



NEHRU INSTITUTE OF ENGINEERING AND TECHNOLOGY

T. M. Palayam, Coimbatore-641 105

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

Accredited by NAAC, Recognized by UGC under Section 2(f) and 12(B)

NBA Accredited UG Courses: AERO, CSE, MECH



C.7.1.6.Index

S.No.	Description
Reports of the Audit	
7.1.6.1	Energy Audit
7.1.6.2	Green Audit
7.1.6.3	Environment Audit

Vision: Our vision is to mould the youngsters to acquire sound knowledge in technical and scientific fields to face the future challenges by continuous upgradation of all resources and processes for the benefit of humanity as envisaged by our great leader pandit Jawaharlal Nehru.

Mission: To built a strong centre of learning and research in Engineering and Technology.
To facilitate the youth to learn and imbibe discipline, culture and spirituality
To produce quality engineers, dedicated scientists and leaders.
To encourage Entrepreneurship
To face the challenging needs of the global industries.

2021

Energy Audit Report

of

**Nehru Institute of Engineering
and Technology, Coimbatore**

Energy Audit by

Sri Energy

Solutions

09/02/2021

Project Report Title : **Energy Audit**

Client Name : **Nehru Institute of Engineering and Technology**

Plant Location : **Nehru Garden,
Nehru College Road,
Thirumalayam palayam,
Coimbatore-641 105.**

Date of Audit : **09th February 2021**

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

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Acknowledgement

Sri Energy Solutions acknowledge with hearty thanks to **Dr.P.Krishna das, Chairman and Managing Trustee, Dr.P.Krishnakumar, CEO and Secretary, Nehru Institute of Engineering and Technology, Coimbatore** for them support for carrying out this audit.

Our special thanks to **Dr.P.Maniarasan – Principal and Dr.Kannan - HOD** for their co-operation and support us to carry out the Energy audit on time.

In addition with this, we are grateful to your staffs **Mr.N.Sathish kumar and Mr.Jagadesh** for their co-operation and support us to carry out the Energy audit very effectively.

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1. Introduction

Nehru Institute of Engineering and Technology is located at Thirumalayam palayam, Coimbatore. This college is having lot of courses in Engineering sector with complete equipped. This institution has LTCT TNEB service and two backup generators of 250 KVA and 125 KVA capacity. High quality panels and switch gears are connected with this service for giving quality supply to the equipments. The capacity of generator is also well enough to meet the demand. On the next step, the management decided to conduct the energy audit in their institution to reduce their energy cost.

2. Objectives

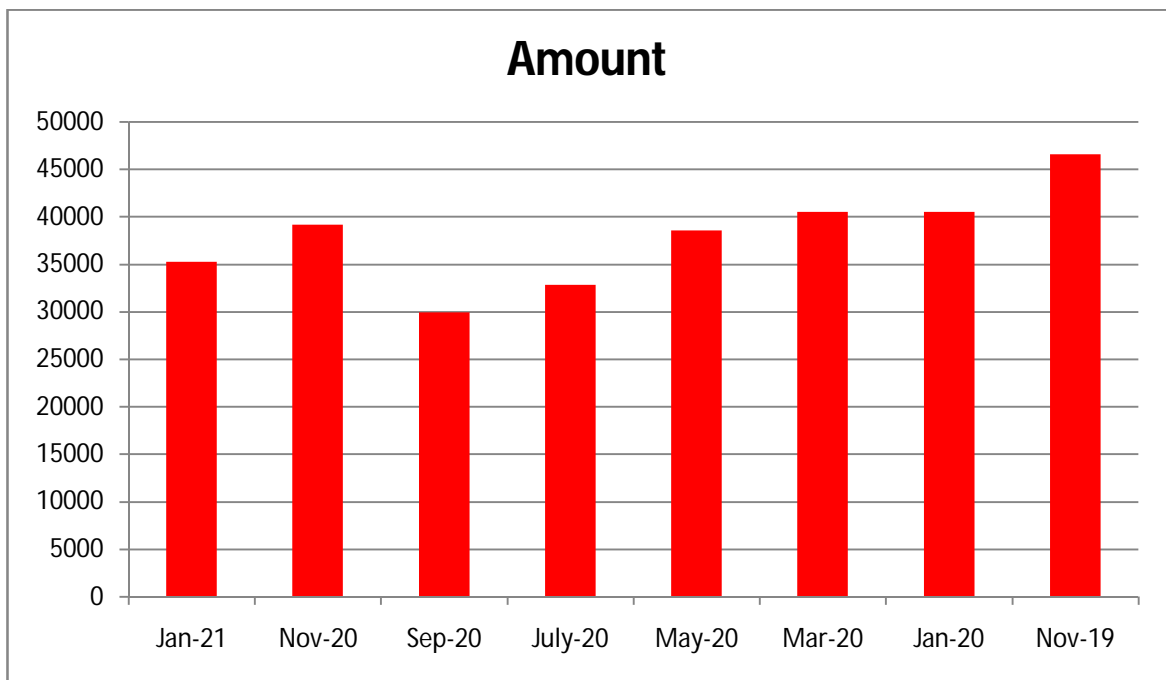
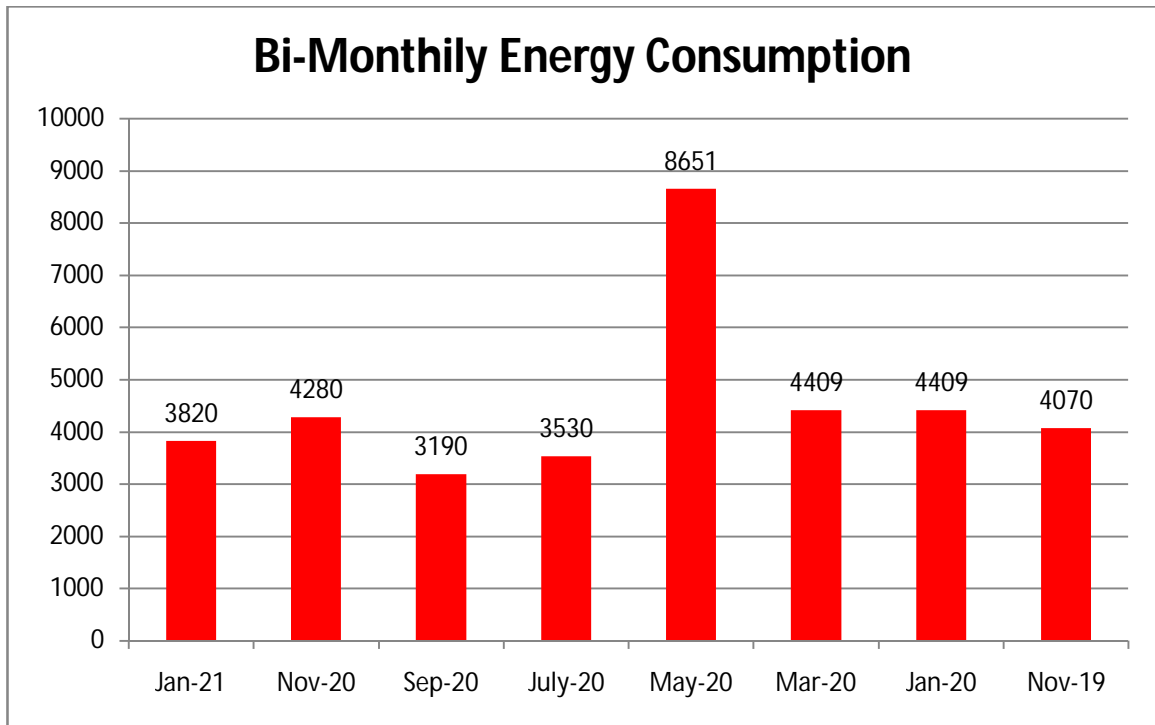
The following objectives of Energy Audit are,

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

3. Executive Summary

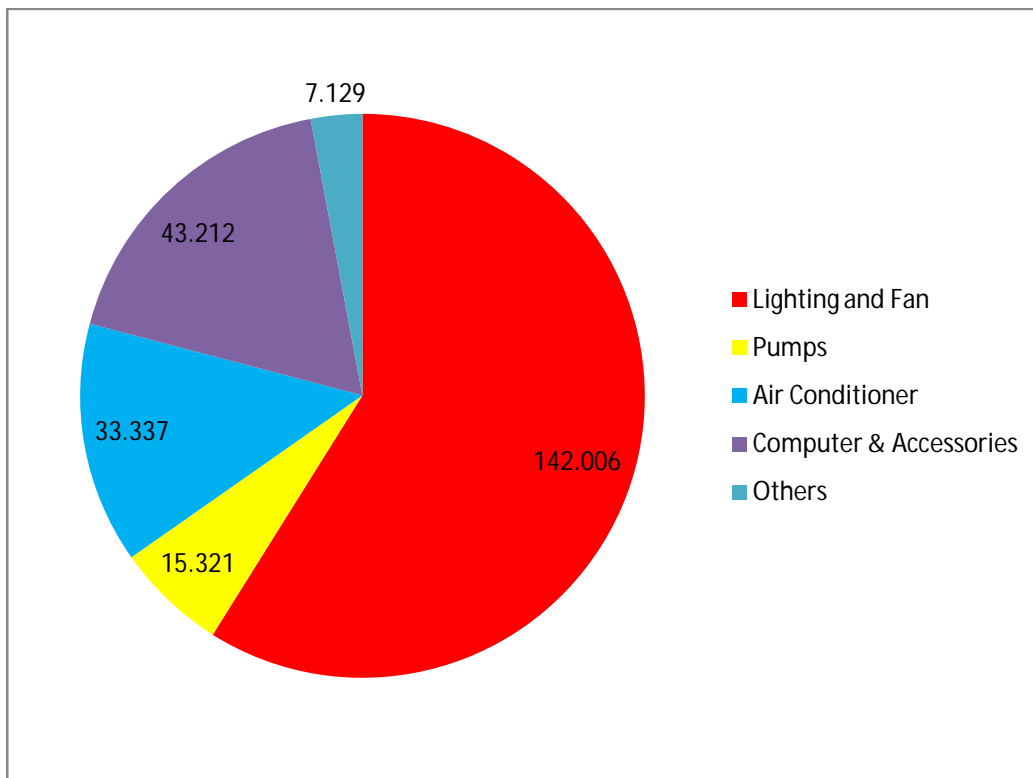
- The sanctioned demand of **TNEB supply of 107 KW** is well enough to meet the connected load of **241 KW**. Since it is batch process service.
- Standby power source is from **250 KVA and/or 125 KVA** generators is more than enough
- Average monthly Energy consumption is **2,272 units**. This is low since the educational institutions operation was limited due to covid pandemic.
- Energy efficient lighting conversion is already in the process
- Total lighting and fan power load is **142 KW** and has saving potential of **70.4 KW**. The saving potential is **49.4 %**
- Total Air Conditioner power load is **33.37 KW** and has saving potential of **5 KW**. The saving potential is **14.98%**
- Some panels required earthing connections, which is very essential in safety aspects and to reduce the components failure
- Some windows required cooling sheets to reduce the power consumption of Air conditioners
- We can go for 30 KW Solar power plant to this service and can yield annual saving of **Rs.3,03,750 /-**
- The Annual energy saving by energy efficiency method is **43,065.5 units**
- The Annual energy saving by alternate energy use is **40,500 units**
- The overall annual cost saving by implementing the recommendations mentioned in this report is **Rs.6,68,524 /-**

4. TNEB Power Consumption Trend



5. Energy Consumption Analysis

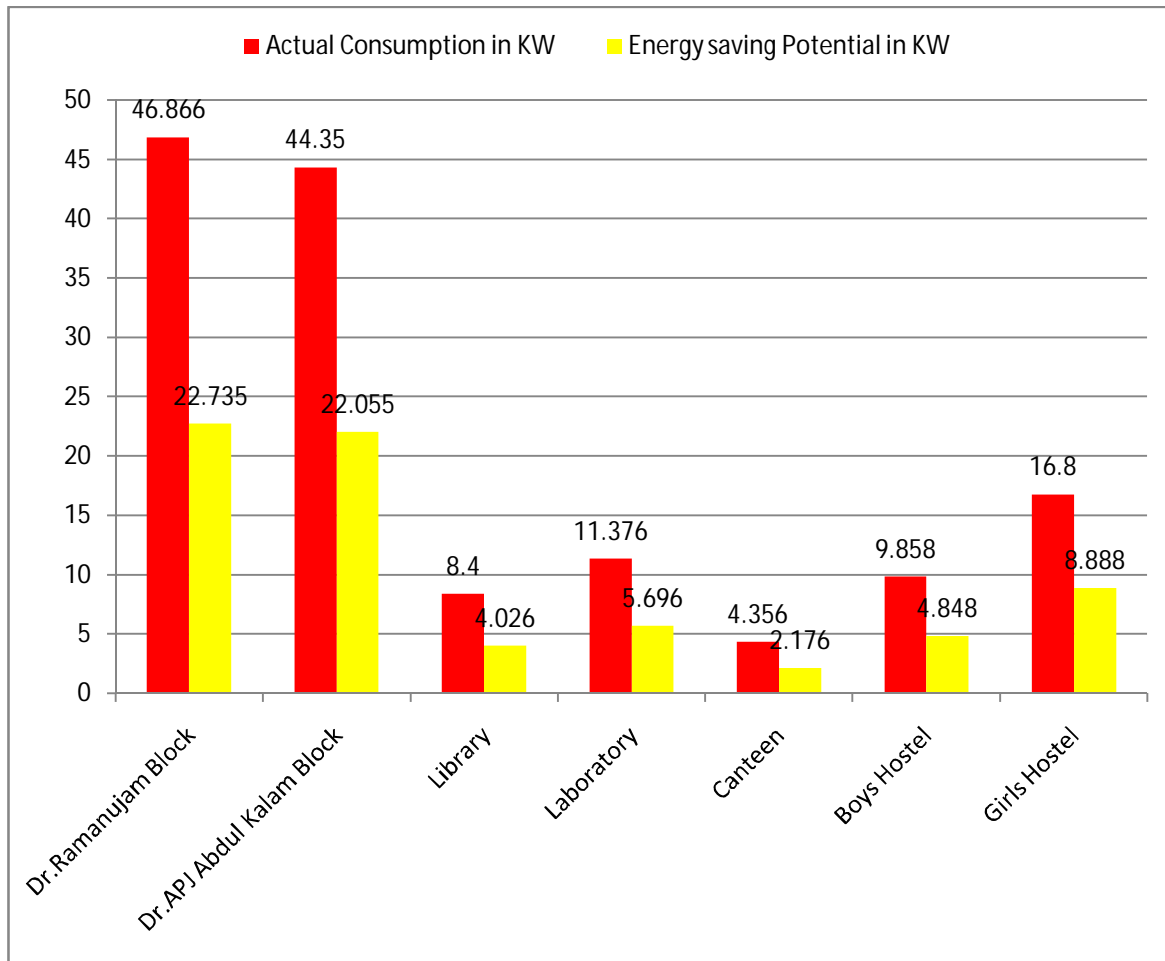
Load Type	Load Details in KW
Lighting and Fan	142.006
Pumps	15.321
Air Conditioner	33.337
Computer & Accessories	43.212
Others	7.129
Total	241.005



