with energy efficient Air Conditioners to observe the following energy savings.

Estimated Savings:

Replace existing 1.5 TR 3- Star Split AC to 1.5 TR 5 - Star Invertor Split AC		
Description	**Units**	**Values**
Total Number of 3- Star Split AC	Nos	177
Wattage of 3- Star Split AC	W	1408
Running hours	hours/day	7
Total working days (Approx)	days/Annum	280
Average unit cost	INR/kWh	6.35
Energy Consumption by existing 3- Star Split AC	kWh/Annum	4,88,463
Wattage of 5 - star Invertor AC	W	840
Energy Consumption by 5 - star Invertor AC	kWh/Annum	2,91,413
Cost of one 5 - star Invertor AC	INR	40,000
Energy savings	kWh/Annum	1,97,051
Cost Savings	INR/Annum	12,51,271
Investment	INR	70,80,000
Payback Period	Months	68

17.6 Replace 25 no's existing Window AC to 1.5 TR 5 - Star Invertor Split AC

Observation:

During audit it was observed Window Air Conditioners that were used for ventilation purposes.

Recommendation:

It is recommended to replace those Air Conditioners with energy efficient Air Conditioners to observe the following energy savings.

Estimated Savings:

Replace existing Window AC to 1.5 TR 5 - Star Invertor Split AC		
Description	**Units**	**Values**
Total Number of Window AC	Nos	25
Wattage of Window AC	W	1400
Running hours	hours/day	7
Total working days (Approx)	days/Annum	270
Average unit cost	INR/kWh	6.35
Energy Consumption by existing Window AC	kWh/Annum	66,150
Wattage of 5 - star Invertor AC	W	840
Energy Consumption by 5 - star Invertor AC	kWh/Annum	39,690
Cost of one 5 - star Invertor AC	INR	40,000
Energy savings	kWh/Annum	26,460
Cost Savings	INR/Annum	1,68,021
Investment	INR	10,00,000
Payback Period	Months	71

18.0 ACCREDITED ENERGY AUDITOR CERTIFICATES

ENERGY IS LIFE
BEE
CONSERVE IT

BUREAU OF ENERGY EFFICIENCY

Examination Registration No. EA-3201

Accreditation Registration No. AEA 0023

Certificate of Accreditation

This is to certify that Mr./Ms. B. Senthilkumar having its trade/registered office at Chennai has been given accreditation as accredited energy auditor. The certificate shall be effective from 26th day of February 2013

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. 0023 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 26th day of May 2014

Secretary,
Bureau of Energy Efficiency
New Delhi

iqms

In association with

SWISO

THIS IS TO CERTIFY THAT

B. Senthil Kumar

has successfully completed a course approved by the
Institute of Environmental Management & Assessment in

ADVANCED EMS AUDITOR
(ISO 14001:2004)

(achieving an overall mark of 75%)

13th to 17th October 2008

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Signed for Swiso India Private Limited

IQ – EMS42357

CERTIFICATE NUMBER

iqms Course No: IQM/EMS4007.005 (A) approved by IEMA

SGS

CERTIFICATE

SGS Taiwan GHG Group

This to certify that

B SENTHIL KUMAR

has successfully passed the course assessment and examination for

ISO14064:2006 GHG Inventory and Verification

Held on: 2nd-4th March 2009
Location: Gurgaon, India

Richard Huang
Technical Manager
SGS Taiwan GHG Group

TW-I-0082
Certificate Number

SGS United Kingdom Limited
Climate Change Programme

ऊर्जा दक्षता ब्यूरो
(भारत सरकार, विद्युत मंत्रालय)
BUREAU OF ENERGY EFFICIENCY
(Government of India, Ministry of Power)

15 YEARS OF CELEBRATING THE MAHATMA

F.No.09/06/07/IMPL/ECBC/5979-6028 SPEED POST

August 21, 2019

Shri Praveen Kumar Yadav
Environmental Design Solution Pvt Ltd
A-4/3, Basement, Vasant Vihar,
New Delhi - 110057

Subject: Empanelment of ECBC Expert Professional

Dear Shri Praveen,

This has reference to your application for empanelment of ECBC Expert Professional for implementing the Energy Conservation Building Code (ECBC). We are pleased to inform that you have been shortlisted to act as the ECBC Expert professional for helping in building technical capacity, compliance with code and effective implementation of it. The validity of the empanelment is for two years or till the creation of a pool of Certified Energy Auditors (Buildings), whichever is earlier. A brief on roles and responsibilities of professionals will be as per the prevailing ECBC Rules, 2018, is enclosed herewith.

It may be further noted that "**the professional working with ECBC Cell in States/UTs shall not work on the projects for the same State/UT during their tenure as a part of ECBC cells and after one year from the last date of their incumbent in the ECBC cell. Such professionals may provide technical assistance in other State/UT for other projects.**"

With best regards.

Yours sincerely,

(Saurabh Diddi)
Director

Encl: As above

TM

Factual Assessments - Global Certifications

Certificate of Compliance

This is to certify that

NIN Energy India Private Limited

JUSA Complex, New No 47, Old No 21/2, Ponniamman Koil Street, Kottur,
Chennai - 600085 (Tamil Nadu), India.

has been assessed by RSI and found to comply with the requirements of

ISO/IEC 17020:2012

Operation of various types of bodies performing inspection - Requirements

for the following activities:

Mandatory Energy Audit, Environment Audit, Green Audit, PAT Measurement and Verification (M&V), Power Quality Audit, Infrared Thermography, Electrical Safety Audit, Energy Management Training, Energy Management System, Measurement & Verification, Green Building Services, Renewable Energy Services, Carbon Foot Printing and Water Audit

Certificaat Nummer / Certificate No. : IE-BV-2207-5410

Datum Van Publicatie / Date of Issue : 27/07/2022
Vervaldatum / Date of Expiry : 26/07/2025
Ist Annual surveillance audit due on : 26/06/2023
IInd Annual surveillance audit due on : 26/06/2024

Director (Certification)

Royal Stancert B.V.
Feitelijke Beoordelingen - Wereldwijde Beoordelingen
Certificaat Nummer / Certificate No. : Q-101-10001-10101

Regd. Office - Joop Geesinkweg 701, 1114 AB Amsterdam. The Netherlands
(KvK-Nummer 71431802 / RSIN 858713159 - Rechtsvorm - Besloten Vennootschap).

This certificate remains the property of **Royal Stancert B.V.** and must be returned whenever demanded. The validity of this certificate can be verified at http://www.royalstancert.org. **Royal Stancert B.V.** is an independent system, product and personal assessment body accredited by Global Euro Accreditation Centre, Georgia. (GCTN - 654). Email: info@royalstancert.org

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PAC-GEAC-1506-299