Power Consumption in KW

6. Lighting and Fan Power Consumption Analysis

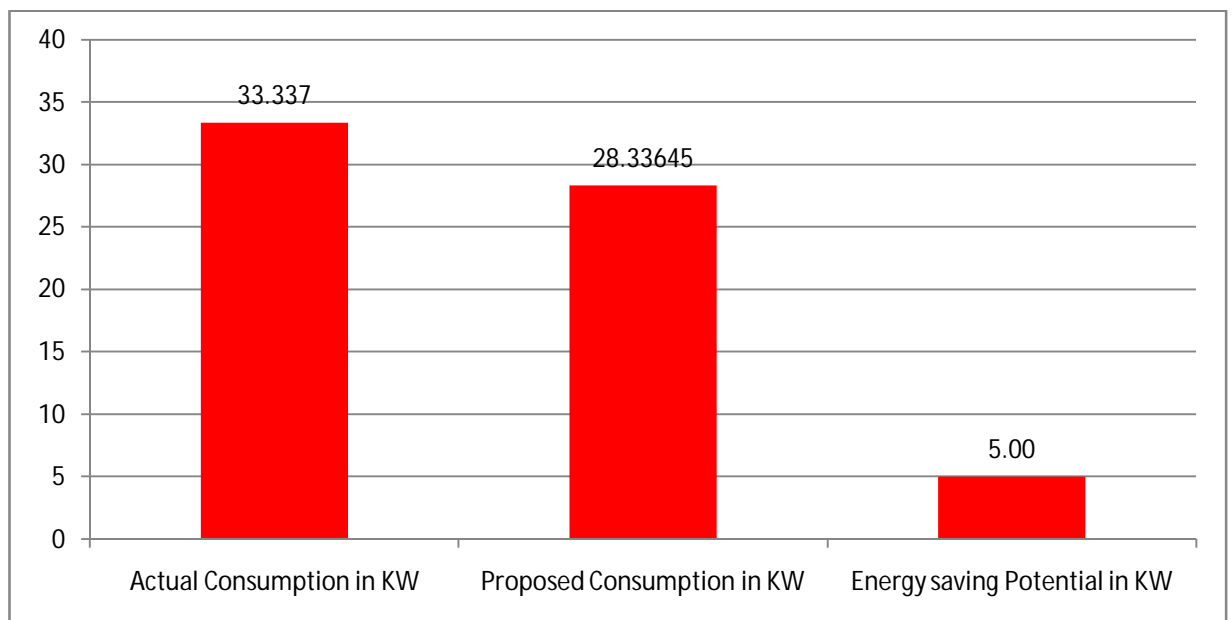
Building	Actual Consumption in KW	Energy saving Potential in KW
Dr.Ramanujam Block	46.866	22.735
Dr.APJ Abdul Kalam Block	44.35	22.055
Library	8.4	4.026
Laboratory	11.376	5.696
Canteen	4.356	2.176
Boys Hostel	9.858	4.848
Girls Hostel	16.8	8.888
Total	142.006	70.424



Power consumption indicated in KWH

7. AC Power Consumption Analysis

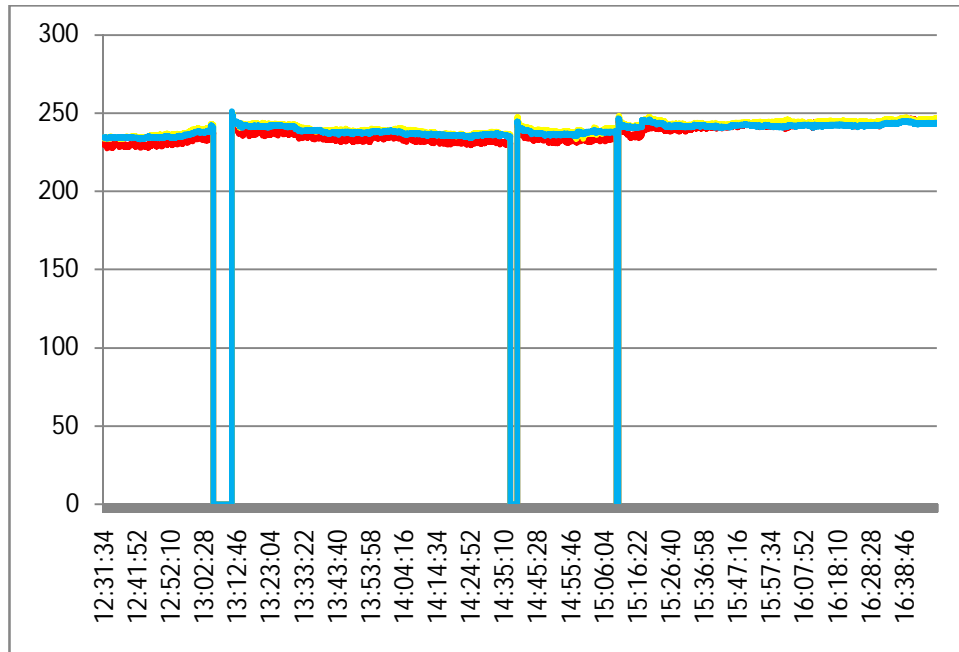
AC Location	Actual Consumption in KW	Proposed Consumption in KW	Energy saving Potential in KW
Smart Class Room I	2.11	1.794	0.317
Dean Room	1.23	1.046	0.185
Server Room	1.21	1.029	0.182
Placement	2.81	2.389	0.422
Admission office	2.87	2.440	0.431
Seminar Hall	1.15	0.978	0.173
Smart Class Room II	4.99	4.242	0.749
CISCO Lab	2.18	1.853	0.327
Room No.108	1.23	1.046	0.185
Principal Office	2.15	1.828	0.323
CEO Room	2.187	1.859	0.328
Conference Room	2.34	1.989	0.351
Sim Lab	2.38	2.023	0.357
Computer Lab7	2.29	1.947	0.344
IOT Lab	2.21	1.879	0.332
Total	33.337	28.33645	5.00



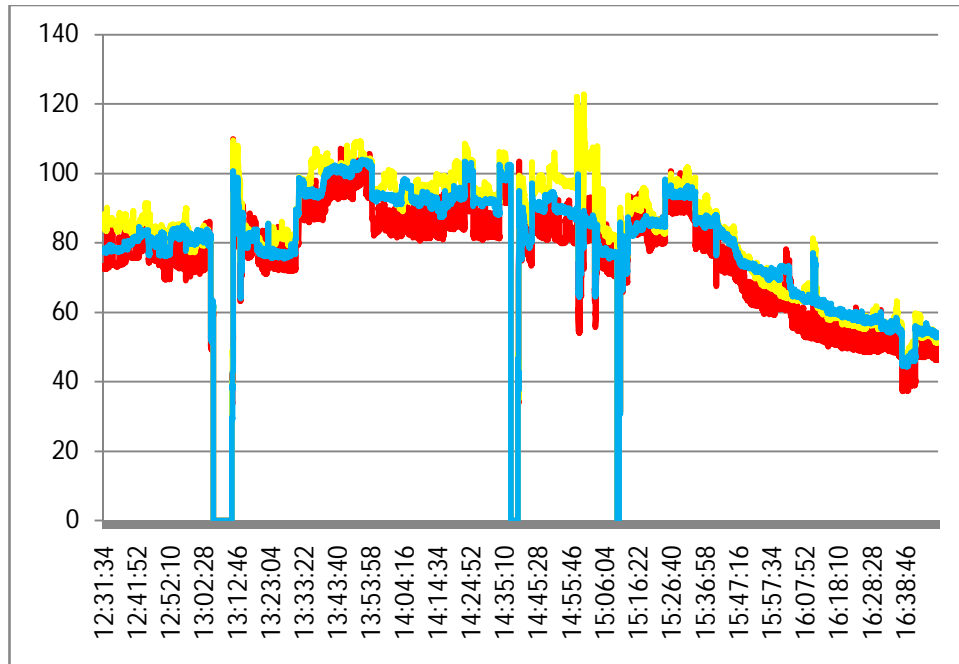
Power consumption indicated in KWH

8. Main Incoming Trends (S.C.950)

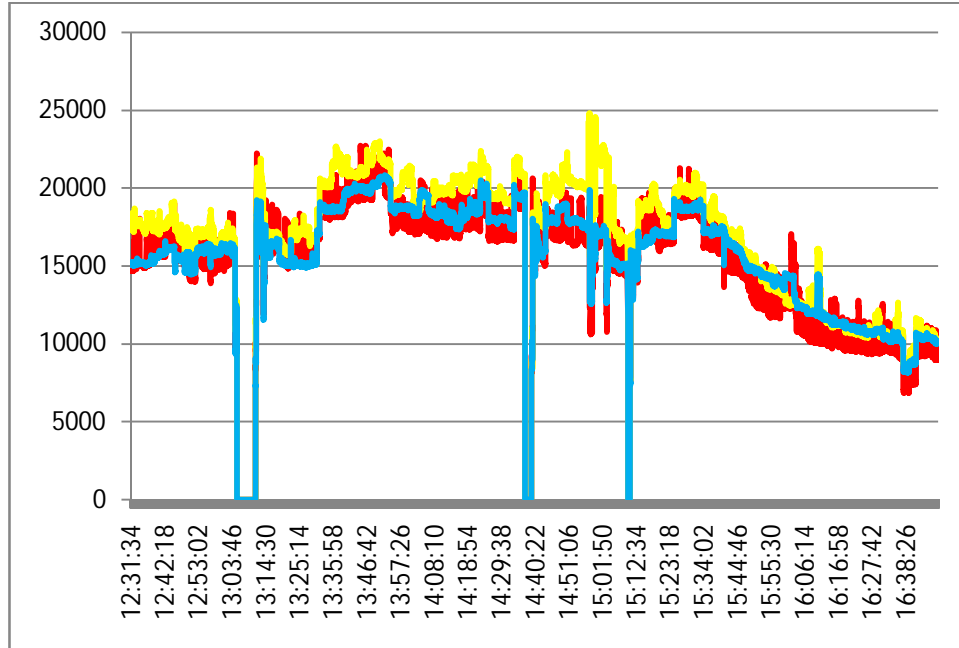
Voltage Trend



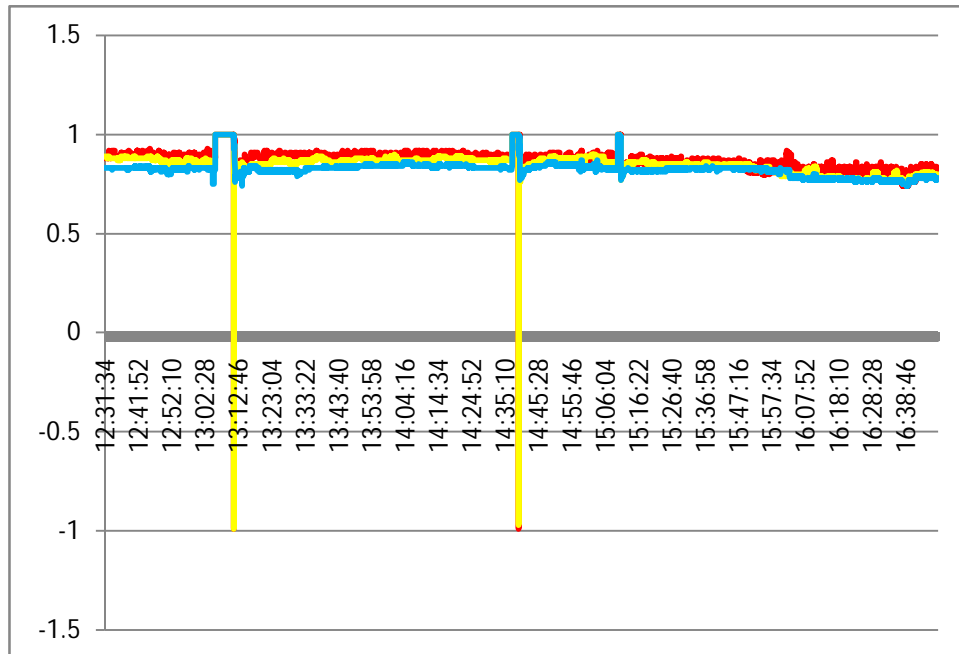
Current Trend



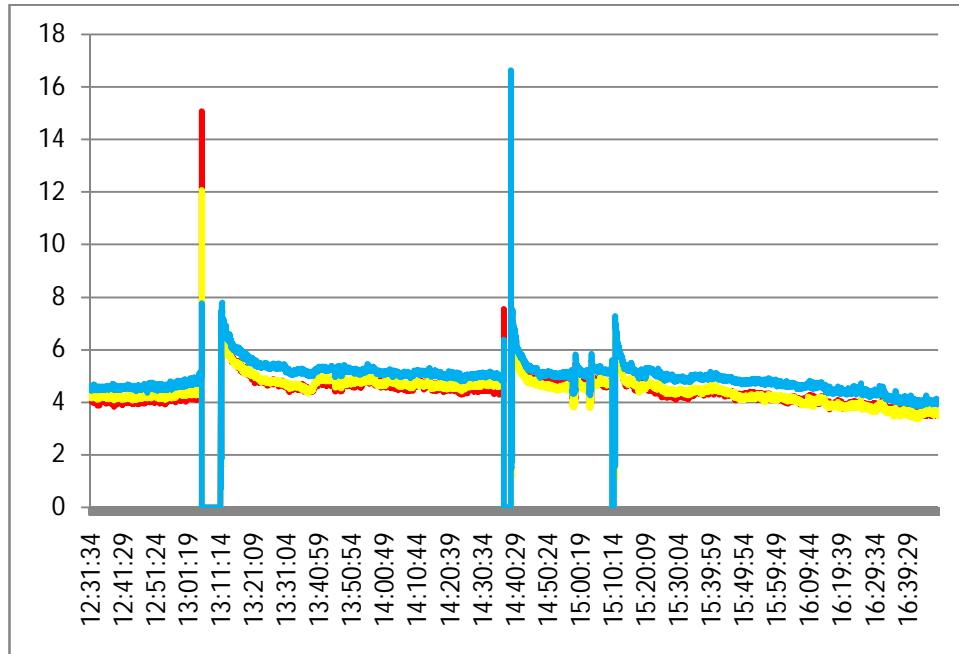
Power Trend



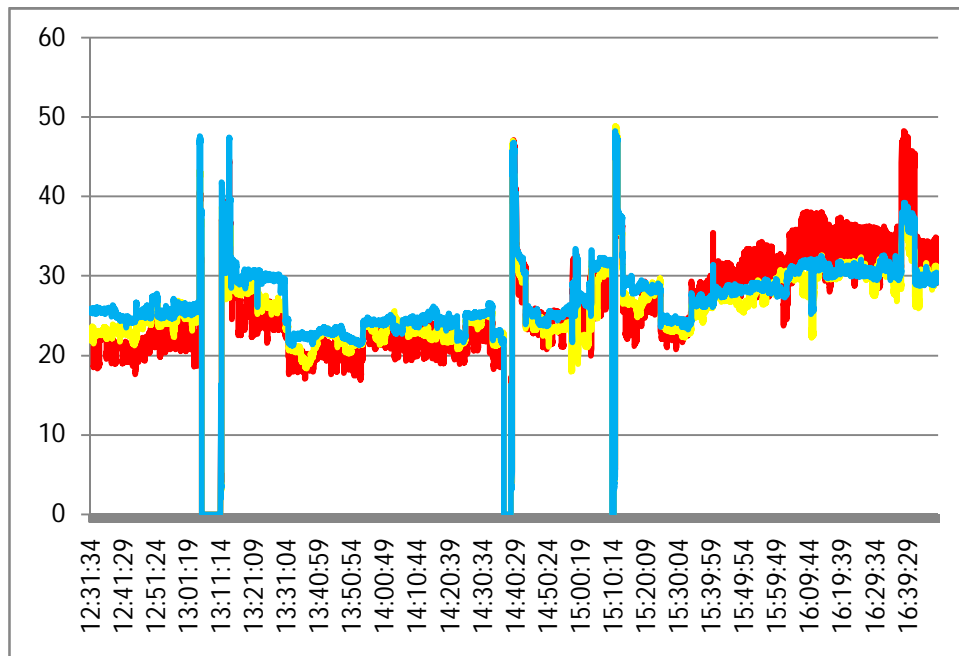
Power Factor Trend



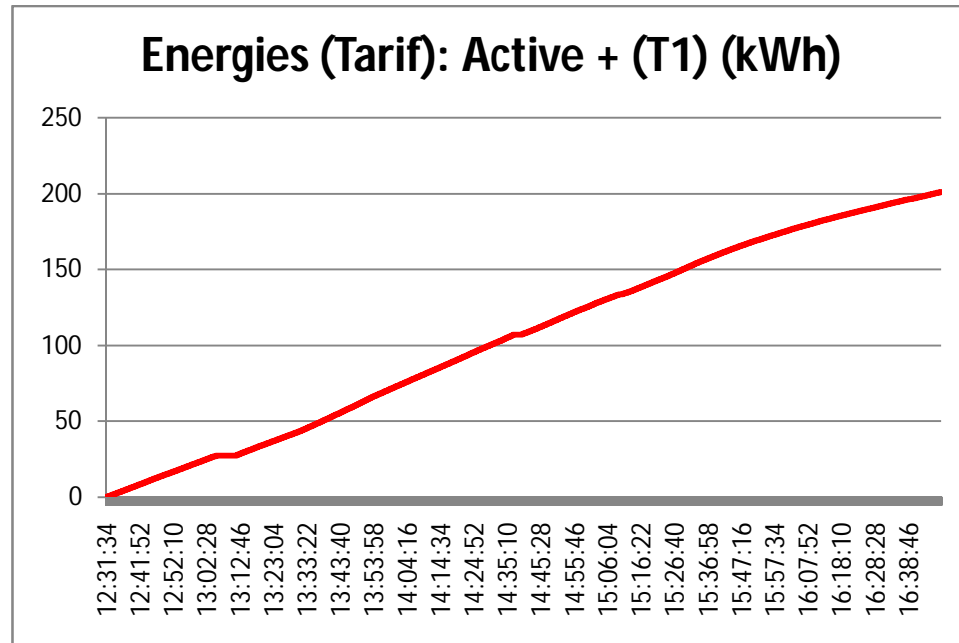
Voltage Harmonics Trend



Current Harmonics Trend



Active Energy Consumption



Key Points

- Average energy consumption is 51 KWH per hour in day time
- Both voltage harmonics and current harmonics are on higher side requires harmonics mitigation equipments at all UPS and Lighting Circuits
- Isolated earthing is needed for all UPS
- Most of the tube lights are conventional 36W bulbs and the same should be replaced with 20W LED tube light which gives same illumination. This saves 50% of energy bill.
- Fans which are used also conventional type 75W fans and the same should be replaced with 35W BLDC Fan which saves 53% energy bill.
- Power factor is in mid range. But still we can improve by the balancing the load in all phases up to the maximum extend and providing load side capacitors to the pumps.
- By installing motion sensors in common area lighting, our energy saving potential in lighting will increase.

9. Energy Saving Potential in Lighting & Fan – Ground Floor (Dr.Ramanujam Block)

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Staff Room	Light	36W TFL	6	0.216	20 W LED	0.12	0.096
	Fan	75W Conv	8	0.6	BLDC Fan	0.28	0.32
Rasmus Lerdort Lab	Light	36W TFL	9	0.324	20W LED	0.18	0.144
	Fan	75W Conv	9	0.675	BLDC Fan	0.315	0.36
Smart Class Room	Light	15W LED	6	0.09	-	-	0
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
II MBA	Light	15W LED	8	0.12	-	-	0
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Tutorial Room	Light	15W LED	8	0.12	-	-	0
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
UPS Room	Light	36W TFL	2	0.072	20 W LED	0.04	0.032
	Fan	75W Conv	2	0.15	BLDC Fan	0.07	0.08
Varandha	Light	36W TFL	12	0.432	20W LED	0.24	0.192
		20W LED	8	0.16	-	-	0
Server Room	Light	36W TFL	3	0.108	20 W LED	0.06	0.048
	Fan	75W Conv	3	0.225	BLDC Fan	0.105	0.12
Deen Room	Light	36W TFL	5	0.18	20 W LED	0.1	0.08
	Fan	75W Conv	4	0.3	BLDC Fan	0.14	0.16
Placement Cell	Light	5W LED	6	0.03	-	-	0
		15W LED	16	0.24	-	-	0
	Fan	75W Conv	4	0.3	BLDC Fan	0.14	0.16
Robotics	Light	15W LED	12	0.18	-	-	0
	Fan	75W Conv	4	0.3	BLDC Fan	0.14	0.16
Electrical Machines Lab	Light	36W TFL	18	0.648	20W LED	0.36	0.288
	Fan	75W Conv	17	1.275	BLDC Fan	0.595	0.68
Cash Counter	Light	36W TFL	4	0.144	20W LED	0.08	0.064
	Fan	75W Conv	2	0.15	BLDC Fan	0.07	0.08
Administrative Office	Light	7W LED	4	0.028	-	-	0
		15W LED	15	0.225	-	-	0
	Fan	75W Conv	6	0.45	BLDC Fan	0.21	0.24
AO Room	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	3	0.225	BLDC Fan	0.105	0.12
Dispensary	Light	36W TFL	4	0.144	20W LED	0.08	0.064
	Fan	75W Conv	3	0.225	BLDC Fan	0.105	0.12

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
NSS Cell	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Common Room	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	3	0.225	BLDC Fan	0.105	0.12
Ill Cell	Light	36W TFL	2	0.72	20W LED	0.04	0.032
	Fan	75W Conv	2	0.15	BLDC Fan	0.07	0.08
Computer Lab 3	Light	36W TFL	10	0.36	20W LED	0.2	0.16
		11W LED	24	0.264	-	-	0
	Fan	75W Conv	8	0.6	BLDC Fan	0.16	0.44
Cafeteria	Light	36W TFL	6	0.216	20W LED	0.12	0.08
		11W CFL	10	0.11	5W LED	0.05	0.06
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Total				13.18		5.335	5.724

10. Energy Saving Potential in Lighting & Fan – Library Building

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Library	Light	36W TFL	85	3.06	20W LED	1.700	1.306
		20W LED	12	0.24	-	-	0
	Fan	75W Conv	68	5.1	BLDC Fan	2.38	2.72
Total				8.4		4.32	4.026

11. Energy Saving Potential in Street Lighting

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Library	Light	36W TFL	16	0.576	20W LED	0.320	0.256
	Light	150W LED	2	0.500	-	-	0
Total				1.076		0.320	0.256

12. Energy Saving Potential in Lighting & Fan – First Floor (Dr.Ramanujam Block)

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Seminar Hall	Light	11W CFL	31	0.341	5W LED	0.155	0.186
		36W CFL	6	0.216	20W LED	0.12	0.086
	Fan	75W Conv	9	0.675	BLDC Fan	0.315	0.36
Room No.115	Light	36W CFL	9	0.324	20W LED	0.18	0.144
	Fan	75W Conv	6	0.45	BLDC Fan	0.21	0.24
Room No.101	Light	36W CFL	6	0.216	20W LED	0.14	0.076
	Fan	75W Conv	7	0.525	BLDC Fan	0.245	0.28
Varandha	Light	36W TFL	5	0.18	20W LED	0.1	0.08
Room No.114	Light	36W TFL	7	0.252	20W LED	0.14	0.112
	Fan	75W Conv	6	0.45	BLDC Fan	0.21	0.24
Room No.103	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	4	0.300	BLDC Fan	0.08	0.22
Staff Toilet	Light	36W TFL	3	0.108	20W LED	0.06	0.048
CSE Staff Room	Light	36W TFL	6	0.216	20W LED	0.120	0.086
	Fan	75W Conv	8	0.600	BLDC Fan	0.280	0.320
III CSE	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
CISCO Lab	Light	20W TFL	28	0.560	20W LED	0.140	0.420
		7W LED	11	0.077	-	-	0
	Fan	75W Conv	13	0.975	BLDC Fan	0.455	0.520
Varandha	Light	36W TFL	5	0.180	20W LED	0.100	0.080
IV CSE	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Seminar Hall	Light	36W TFL	10	0.360	20W LED	0.180	0.180
	Fan	75W Conv	8	0.600	BLDC Fan	0.280	0.320
Room No.112	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Room No.108	Light	15W LED	8	0.120	-	-	0
		5W LED	7	0.035	-	-	0
	Fan	75W Conv	4	0.300	BLDC Fan	0.140	0.160
Principal Office	Light	18W CFL	4	0.072	10W LED	0.040	0.032
		15W LED	1	0.015	-	-	0
	Fan	75W Conv	1	0.075	BLDC Fan	0.035	0.040

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Dining Room	Light	18W CFL	32	0.576	10W LED	0.160	0.416
		5W LED	11	0.055	-	-	0
		7W LED	12	0.084	-	-	0
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
Varandha	Light	7W CFL	18	0.126	5W LED	0.090	0.036
CEORoom	Light	18W CFL	22	0.396	10W LED	0.220	0.176
		5W CFL	8	0.040	3W LED	0.024	0.016
	Fan	75W Conv	4	0.300	BLDC Fan	0.140	0.160
Nearby Room	Light	18W CFL	6	0.108	10W LED	0.060	0.048
		15W CFL	1	0.015	5W LED	0.05	0.010
		7W LED	1	0.007	-	-	0
	Fan	75W Conv	1	0.075	BLDC Fan	0.035	0.040
Waiting Hall	Light	36W TFL	5	0.180	20W LED	0.10	0.080
	Fan	75W Conv	1	0.075	BLDC Fan	0.035	0.040
Conference Room	Light	15W LED	9	0.135	-	-	0
		7W LED	3	0.021	-	-	0
		5W LED	1	0.005	-	-	0
	Fan	75W Conv	4	0.300	BLDC Fan	0.140	0.160
Total				12.652		5.719	6.404

13. Energy Saving Potential in Lighting & Fan – Second Floor (Dr.Ramanujam Block)

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Computer Lab	Light	36W TFL	5	0.18	20W LED	0.1	0.08
		7W LED	21	0.147	-	-	0
	Fan	75W Conv	8	0.6	BLDC Fan	0.280	0.320
I Aero A	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
I Aero B	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
I CSE	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Exam Hall	Light	36W TFL	7	0.252	20W LED	0.14	0.112
	Fan	75W Conv	7	0.525	BLDC Fan	0.245	0.285
Store Room	Light	36W TFL	3	0.108	20W LED	0.06	0.048
Male Staff Room	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	4	0.3	BLDC Fan	0.14	0.16
Female Staff Room	Light	36W TFL	3	0.108	20W LED	0.06	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
I EEE	Light	36W TFL	6	0.216	20W LED	0.12	0.086
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Room No.205	Light	36W TFL	4	0.144	20W LED	0.08	0.064
	Fan	75W Conv	6	0.450	BLDC Fan	0.210	0.240
Staff Room	Light	36W TFL	5	0.180	20W LED	0.1	0.08
	Fan	75W Conv	8	0.6	BLDC Fan	0.280	0.320
IQAC	Light	36W TFL	2	0.072	20W LED	0.04	0.032
		15W CFL	24	0.432	10W LED	0.120	0.312
	Fan	75W Conv	9	0.675	BLDC Fan	0.315	0.360
Embedded System Lab	Light	5W LED	4	0.020	-	-	0
		15W CFL	8	0.120	10W LED	0.040	0.080
	Fan	75W Conv	2	0.150	BLDC Fan	0.070	0.080
Staff Room 215	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.20
Room No 214	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.20
Varandha	Light	36W TFL	10	0.360	20W LED	0.200	0.160
I ME Embedded System	Light	36W TFL	4	0.144	20W LED	0.080	0.064
	Fan	75W Conv	4	0.300	BLDC Fan	0.140	0.160

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
EEE Staff Room	Light	36W TFL	6	0.216	20W LED	0.120	0.086
	Fan	75W Conv	8	0.600	BLDC Fan	0.280	0.320
Smart Class Room	Light	15W LED	6	0.09	-	-	0
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.2
Computer Lab Room	Light	36W TFL	5	0.180	20W LED	0.100	0.080
	Fan	75W Conv	7	0.525	BLDC Fan	0.245	0.280
Lab 8	Light	5W Led	4	0.02	-	-	0
	Fan	75W Conv	2	0.150	BLDC Fan	0.070	0.080
Total				11.512		5.395	5.825

14. Energy Saving Potential in Lighting & Fan – Third Floor (Dr.Ramanujam Block)

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Electric Circuits Lab	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	6	0.450	BLDC Fan	0.210	0.240
ADA Lab	Light	36W TFL	5	0.180	20W LED	0.100	0.080
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
IV EEE	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
Varandha	Light	36W TFL	4	0.144	20W LED	0.080	0.064
Room No.305	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
II EEE	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
Power Electronics Lab	Light	36W TFL	6	0.216	20W LED	0.120	0.086
	Fan	75W Conv	8	0.600	BLDC Fan	0.280	0.320
ED Lab	Light	36W TFL	10	0.360	20W LED	0.200	0.160
	Fan	75W Conv	13	0.975	BLDC Fan	0.455	0.520
I MCTB	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
I ECE B	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
Staff Room	Light	36W TFL	5	0.180	20W LED	0.100	0.080
	Fan	75W Conv	6	0.450	BLDC Fan	0.210	0.240
Room No.302	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
I ECE	Light	36W TFL	3	0.108	20W LED	0.060	0.048
	Fan	75W Conv	5	0.375	BLDC Fan	0.175	0.200
Varandha	Light	36W TFL	4	0.144	20W LED	0.080	0.064
Physics Lab	light	36W TFL	7	0.252	20W LED	0.140	0.112
	Fan	75W Conv	7	0.525	BLDC Fan	0.245	0.280
Chemistry Lab	light	36W TFL	10	0.36	20W LED	0.200	0.16
		20W LED	2	0.04	-	-	0
	Fan	75W Conv	10	0.750	BLDC Fan	0.350	0.400
Total				9.522		4.658	4.782

15. Energy Saving Potential in Lighting & Fan – Ground Floor (Dr.APJ.Abdul Kalam Block)

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
LIC Lab	Light	36W TFL	9	0.324	20W LED	0.180	0.144
	Fan	75W Conv	8	0.600	35W BLDC	0.280	0.320
Simulation Lab	Light	7W TFL	20	0.140	-	-	0
		11W CFL	11	0.121	5W LED	0.055	0.066
	Fan	75W Conv	16	1.200	35W BLDC	0.560	0.640
Room No.012	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Microprocessor Lab	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Innovation Lab	Light	15W LED	4	0.060	-	-	0
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
IOT Lab	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Varandha	Light	36W TFL	11	0.396	20W LED	0.220	0.176
LIC Lab	Light	36W TFL	9	0.324	20W LED	0.180	0.144
	Fan	75W Conv	8	0.600	35W BLDC	0.280	0.320
Simulation Lab	Light	7W TFL	20	0.140	-	-	0
		11W CFL	11	0.121	5W LED	0.055	0.066
	Fan	75W Conv	16	1.200	35W BLDC	0.560	0.640
Room No.012	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Microprocessor Lab	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Innovation Lab	Light	15W LED	4	0.060	-	-	0
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
IOT Lab	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Varandha	Light	36W TFL	11	0.396	20W LED	0.220	0.176
Total				11.628		5.48	5.748

16. Energy Saving Potential in Lighting & Fan – First Floor (Dr.APJ.Abdul Kalam Block)

Location	Equipment	Existing	Population	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Computer Lab	Light	5W LED	10	0.050	-	-	0
		11W CFL	16	0.176	5W LED	0.080	0.096
	Fan	75W Conv	12	0.900	35W BLDC	0.420	0.480
Room No.101	Light	36W TFL	5	0.180	20W LED	0.100	0.080
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
Room No.102	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.110	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.101	Light	36W TFL	5	0.180	20W LED	0.100	0.080
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
IMF	Light	36W TFL	4	0.144	20W LED	0.080	0.064
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
Aero Staff Room I	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Aero Staff Room II	Light	36W TFL	8	0.288	20W LED	0.160	0.128
	Fan	75W Conv	8	0.600	35W BLDC	0.280	0.320
Varandha	Light	36W TFL	10	0.360	20W LED	0.260	0.1
		20W LED	3	0.06	-	-	0
II ME Aero	Light	36W TFL	4	0.144	20W LED	0.080	0.064
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
III BE Aero	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
IV BE Aero	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Total				8.737		4.295	4.332

17. Energy Saving Potential in Lighting & Fan – Seond Floor (Dr.APJ.Abdul Kalam Block)

Location	Equipm ent	Existing	Popul ation	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Room No.201	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
Room No.213	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.202	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.212	Light	36W TFL	4	0.144	20W LED	0.080	0.064
	Fan	75W Conv	4	0.300	35W BLDC	0.140	0.160
Seminar Hall-4	Light	15W CFL	19	0.285	10W LED	0.190	0.095
	Fan	75W Conv	12	0.900	35W BLDC	0.420	0.480
Room No.203	Light	36W TFL	8	0.288	20W LED	0.160	0.128
	Fan	75W Conv	8	0.600	35W BLDC	0.280	0.320
Research Lab	Light	36W TFL	2	0.072	20W LED	0.040	0.032
	Fan	75W Conv	3	0.225	35W BLDC	0.105	0.120
Varandha	Light	36W TFL	15	0.540	20W LED	0.300	0.200
		20W LED	3	0.06	-	-	0
Room No.211	Light	36W TFL	5	0.180	20W LED	0.100	0.080
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.204	Light	36W TFL	8	0.288	20W LED	0.160	0.128
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Room No.210	Light	36W TFL	4	0.144	20W LED	0.080	0.064
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
Room No.209	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.205	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.206	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
Room No.208	Light	36W TFL	8	0.288	20W LED	0.160	0.128
	Fan	75W Conv	12	0.900	35W BLDC	0.420	0.480
Total				11.16		5.525	5.535

18. Energy Saving Potential in Lighting & Fan – Third Floor (Dr.APJ.Abdul Kalam Block)

Location	Equipm ent	Existing	Popul ation	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Room No.314	Light	36W TFL	12	0.432	20W LED	0.240	0.192
	Fan	75W Conv	18	1.350	35W BLDC	0.630	0.720
Room No.301	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.313	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.302	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.312	Light	15W CFL	4	0.144	20W LED	0.080	0.064
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
Room No.303	Light	36W TFL	7	0.252	20W LED	0.140	0.112
	Fan	75W Conv	8	0.600	35W BLDC	0.280	0.320
Signal Process Lab	Light	36W TFL	8	0.288	20W LED	0.160	0.128
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Varandha	Light	36W TFL	20	0.720	20W LED	0.400	0.320
		20W LED	3	0.06	-	-	0
Room No.304	Light	36W TFL	8	0.288	20W LED	0.160	0.128
	Fan	75W Conv	9	0.675	35W BLDC	0.315	0.360
Room No.310	Light	36W TFL	4	0.144	20W LED	0.080	0.064
	Fan	75W Conv	6	0.450	35W BLDC	0.210	0.240
Room No.307	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.305	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	7	0.525	35W BLDC	0.245	0.280
Room No.306	Light	36W TFL	6	0.216	20W LED	0.120	0.096
	Fan	75W Conv	8	0.600	35W BLDC	0.280	0.320
Room No.308	Light	36W TFL	16	0.576	20W LED	0.320	0.256
	Fan	75W Conv	16	1.200	35W BLDC	0.560	0.640
Total				12.825		6.325	6.44

19. Energy Saving Potential in Lighting & Fan – Labs

Location	Equipm ent	Existing	Popul ation	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Machine Shop	Light	36W TFL	16	0.576	20W LED	0.320	0.256
	Fan	75W Conv	16	1.200	35W BLDC	0.560	0.640
SOM lab	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
Thermal Engineering	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
EC Lab	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
Air Frame Lab	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
Fluid Mech Lab	Light	36W TFL	16	0.576	20W LED	0.320	0.256
	Fan	75W Conv	16	1.200	35W BLDC	0.560	0.640
Aero Modelling	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
Varandha	Light	36W TFL	20	0.720	20W LED	0.400	0.320
Air craft Structure	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
Thermodyn amics	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
Dynamics Lab	Light	36W TFL	8	0.600	35W BLDC	0.280	0.320
	Fan	75W Conv	8	0.288	20W LED	0.160	0.128
Total				11.376		5.68	5.696

20. Energy Saving Potential in Lighting & Fan – Canteen

Location	Equipm ent	Existing	Popul ation	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Canteen	Light	36W TFL	46	1.656	20W LED	0.920	0.736
	Fan	75W Conv	36	2.700	35W BLDC	1.260	1.440
				4.356		2.18	2.176

21. Energy Saving Potential in Lighting & Fan – Boys Hostel

Location	Equipm ent	Existing	Popul ation	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Ground Floor	Light	36W TFL	25	0.900	20W LED	0.500	0.400
	Fan	75W Conv	17	1.275	35W BLDC	0.595	0.680
First Floor	Light	36W TFL	49	1.764	20W LED	0.980	0.784
	Fan	75W Conv	23	1.725	35W BLDC	0.805	0.920
Second Floor	Light	36W TFL	54	1.944	20W LED	1.080	0.864
	Fan	75W Conv	30	2.250	35W BLDC	1.050	1.200
Total				9.858		5.01	4.848

22. Energy Saving Potential in Lighting & Fan – Girls Hostel

Location	Equipm ent	Existing	Popul ation	Actual Power Consumption	Replacement option	Proposed Energy Consumption	Energy Saving Potential
Name	Name	Product	Qty	KWH	Product	KWH	KWH
Ground Floor	Light	36W TFL	18	0.648	20W LED	0.360	0.288
	Fan	75W Conv	8	0.600	35W BLDC	0.280	0.320
First Floor	Light	36W TFL	48	1.764	20W LED	0.980	0.784
		15W NL	38	0.570	3W LED	0.114	0.456
	Fan	75W Conv	38	2.850	35W BLDC	1.330	1.520
Second Floor	Light	36W TFL	48	1.764	20W LED	0.980	0.784
		15W NL	38	0.570	3W LED	0.114	0.456
	Fan	75W Conv	38	2.850	35W BLDC	1.330	1.520
Third Floor	Light	36W TFL	48	1.764	20W LED	0.980	0.784
		15W NL	38	0.570	3W LED	0.114	0.456
	Fan	75W Conv	38	2.850	35W BLDC	1.330	1.520
Total				16.800		7.912	8.888

23. Energy saving potential in Air Conditioner

AC Location	Actual Consumption in KW	Proposed Consumption in KW	Energy saving Potential in KW
Smart Class Room I	2.11	1.794	0.317
Dean Room	1.23	1.046	0.185
Server Room	1.21	1.029	0.182
Placement	2.81	2.389	0.422
Admission office	2.87	2.440	0.431
Seminar Hall	1.15	0.978	0.173
Smart Class Room II	4.99	4.242	0.749
CISCO Lab	2.18	1.853	0.327
Room No.108	1.23	1.046	0.185
Principal Office	2.15	1.828	0.323
CEO Room	2.187	1.859	0.328
Conference Room	2.34	1.989	0.351
Sim Lab	2.38	2.023	0.357
Computer Lab7	2.29	1.947	0.344
IOT Lab	2.21	1.879	0.332
Total	33.337	28.33645	5.00

Air conditioner manufacturers make use of Thermodynamic thermostats alone when controlling compressors. Even with modern inverter drives this approach delivers limited opportunities for energy saving. Energy saver is comes with two temperature sensors for determining when work is needed from the air-conditioner.

The first sensor replicates the function of the thermodynamic (temperature) thermostat and is employed by energy saver to deliver the required fixed minimum room temperature as a priority.

The second sensor measures the temperature of the cold-supply air from the air-conditioner and this is used as a proxy to determine when the compressor has completed its hydraulic work of fully compressing the refrigerant gas.

Hence we can connect all the AC's with energy saver will leads to lot of Energy saving.

24. Solar Power Plant

The maximum power consumption is between 9AM to 3 PM. Hence we can go for solar power plant which will reduce our TNEB power consumption and supports our green initiative. Based on the study we can go for 30KW plant as of now and can be connected at power house panel. Thereby the power generated from the solar power plant can be utilized well enough.

30KW Solar power plant supply cost	=	9,39,800 /-
30KW Solar Power Plant Erection Cost	=	1,60,200 /-
Total solar power plant cost	=	11,00,000 /-

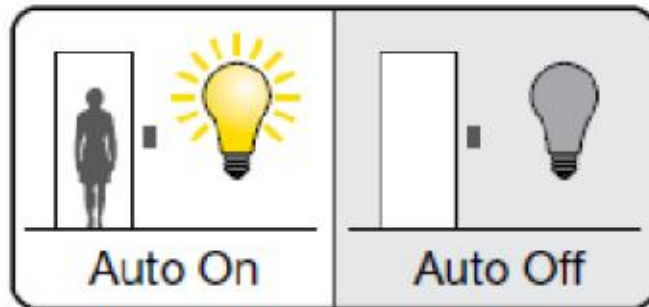
Depreciation cost of solar power plant	=	2,46,400 / -
Solar cost after depreciation	=	8,53,600 /-

Annual Solar Power generation	=	30 X 4.5 X 300
	=	40,500KWH
Annual cost saving by using solar	=	40,500 X 7.5
	=	3,03,750 /-

Payback period of solar power Plant	=	3 years
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25. Points for Improvement

- Provide double earth to all the motors and panel boards as a safety measures.
- Provide MPD in all pumping application which is will protect your pumps from dry run.
- Provide automatic lighting on-off and trim control in all Street light and Varandha lighting circuits. Occupancy sensors function by switching the lights ON and OFF based on the occupancy of the room and are a smart way to save energy in commercial organizations.



- Use 5 star rated AC's in next replacement period will yield energy saving in AC's Energy consumption

New BEE Energy Efficiency Ratings (EER) for Room Air Conditioners					
STAR RATING LEVELS-Jan1, 2018 - Dec 31,2020					
EER (W/W)					
WRAC			SPLIT		
Star Rating	Minimum ISEER	Maximum ISEER	Star Rating	Minimum ISEER	Maximum ISEER
1 Star ★	2.50	2.69	1 Star ★	3.10	3.29
2 Star ★★	2.70	2.89	2 Star ★★	3.30	3.49
3 Star ★★★	2.90	3.09	3 Star ★★★	3.50	3.99
4 Star ★★★★	3.10	3.29	4 Star ★★★★	4.00	4.49
5 Star ★★★★★	3.30	-	5 Star ★★★★★	4.50	-

26. Audit Report

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

- The energy saving potential in lighting and fans circuit is 70.4 KWH per hour at 100% loading, which is 49.4%
- The energy saving potential in Air conditioner circuit is 5 KWH per hour at 100% loading, which is 15%
- By installing 30KW solar power plant can reduce TNEB energy consumption by 25%.

For Sri Energy Solutions,



M.Rameshkumar

BEE Certified Energy Auditor – EA 22303

Future Support

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

THANK YOU

From,

M/s.Sri Energy Solutions

2/57, Church Street,

Silukkuvarpatti,

Dindigul – 624 215

Mob : 90420 64932

For Query : srienergysolutions@gmail.com

2021

Green Audit Report

of

**Nehru Institute of Engineering
and Technology, Coimbatore**

Green Audit Done by

Sri Energy Solutions

10/02/2021

Project Report Title : **Green Audit**

Client Name : **Nehru Institute of Engineering and Technology**

Plant Location : **Nehru Garden,
Nehru College Road,
Thirumalayam palayam,
Coimbatore-641 105.**

Date of Audit : **10th February 2021**

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

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

**2. C.Sekar.,B.E.,
Trainee Engineer – Energy Audit**

Acknowledgement

Sri Energy Solutions acknowledge with hearty thanks to **Dr.P.Krishna das, Chairman and Managing Trustee, Dr.P.Krishnakumar, CEO and Secretary, Nehru Institute of Engineering and Technology, Coimbatore** for their support for carrying out this audit.

Our special thanks to **Dr.P.Maniarasan – Principal and Dr.Kannan - HOD** for their co-operation and support us to carry out the Green audit on time.

In addition with this, we are grateful to your staffs **Mr.N.Sathish kumar and Mr.Jagadesh** for their co-operation and support us to carry out the Green audit very effectively.

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1. Introduction

Nehru Institute of Engineering and Technology is one of the leading higher education institutions under Anna university, chennai. This college was established by Shri.P.K.Das in the year of 2006.

This college is located at Nehru Garden, Thriumalayam Palayam village, Coimbatore. This college is having lot of courses in Engineering sector with complete equipped. It has been providing quality education to the rural and semi-urban students of Coimbatore and Palakkad district. This institution has LTCT TNEB service and two backup generators. High quality panels and switch gears are connected with this service for giving quality supply to the equipments. The capacity of generator is also well enough to meet the demand.

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

2. Objectives

The main objectives of the green audit are to promote the environment management and conservation in the college campus. The purpose of the audit is to identify, quantify, describe and priorities framework environment sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are,

- To introduce and make aware students to real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and the extent of resource use on the campus
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost
- To bring out a present status report on environmental compliance

3. Methodology

In order to perform green audit, the methodology included different techniques such as physical inspection of the campuses, observation and review of the documentation, interviewing key persons, and data analysis, measurements and recommendations. The study covered the following area to summarize the present status of environment management in the campuses:

- Water quality assessment, consumption and management
- Air quality assessment and management
- Electricity consumption and management
- Sound pollution monitoring
- Waste management
- Biodiversity status of the campus

4. About the College

Institutional Vision

Nehru Institute of Engineering and Technology seeks to become a centre of excellence by providing its students a comprehensive education with special emphasis on responsible citizenship, secular outlook, moral values and abiding faith in God expressed in active concern for others.

Objectives of the College

The college endeavors to prepare its students for fulfilling careers by enabling them to realize their full potential and by inculcating in them the spirit of intellectual enquiry, independent thinking, self- reliance, leadership, co- operation, expression of cultural talents and social service.

NAAC Grading in Assessments

NAAC accreditation First cycle : B++ Grade with 2.91 Points

5. Water Quality Assessment, Consumption and Management

Water quality analysis was conducted by Eutech PCS multi-parameter tester 35, uc turbidity meter 135 and Lutron DO-5509 meter.

Well Water

Parameter	Value
PH	7.4
P.Akalinity	Nil
M.Akalinity	370 ppm
H.Akalinity	Nil
Total Alkalinity	370 ppm
Total Hardness	520 ppm
Total Dissolved solids	640 ppm

Borewell Water

Parameter	Value
PH	7.5
P.Akalinity	Nil
M.Akalinity	380 ppm
H.Akalinity	Nil
Total Alkalinity	380 ppm
Total Hardness	410 ppm
Total Dissolved solids	720 ppm

RO Water

Parameter	Value
PH	7.1
P.Akalinity	Nil
M.Akalinity	40 ppm
H.Akalinity	Nil
Total Alkalinity	40 ppm
Total Hardness	50 ppm
Total Dissolved solids	60 ppm

Kitchen Water

Parameter	Value
PH	7.1
P.Akalinity	Nil
M.Akalinity	40 ppm
H.Akalinity	Nil
Total Alkalinity	40 ppm
Total Hardness	50 ppm
Total Dissolved solids	70 ppm

Boys Hostel Water

Parameter	Value
PH	7.4
P.Aikalinity	Nil
M.Aikalinity	320 ppm
H.Aikalinity	Nil
Total Aikalinity	320 ppm
Total Hardness	520 ppm
Total Dissolved solids	730 ppm

Girls Hostel Water

Parameter	Value
PH	7.4
P.Aikalinity	Nil
M.Aikalinity	460 ppm
H.Aikalinity	Nil
Total Aikalinity	460 ppm
Total Hardness	540 ppm
Total Dissolved solids	820 ppm

Sample No	Location	MPN Index (per 100ml)	Water Quality
1	Class Room - GF	00	Outstanding (Potable)
2	Class Room - FF	00	Outstanding (Potable)
3	Class Room - SF	00	Outstanding (Potable)
4	Staffs Room	00	Outstanding (Potable)
5	Canteen	00	Outstanding (Potable)
6	Tap Water	09	Good (Non-potable)
7	Bore water	52	Average (Non-potable)

❖ Main water uses in the campus

- Drinking
- Canteen
- Toilet
- Garden
- Lab
- Cleaning
- Bathrooms
- Washing
- Construction works
- Bus maintenance

❖ There are water treatment system to purify the water

❖ Water cooler with drinking water filtration is installed

- ❖ Number of urinals and toilet – 88 Nos
- ❖ Number of waterless urinals - Nil
- ❖ Number of Bathroom – 106 Nos
- ❖ Number of Toilets – 190 Nos
- ❖ Number of water taps - 424 Nos
- ❖ Number of borewell - 3 Nos
- ❖ Number of Open well - 3 Nos
- ❖ Water pumps 6 Nos
- ❖ Quantity of water pumped - 30 KL including agriculture purpose
- ❖ Water charges paid – No water charges (No municipal water supply, using water from own well)
- ❖ Number of water tanks for storage – 16 Nos
- ❖ Amount of water stored – 64,000 Liters
- ❖ No meters fixed for water management
- ❖ Number of leaky water taps – 3 Nos
- ❖ There are signs reminding people to turn off the water
- ❖ Number of water fountain – 2 Nos
- ❖ Drip irrigation system is used to water plants
- ❖ Time of watering plants – 9AM to 5 PM
- ❖ Reasons for water wastage
 - Leakage from water taps
 - Over use of water
 - Overflow of water from motors
 - Unorganized watering of garden

❖ Overall utilization of water in the college

Sections	Water use / day in KL
Garden	13 KL
College	16 KL
Hostel	40 KL
Bus wash	2 KL
Canteen	5 KL

Water Audit at Nehru College, Coimbatore					
Activity	Water use per activity (litres)	Number of activity /day	Average water use/ person / day (litres)	Number of persons using water	Total water consumption / day (litres)
Washing hands and face	2L	Twice	3 L	1544	4632
Bath	10-30	once	20L	50	1000
Toilet flush	6-20	once	10L	500	5000
Drinking (cup)	0.25	twice	0.5L	1544	772
Washing dishes	5	once	5L	1544	7720
Leaking/dripping tap (1 drop/ second /day)	10-30	continuous	240 L	3	720
garden use	4	once	L/s		13000
Cooking (average)	3	once	L/s		4500
Hostel uses	All uses	Twice	100	895	89500
Bus Washes	All uses	Once	l/s	-	2000
Total Water Use					1,28,844

6. Air Quality Assessment, Consumption and Management

The following air quality parameters were measured using Airveda and government's official sites.

Parameter	Minimum Value	Maximum Value
PM 2.5	78	146
PM 10	25	152
O ₃	7	25
NO ₂	9	17
CO	6	14
Temp	24	29
Pressure	833	848
Humidity	26	57
Wind Speed	5	11

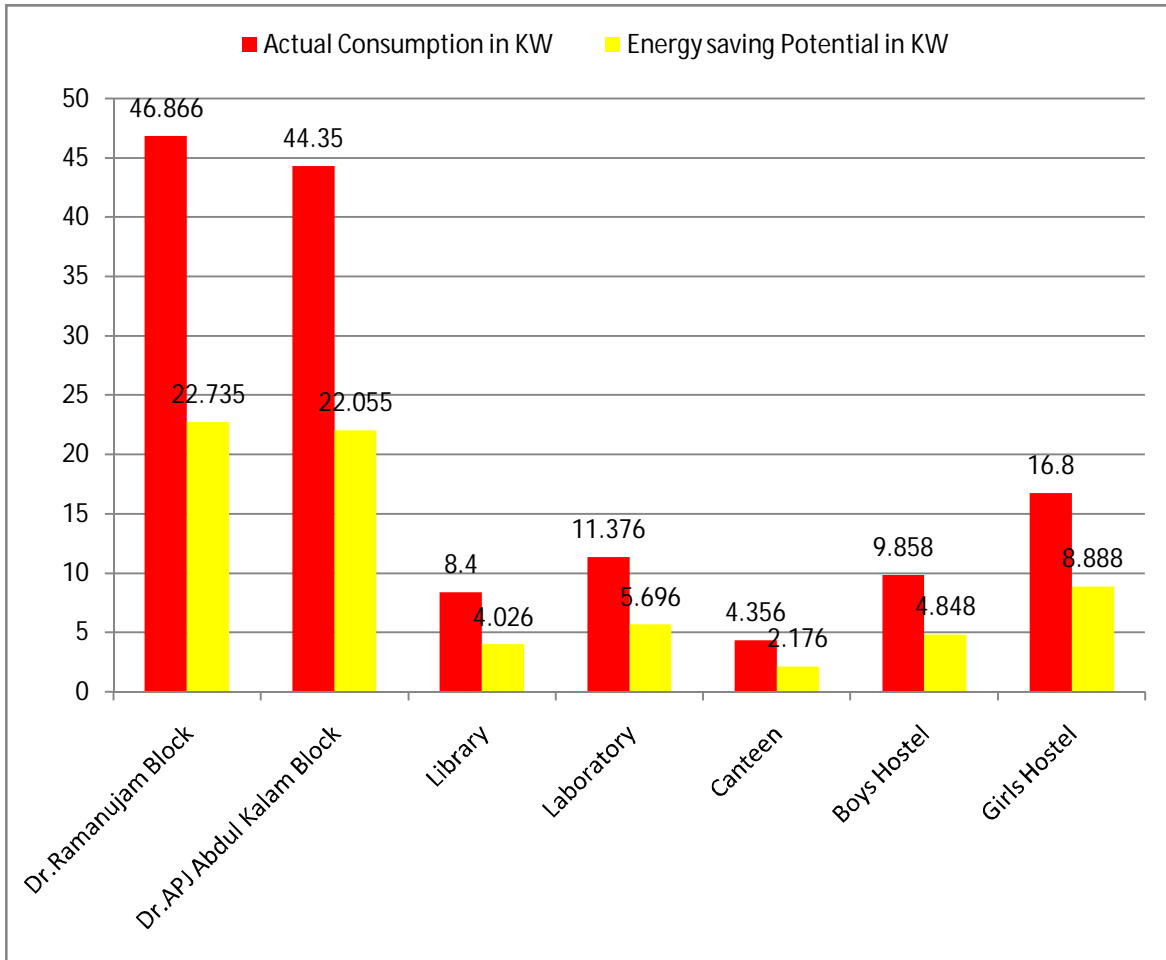
Present air pollution level is in the range of moderate due to high population and heavy transport. It's required lot of effort to reduce the air pollutions. Nehru institute of engineering and technology developed good green belt. Still it needs to be improved.

7. Energy Consumption Analysis

Load Type	Load Details in KW
Lighting and Fan	142.006
Pumps	15.321
Air Conditioner	33.337
Computer & Accessories	43.212
Others	7.129
Total	241.005

Building	Actual Consumption in KW	Energy saving Potential in KW
Dr.Ramanujam Block	46.866	22.735
Dr.APJ Abdul Kalam Block	44.35	22.055
Library	8.4	4.026
Laboratory	11.376	5.696
Canteen	4.356	2.176
Boys Hostel	9.858	4.848
Girls Hostel	16.8	8.888
Total	142.006	70.424

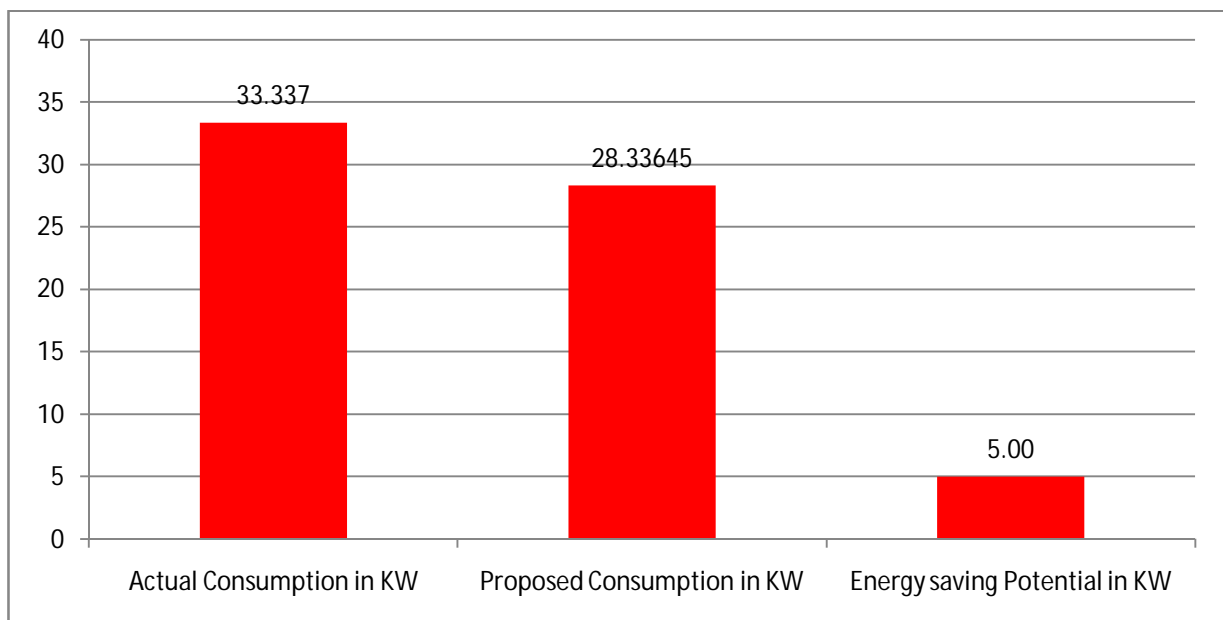
8. Lighting and Fan Power Consumption Analysis



Power consumption indicated in KWH

9. AC Power Consumption Analysis

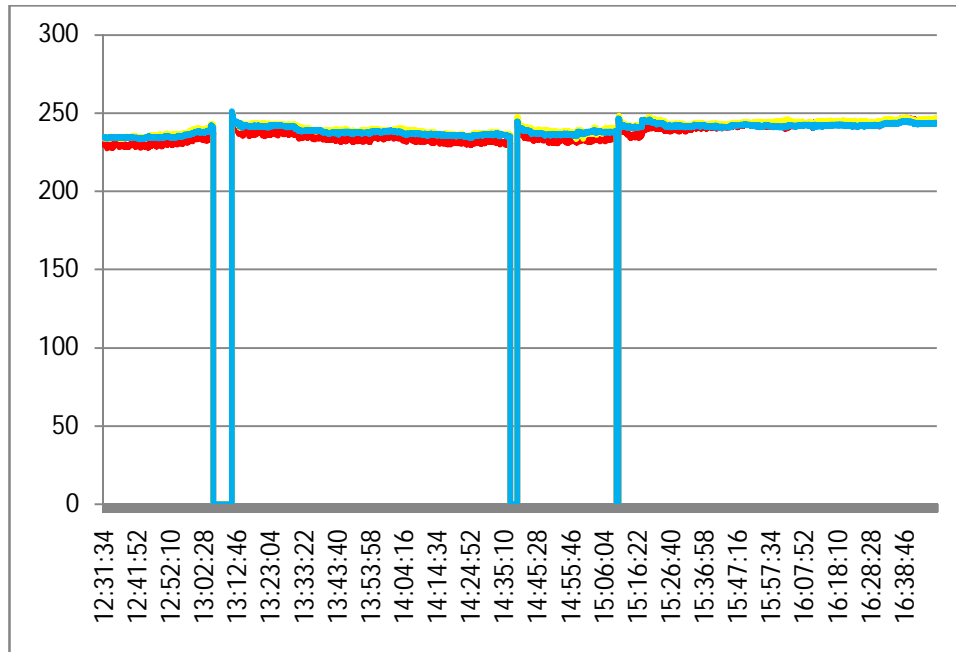
AC Location	Actual Consumption in KW	Proposed Consumption in KW	Energy saving Potential in KW
Smart Class Room I	2.11	1.794	0.317
Dean Room	1.23	1.046	0.185
Server Room	1.21	1.029	0.182
Placement	2.81	2.389	0.422
Admission office	2.87	2.440	0.431
Seminar Hall	1.15	0.978	0.173
Smart Class Room II	4.99	4.242	0.749
CISCO Lab	2.18	1.853	0.327
Room No.108	1.23	1.046	0.185
Principal Office	2.15	1.828	0.323
CEO Room	2.187	1.859	0.328
Conference Room	2.34	1.989	0.351
Sim Lab	2.38	2.023	0.357
Computer Lab7	2.29	1.947	0.344
IOT Lab	2.21	1.879	0.332
Total	33.337	28.33645	5.00



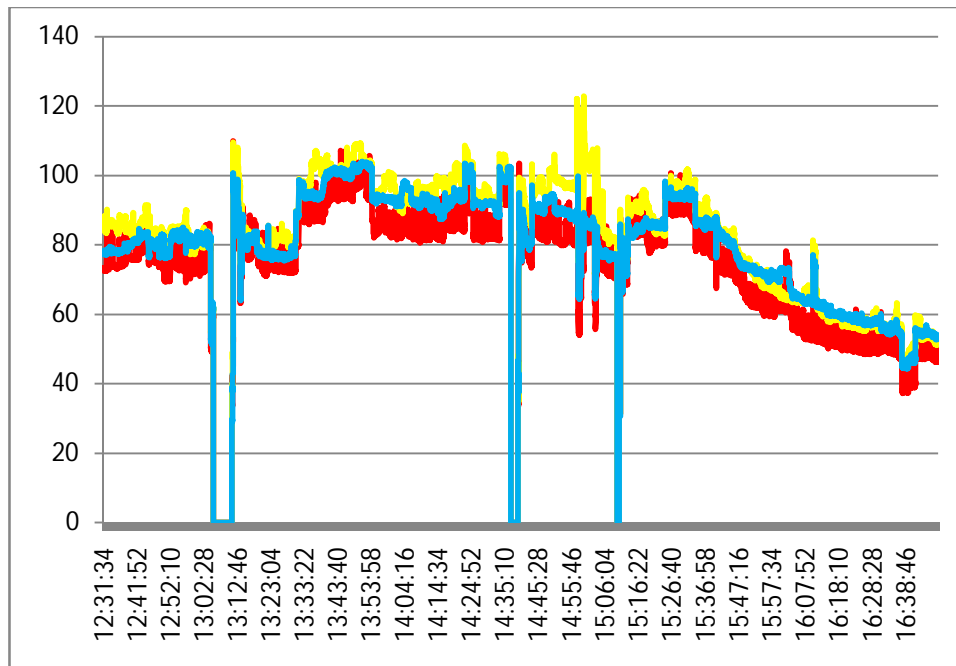
Power consumption indicated in KWH

10. Main Incoming Trends (S.C.950)

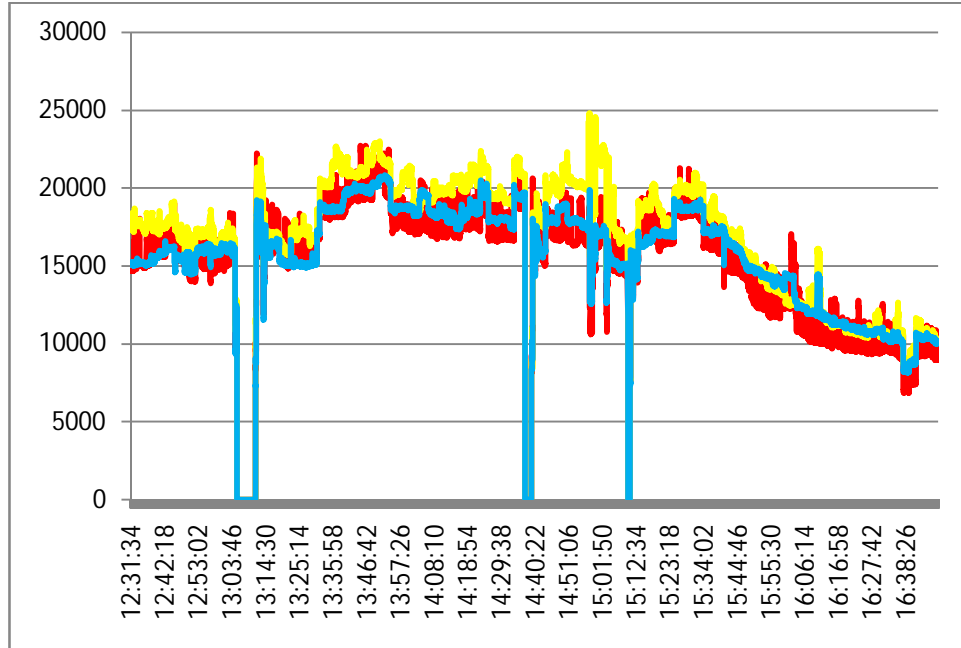
Voltage Trend



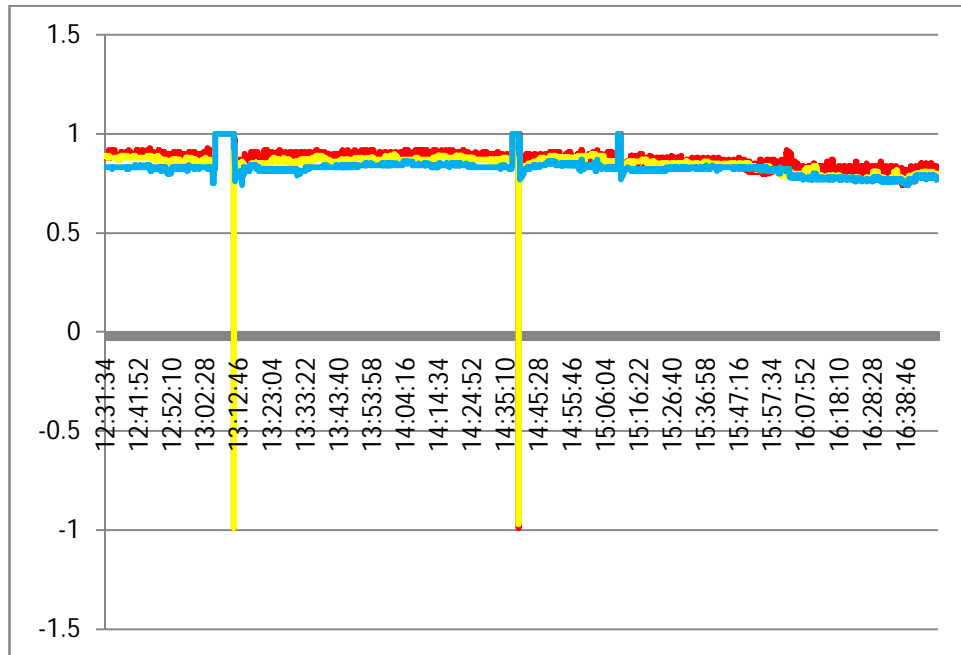
Current Trend



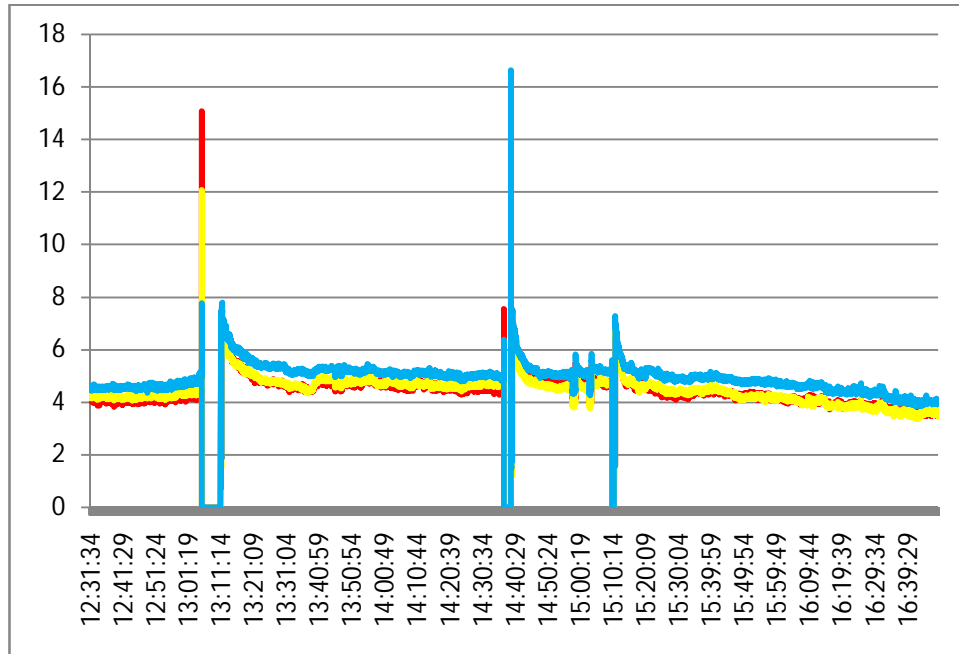
Power Trend



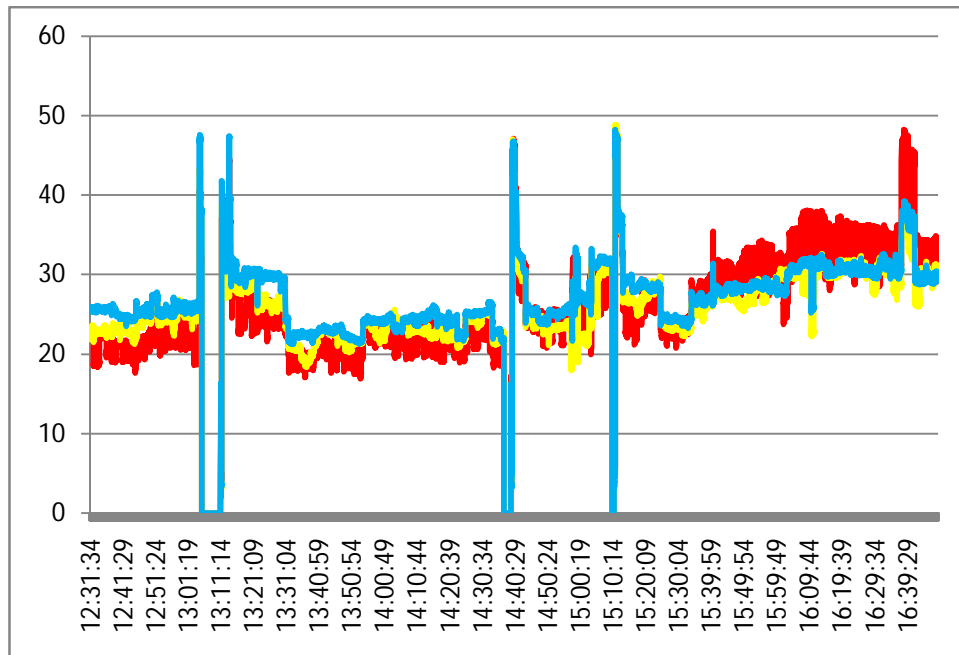
Power Factor Trend



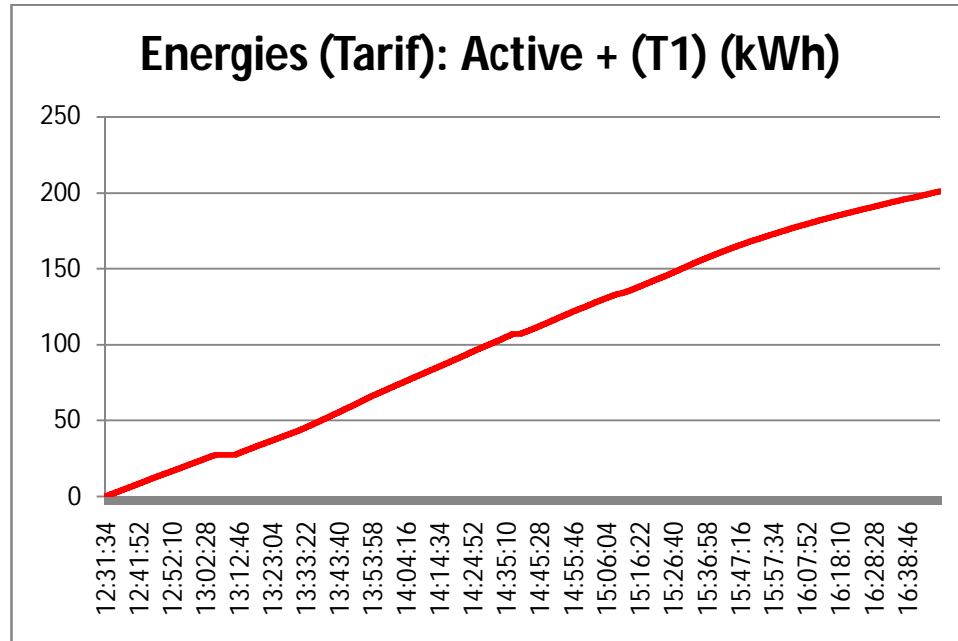
Voltage Harmonics Trend



Current Harmonics Trend



Active Energy Consumption

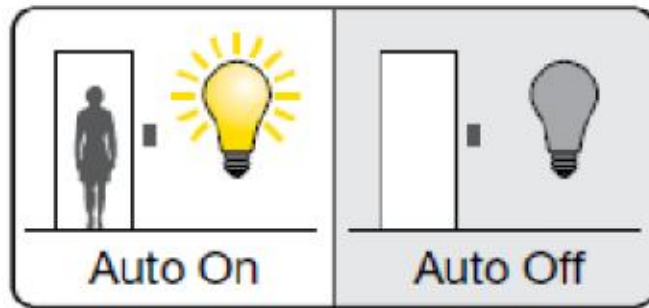


Key Points

- Average energy consumption is 51 KWH per hour in day time
- Both voltage harmonics and current harmonics are on higher side requires harmonics mitigation equipments at all UPS and Lighting Circuits
- Isolated earthing is needed for all UPS
- Most of the tube lights are conventional 36W bulbs and the same should be replaced with 20W LED tube light which gives same illumination. This saves 50% of energy bill.
- Fans which are used also conventional type 75W fans and the same should be replaced with 35W BLDC Fan which saves 53% energy bill.
- Power factor is in mid range. But still we can improve by the balancing the load in all phases up to the maximum extend and providing load side capacitors to the pumps.
- By installing motion sensors in common area lighting, our energy saving potential in lighting will increase.

11. Points for Improvement

- Provide double earth to all the motors and panel boards as a safety measures.
- Provide MPD in all pumping application which is will protect your pumps from dry run.
- Provide automatic lighting on-off and trim control in all Street light and Varandha lighting circuits. Occupancy sensors function by switching the lights ON and OFF based on the occupancy of the room and are a smart way to save energy in commercial organizations.



- Use 5 star rated AC's in next replacement period will yield energy saving in AC's Energy consumption

New BEE Energy Efficiency Ratings (EER) for Room Air Conditioners					
STAR RATING LEVELS-Jan1, 2018 - Dec 31,2020					
EER (W/W)					
WRAC			SPLIT		
Star Rating	Minimum ISEER	Maximum ISEER	Star Rating	Minimum ISEER	Maximum ISEER
1 Star ★	2.50	2.69	1 Star ★	3.10	3.29
2 Star ★★	2.70	2.89	2 Star ★★	3.30	3.49
3 Star ★★★	2.90	3.09	3 Star ★★★	3.50	3.99
4 Star ★★★★	3.10	3.29	4 Star ★★★★	4.00	4.49
5 Star ★★★★★	3.30	-	5 Star ★★★★★	4.50	-

12. Sound Pollution Monitoring

Sound pollution is another important parameter that is taken into account for green auditing of the college campus. Fifteen different sites are chosen for the sound monitoring was quantified by the Sound level meter (Lutron – SL4030)

Location	Average Sound Level (db)
Ground Floor	76
First Floor	68
Second Floor	58
Third Floor	55
Canteen	75
Main Gate	49
Hostel	45
Workshop	74
Power House	53
Library	50
Office	53
Principal Room	52
Conference Room	47
Reception	49
Play ground	64

13. Waste Management

This indicator addresses waste production and disposal of different wastes like food, Paper, Plastic, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair and reuse. For proper segregation and management, proper use of waste bins is the only solutions for waste management purpose in the college campus.



In Nehru Institute of Engineering and Technology, there is a practice of collecting the waste with colour coded bins. Each floor contains two or more sets of colour bins for proper waste management.

Location	Number of Waste bins
College – Ground Floor	6 Nos
College – First Floor	6 Nos
College – Second Floor	6 Nos
College – Third Floor	6 Nos
Canteen	3 Nos
Hostel	6 Nos

- ❖ Total stake holders – 1544
- ❖ Class rooms – 57
- ❖ Staffs Rooms - 10
- ❖ Office Rooms – 4
- ❖ E-waste – Computer, Electrical and electronics parts – Disposal by selling
- ❖ Plastic Waste – Disposal by selling
- ❖ Food waste – to municipal waste collection center
- ❖ Solid wastes – to municipal waste collection center
- ❖ Glass waste – No treatment
- ❖ Waste water – Urinals, washing, bathroom in soak Pits
- ❖ Napkin incinerator – 2

Quantity of waste generated:-

- ❖ Biodegradable – 1½ kg/day (office)
- ❖ Non biodegradable – 0.3 kg/day (office)
- ❖ Biodegradable – 0.2kg/day (labs)
- ❖ Non-biodegradable – 0 kg/day (including glass bottles)
- ❖ Hazardous waste –50 gm/day
- ❖ Biodegradable – 25 kgs/day (Canteen)

7. Green Campus

- ❖ Total number of plant species identified – 410
- ❖ Tree cover of the campus - 1691 m²
- ❖ Free space in the campus – 452 m²
- ❖ Garden area inside the college – 6.5 acres
- ❖ Total campus area – 14.84 Acres

8. Carbon Footprint

- ❖ Petrol used by two wheelers/day–**100 L**
(Per person to and fro 40 kms = 1L)
- ❖ Fuel used by four wheelers (46 Persons) - **92 L**
(Per person to and fro 40 kms = 2L)
- ❖ Fuel for persons (total 649 persons) travelling
by common transportation = **440 L** (20L x 30 persons)
- ❖ **Total fossil fuel use is 632 L / day**
- ❖ **Total fuel cost per day for transportation = Rs 60,040/-**
(632 L x Rs 95)
- ❖ Cost of Gas cylinders used Rs. 34720/month (28 cylinders)
- ❖ Cost of generator fuel – Rs. 648/month (0.3 L per day)
- ❖ Amount spent for transportation (office) – Rs. 4800/month (Approx.)
- ❖ Amount spent for transportation (canteen) – Rs. 4800/month
- ❖ Amount spent for transportation (visitors) – Rs. 7500/year
- ❖ Other expenditures for the energy – Rs. 658/day

Burning of fossil fuels is the main source and cause of carbon dioxide release to the atmosphere. Carbon dioxide release for the stakeholders to reach the college is very high. It is contributing to the global warming and increasing the pace of climate change. If a College bus is flying for the staff and students carbon dioxide released for the stakeholders' commutation can be reduced. More trees are planted in the campus in order to make a source of sink for the carbon dioxide and for other green house gases.

List of eco friendly activities going on in the campus

- ❖ Planting and caring of trees in and around the campus.
- ❖ Timely disposal of wastes from the campus.
- ❖ Celebration of important days like World Environment Day, Ozone day, with great importance.
- ❖ Campus is declared plastic free.
- ❖ Management has decided to adopt green protocol
- ❖ Distribution of medicinal plant saplings among students

9. Major Audit Observations

- ❖ The environmental awareness initiatives are substantial.
- ❖ The installation of solar panels are not initiated
- ❖ Training in vegetable cultivation and composting practices are inadequate.
- ❖ There is no Green policy/ environmental policy statement indicating the commitment of the college towards its environmental performance.
- ❖ Gardens inside the college premises are found well maintained.
- ❖ Attention needed in developing Herbal Gardens
- ❖ Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- ❖ Programs on green initiatives have to be increased. Campus is declared plastic free, stringent actions should be taken to maintain this.
- ❖ Rain water harvesting systems, solar power generation, environmental education programs have to be strengthened.
- ❖ Lot of NSS program conducted related cleaning activities in villages around the college are appreciable.
- ❖ Water conservation committee is needs to be framed and monitored
- ❖ Energy Conservation group also needed
- ❖ Separate group is needed to plan and cultivate location based plants to reduce the water consumption of the Garden
- ❖ College should take initiative to educate the nearby village peoples about global warming and waste management through their programs

10. Water Audit Findings

- ❖ There is no water consumption monitoring system in the college campus.
- ❖ The college does not have waste water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.
- ❖ Automatic switching system is not installed for pump sets used for overhead tank filling.
- ❖ Per day use of water is very high and there is no control over wastage of water.
- ❖ Display boards against the misuse of water use are lacking.

11. Energy Audit

- ❖ The communication process for awareness in relation to energy conservation is found adequate.
- ❖ Monthly use of electricity in the college is very optimum
- ❖ Objectives for reducing energy, water and fuel consumption are merger.
- ❖ There are fans of older generation and non energy efficient which can be phase out by replacing with new energy efficient fans.
- ❖ Regular monitoring of equipments and immediate rectification of any problems.
- ❖ Use of renewable energy is not sufficient. It needs great attention to reduce green house gas emission.

12. Waste Audit

- ❖ Solid waste management systems established are sufficient.
- ❖ The college has proper communication with the local body for regular collection of solid waste from the campus.
- ❖ Waste bins in the class rooms, veranda, canteen and campus are adequate.
- ❖ Bio gas plant is available
- ❖ Proper composting systems are lacking.
- ❖ Green chemistry labs are not introduced.

13. Green Campus Audit

- ❖ Tree cover of the college with respect to the stakeholder strength is enough.
- ❖ Regular planting of trees in the campus are adequate.
- ❖ Display boards to all plants identified are lacking.
- ❖ Water uses for gardens are high.
- ❖ No arboretum is set up in the college campus.
- ❖ There is only very few fruit trees in the college to attract birds.
- ❖ Registry for flora and fauna on the campus is lacking.
- ❖ College needs to plant more herbal plants

14. Carbon Foot Print Audit

- College has not yet taken any initiative for carbon accounting.
- Encourage students to use cycles.
- 632 liters of fossil fuel is burned every day for the functioning of the college. This is too high carbon emission
- A huge amount such as Rs. 60,040 per day is spent as the cost of fossil fuel by the stakeholders.
- Usage of 28 gas cylinders per month is very high.

15. Preparation of Action Plan

Policies referring to college's management and approach's towards the use of resources need to be considered. The college should have a green policy/environmental policy for its sustainable development. The environmental policy formulated by the management of the college should be implemented meticulously. The college should have a policy on awareness raising or training programs (for ground staff or kitchen staff for example) and college also should have a procurement policy (the College's policy for purchasing materials).

16. Follow Up Action and Plans

Green Audits are exercises which generate considerable quantities of valuable management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings.

Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

17. Environmental Education

The following environmental education program may be implemented in the college before the next green auditing:-

- ❖ Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, paddy cultivation, tree planting, energy management, landscape management, pollution monitoring methods, and rain water harvesting methods.
- ❖ Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- ❖ Activate the environmental clubs
- ❖ Set up model rainwater harvesting system, rainwater pits, vegetable garden, medicinal plant garden, paddy fields etc. for providing proper training to the students.
- ❖ Conduct exhibition of recyclable waste products
- ❖ Implement chemical treatment system for waste water from the laboratories.

18. Awareness on Carbon Consumption

- ❖ Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- ❖ The carbon consumption awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

19. Conclusion and Full List of Recommendations

The green audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a college.

The green audit reports assist in the process of attaining an eco friendly approach to the sustainable development of the college. Hope that the results presented in the green auditing report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices. A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development.

It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. An outside view, perspective and opinion often helps staff who have been too close to problems or methods to see the value of alternative approaches. A green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

20. Common Recommendations

- ❖ Adopt an environmental policy for the college
- ❖ Establish a purchase policy for environmental friendly materials
- ❖ Introduce UGC Environmental Science course to all students
- ❖ Conduct more seminars and group discussions on environmental education
- ❖ Students and staff can be permitted to solve local environmental problems
- ❖ Renovation of cooking system in the canteen to save gas
- ❖ Establish water, waste and energy management systems

21. Criteria Wise Recommendations

Water

- Remove damaged taps and install sensitive taps is possible.
- Drip irrigation for gardens and vegetable cultivation can be strengthened.
- Install Meters to monitor the water use
- Establish water treatment systems.
- Use waterless urinals
- Spray the water to the garden in the early morning of the day
- Use aerator in the taps to reduce the water consumption and wastage
- Use treated water for bus wash and other toilet use
- Conduct leak test at least once in two months
- Use water efficient garden techniques to reduce the water consumptions in garden
- Rain water harvesting system needs to be improved
- Awareness programs on water conservation to be conducted.
- Install display boards to control over exploitation of water.

Energy

- Conventional Fans needs to be replaced with energy efficient BLDC Fans.
- Conduct more save energy awareness programs for students and staff.
- Try to install more solar panels to reduce the green house gas emission
- Optimise the energy usage
- Automatic power on/off systems may be introduced.

Waste

- Establish a functional bio gas plant.
- A model solid waste treatment system to be established.
- A model Vormicomposting plant to be set up in the college campus.
- Establish a plastic free campus.
- Avoid paper plates and cups for all functions in the college.

Green Campus

- All trees in the campus should be named scientifically.
- Create more space for planting.
- Grow potted plants at both verandah and class rooms.
- Create automatic drip irrigation system during summer holidays.
- Not just celebrating environment day but making it a daily habit.
- Beautify the college building with indoor plants
- Providing funds to nature club for making campus more green
- Encouraging students not just through words, but through action for making the campus green
- Conducting competitions among departments for making students more interested in making the campus green.

Carbon footprint

- Establish a system of car pooling among the staff to reduce the number of four wheelers coming to the college.
- Encourage students and staff to use cycles.
- Establish a more efficient cooking system to save gas.
- Discourage the students using two wheelers for their commutation.
- More use of generators every day should be discouraged.

29. Audit Report

We have conducted the Green audit at all important areas up to our maximum possible extend. We found lot of points in waste management needed attention. Overall performance of college is found satisfactory.

For Sri Energy Solutions,

A handwritten signature in black ink, appearing to read 'M. Rameshkumar', with a long horizontal stroke extending to the right.

M.Rameshkumar

BEE Certified Energy Auditor – EA 22303

Annexure – A

Details of the Program offered

❖ U.G.Courses

- Aeronautical Engineering
- Mechanical Engineering
- Electrical and Electronics Engineering
- Computer Science and Engineering
- Electronics and Communication Systems
- Mechatronics Engineering
- Artificial Intelligence and Data Science
- Computer Science and Business systems

❖ P.G.Course

- Master of Business Administration
- Aeronautical Engineering
- Communication Systems

Annexure – B

Bus Routes

The college has operates several buses in the following route for the convenience of the students and staffs

- Vadakanchery
- Palakkad
- Pathirapala
- Ottapalam
- Gandhipuram
- Pollachi
- Thiruvazhiyod
- Mannarkkad
- Kottaiy
- Thiruvillamala
- Nemmara
- Vandithavalam
- Mangalam dam
- Malampuzha
- Kollengode
- Tiruppur
- Shoronur
- Cherupalachery
- Alandurai

Annexure – C

Air Pollution Norms

AQI	Air Pollution Level	Health Implications	Cautionary Statement (for PM2.5)
0 - 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 -100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

Future Support

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

THANK YOU

From,

M/s.Sri Energy Solutions

2/57, Church Street,

Silukkuvarpatti,

Dindigul – 624 215

Mob : 90420 64932

For Query : srienergysolutions@gmail.com

2021

Environment Audit Report

of

**Nehru Institute of Engineering
and Technology, Coimbatore**

Environment Audit

Done by

Sri Energy Solutions

11/02/2021

Project Report Title : **Environment Audit**

Client Name : **Nehru Institute of Engineering and Technology**

Plant Location : **Nehru Garden,
Nehru College Road,
Thirumalayam palayam,
Coimbatore-641 105.**

Date of Audit : **11th February 2021**

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

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

**2. C.Sekar.,B.E.,
Trainee Engineer – Energy Audit**

Acknowledgement

Sri Energy Solutions acknowledge with hearty thanks to **Dr.P.Krishna das, Chairman and Managing Trustee, Dr.P.Krishnakumar, CEO and Secretary, Nehru Institute of Engineering and Technology, Coimbatore** for their support for carrying out this audit.

Our special thanks to **Dr.P.Maniarasan – Principal and Dr.Kannan - HOD** for their co-operation and support us to carry out the Environment audit on time.

In addition with this, we are grateful to your staffs **Mr.N.Sathish kumar and Mr.Jagadesh** for their co-operation and support us to carry out the Environment audit very effectively.

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1. Introduction

Nehru Institute of Engineering and Technology is one of the leading higher education institutions under Anna university, chennai. This college was established by Shri.P.K.Das in the year of 2006.

This college is located at Nehru Garden, Thriumalayam Palayam village, Coimbatore. This college is having lot of courses in Engineering sector with complete equipped. It has been providing quality education to the rural and semi-urban students of Coimbatore and Palakkad district. This institution has LTCT TNEB service and two backup generators. High quality panels and switch gears are connected with this service for giving quality supply to the equipments. The capacity of generator is also well enough to meet the demand.

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

2. Objectives

The main objectives of the environment audit are to promote the environment management and conservation in the college campus. The purpose of the audit is to identify, quantify, describe and priorities framework environment sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Environment Audit are,

- To check that the natural resources are properly utilized and to control the adverse effect on the environment
- To check that proper steps have been undertaken for maintaining health, welfare of the community and also for dispersal of harmful wastes and social risks
- To introduce and make aware students to real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and the extent of resource use on the campus
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost
- To bring out a present status report on environmental compliance

3. Methodology

In order to perform environment audit, the methodology included different techniques such as physical inspection of the campuses, observation and review of the documentation, interviewing key persons, and data analysis, measurements and recommendations. The study covered the following area to summarize the present status of environment management in the campuses:

- Water quality assessment, consumption and management
- Air quality assessment and management
- Electricity consumption and management
- Sound pollution monitoring
- Waste management
- Biodiversity status of the campus
- Environment awareness development
- Developing green belt
- Encouraging alternate energy use

4. About the College

Institutional Vision

Nehru Institute of Engineering and Technology seeks to become a centre of excellence by providing its students a comprehensive education with special emphasis on responsible citizenship, secular outlook, moral values and abiding faith in God expressed in active concern for others.

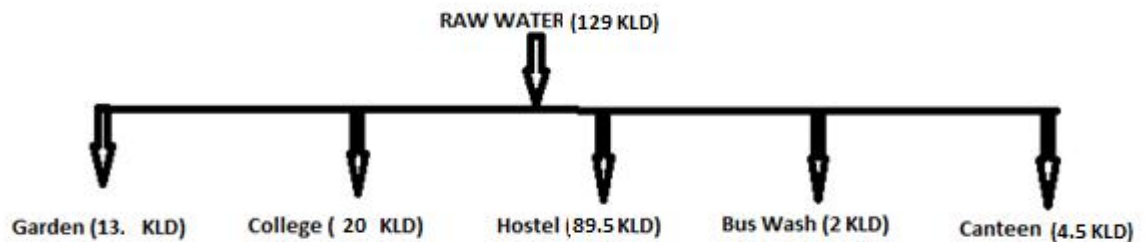
Objectives of the College

The college endeavors to prepare its students for fulfilling careers by enabling them to realize their full potential and by inculcating in them the spirit of intellectual enquiry, independent thinking, self- reliance, leadership, co- operation, expression of cultural talents and social service.

5. Water Quality Assessment, Consumption and Management

In Nehru Institute of Engineering and Technology have two bore wells. The college extracts around 127 KLD of water from bore well and utilizing to the college uses.

The water balance chart of college is given below,



The MPN index of water samples at different locations are given below,

Sample No	Location	MPN Index (per 100ml)	Water Quality
1	Class Room - GF	00	Outstanding (Potable)
2	Class Room - FF	00	Outstanding (Potable)
3	Class Room - SF	00	Outstanding (Potable)
4	Staffs Room	00	Outstanding (Potable)
5	Canteen	00	Outstanding (Potable)
6	Tap Water	09	Good (Non-potable)
7	Bore water	52	Average (Non-potable)

The following actions can be taken up to reduce the water usage and save environment for future generations

- Fixing of Aerators in all taps
- Scheduled watering to garden especially in early morning or late evening
- Usage waterless urinals
- Fixing of metering system to monitor water usage
- Fixing display board to advice about water conservation
- Widening trip irrigation to garden to reduce water usage
- Form water conservation committee and use them to reduce water consumption and management
- Conduct water conservation program to students and nearby villages in order to conserve water
- Construct water treatment plant to treat the waste water and reuse it for bus cleaning and other cleaning purpose
- Conduct water leak test once in a month to reduce water wastage through leak

Most of the above points were discussed with top management and agreed to take immediate actions to conserve water.

College has good practice of using waste water to garden. Still we can try to treat this waste water and can be used to all other purpose.

6. Air Quality Assessment, Consumption and Management

The following air quality parameters were measured using Airveda and government's official sites.

Parameter	Minimum Value	Maximum Value
PM 2.5	78	146
PM 10	25	152
O ₃	7	25
NO ₂	9	17
CO	6	14
Temp	24	29
Pressure	833	848
Humidity	26	57
Wind Speed	5	11

Present air pollution level is in the range of good due to less population and lighter transport. Lot of efforts is taking up to reduce the air pollutions. Nehru institute of engineering and technology developed good green belt. Management takes lot of efforts to improve further.

The location of this college is so away from busy roads. Thereby the college students and staffs are enjoying high quality air and less noise. Moreover the college is maintaining lot of garden and tress to give more than enough clean air than what is required. As per the air sector the college is performing so better.

7. Energy Consumption Analysis

Load Pattern

Load Type	Load Details in KW
Lighting and Fan	142.006
Pumps	15.321
Air Conditioner	33.337
Computer & Accessories	43.212
Others	7.129
Total	241.005

Energy saving Potential in Lighting

Building	Actual Consumption in KW	Energy saving Potential in KW
Dr.Ramanujam Block	46.866	22.735
Dr.APJ Abdul Kalam Block	44.35	22.055
Library	8.4	4.026
Laboratory	11.376	5.696
Canteen	4.356	2.176
Boys Hostel	9.858	4.848
Girls Hostel	16.8	8.888
Total	142.006	70.424

Energy saving Potential in Air Conditioning

AC Location	Actual Consumption in KW	Proposed Consumption in KW	Energy saving Potential in KW
Smart Class Room I	2.11	1.794	0.317
Dean Room	1.23	1.046	0.185
Server Room	1.21	1.029	0.182
Placement	2.81	2.389	0.422
Admission office	2.87	2.440	0.431
Seminar Hall	1.15	0.978	0.173
Smart Class Room II	4.99	4.242	0.749
CISCO Lab	2.18	1.853	0.327
Room No.108	1.23	1.046	0.185
Principal Office	2.15	1.828	0.323
CEO Room	2.187	1.859	0.328
Conference Room	2.34	1.989	0.351
Sim Lab	2.38	2.023	0.357
Computer Lab7	2.29	1.947	0.344
IOT Lab	2.21	1.879	0.332
Total	33.337	28.33645	5.00

Key Points

- Average energy consumption is 51 KWH per hour in day time
- Both voltage harmonics and current harmonics are on higher side requires harmonics mitigation equipments at all UPS and Lighting Circuits
- Isolated earthing is needed for all UPS
- Most of the tube lights are conventional 36W bulbs and the same should be replaced with 20W LED tube light which gives same illumination. This saves 50% of energy bill.
- Fans which are used also conventional type 75W fans and the same should be replaced with 35W BLDC Fan which saves 53% energy bill.
- Power factor is in mid range. But still we can improve by the balancing the load in all phases up to the maximum extend and providing load side capacitors to the pumps.
- By installing motion sensors in common area lighting, our energy saving potential in lighting will increase.

8. Sound Pollution Monitoring

Sound pollution is another important parameter that is taken into account for green auditing of the college campus. Fifteen different sites are chosen for the sound monitoring was quantified by the Sound level meter (Lutron – SL4030)

Location	Average Sound Level (db)
Ground Floor	76
First Floor	68
Second Floor	58
Third Floor	55
Canteen	75
Main Gate	49
Hostel	45
Workshop	74
Power House	53
Library	50
Office	53
Principal Room	52
Conference Room	47
Reception	49
Play ground	64

This college is located so away from busy roads makes the environment very calm. It offers pleasant environment which is very essential for good education.

9. Waste Management

This indicator addresses waste production and disposal of different wastes like food, Paper, Plastic, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair and reuse. For proper segregation and management, proper use of waste bins is the only solutions for waste management purpose in the college campus.

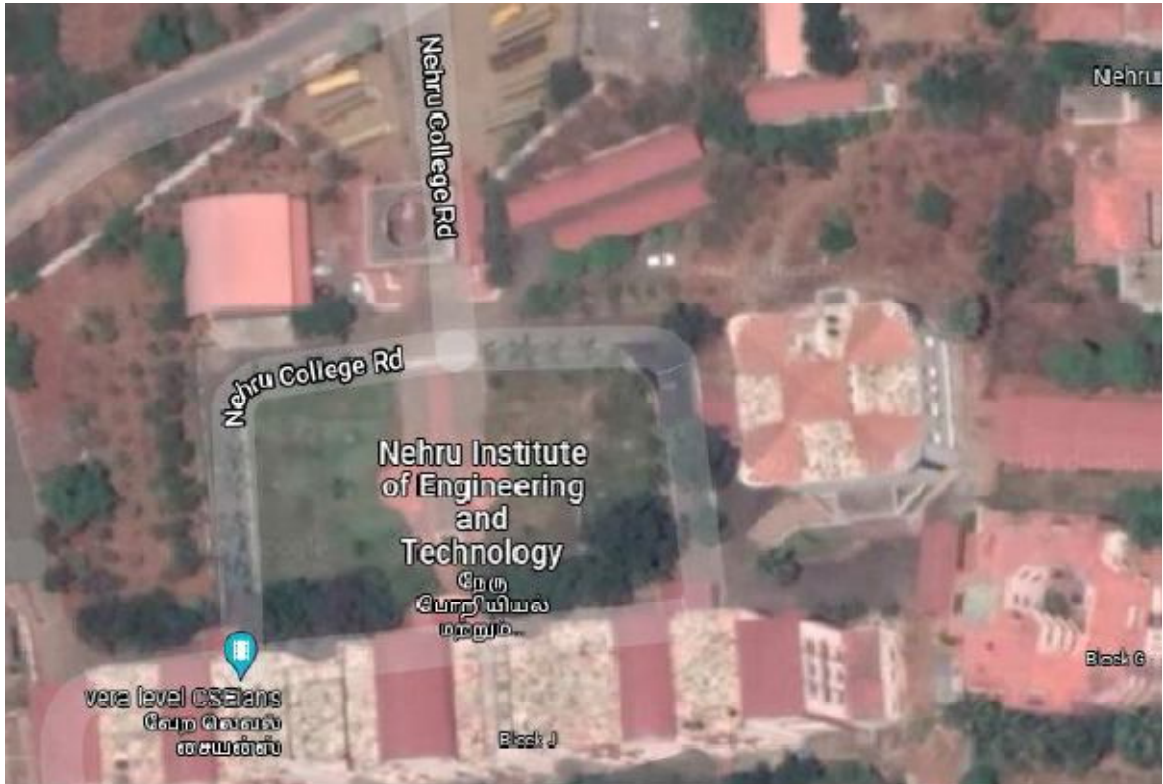


In Nehru Institute of Engineering and Technology, there is a practice of collecting the waste with colour coded bins. Each floor contains two or more sets of colour bins for proper waste management.

Location	Number of Waste bins
College – Ground Floor	6 Nos
College – First Floor	6 Nos
College – Second Floor	6 Nos
College – Third Floor	6 Nos
Canteen	3 Nos
Hostel	6 Nos

Moreover the college has placed lot of display boards to reduce the waste generation which aids to maintain good environment system inside the college campus.

10. Green Campus



- ❖ Total number of Ornamental plants identified – 6,873 Nos
- ❖ Tree cover of the campus – 7,384 m²
- ❖ Free space in the campus – 3.5 m²
- ❖ Garden area inside the college – 6.5 acres

- ❖ Total campus area – 14.84 Acres

The college has maintaining lot of Plants and trees which helps the college surrounding looks more pleasant. This gives pleasant air with good thermal comfort to the students. In addition with all the class rooms were equipped with sufficient Window to floor ratio and enough number of ceiling fans

11. Carbon Footprint

- ❖ Petrol used by two wheelers/day–**100 L**
(Per person to and fro 40 kms = 1L)
- ❖ Fuel used by four wheelers (46 Persons) - **92 L**
(Per person to and fro 40 kms = 2L)
- ❖ Fuel for persons (total 649 persons) travelling
by common transportation = **440 L** (20L x 30 persons)
- ❖ **Total fossil fuel use is 632 L / day**
- ❖ **Total fuel cost per day for transportation = Rs 60,040/-**
(632 L x Rs 95)
- ❖ Cost of Gas cylinders used Rs. 34720/month (28 cylinders)
- ❖ Cost of generator fuel – Rs. 648/month (0.3 L per day)
- ❖ Amount spent for transportation (office) – Rs. 4800/month (Approx.)
- ❖ Amount spent for transportation (canteen) – Rs. 4800/month
- ❖ Amount spent for transportation (visitors) – Rs. 7500/year
- ❖ Other expenditures for the energy – Rs. 658/day

Burning of fossil fuels is the main source and cause of carbon dioxide release to the atmosphere. Carbon dioxide release for the stakeholders to reach the college is very high. It is contributing to the global warming and increasing the pace of climate change. If a College bus is fully utilised for the staff and students means carbon dioxide released for the stakeholders' commutation can be reduced. More trees are planted in the campus in order to make a source of sink for the carbon dioxide and for other green house gases.

$$\begin{aligned}
 \text{Annual CO}_2 \text{ emission by the college} &= (632 \times 60 \times 2.65) + \\
 & \quad (56 \times 7.65 \times 5.68) \\
 &= 102.9 \text{ MT of CO}_2 \\
 \text{Annual Absorption of CO}_2 &= 813 \times 6.5 \\
 &= 5.285 \text{ MT of CO}_2
 \end{aligned}$$

List of eco friendly activities going on in the campus

- ❖ Planting and caring of trees in and around the campus.
- ❖ Timely disposal of wastes from the campus.
- ❖ Celebration of important days like World Environment Day, Ozone day, with great importance.
- ❖ Campus is declared plastic free.
- ❖ Management has decided to adopt green protocol
- ❖ Distribution of medicinal plant saplings among students

12. Tree Plantation Program

M/s. Nehru Institute of Engineering and Technology involved in tree plantation program in and out of the college campus. They had planted wide variety of trees and plants. Also they have take care survival of the same. This will boost environment air system by reducing air pollutions.



13. Rain Water Harvesting

M/s. Nehru Institute of Engineering and Technology constructed with lot of rain water harvesting pits. This will supports to recharge the ground water level. College had the provision to store the rain water for their internal use in future. This is the very good step towards the environment protection.



14. Floral Diversity

M/s. Nehru Institute of Engineering and Technology maintains floral diversity in great manner. They are maintaining different kinds of plants and also have plan of improving their herbal garden in near future.





15. Faunal Diversity

M/s. Nehru Institute of Engineering and Technology maintains faunal diversity in great manner. They are maintaining different kinds of plants to attract different faunal in their campus.





16. Bio Gas Plant

M/s. Nehru Institute of Engineering and Technology maintains Bio Gas Plant in well manner. The college collects all the food wastes from Hostel and Canteen are utilized here to make good natural gas.



17. Major Audit Observations

- ❖ The environmental awareness initiatives are substantial.
- ❖ Solar power plant need to be install to reduce our TNEB bill
- ❖ Training in vegetable cultivation and composting practices are inadequate.
- ❖ There is no Green policy/ environmental policy statement indicating the commitment of the college towards its environmental performance.
- ❖ Gardens inside the college premises are found well maintained.

- ❖ Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- ❖ Programs on green initiatives have to be increased. Campus is declared plastic free, stringent actions should be taken to maintain this.
- ❖ Rain water harvesting systems, solar power generation, environmental education programs have to be strengthened.
- ❖ Lot of NSS program conducted related cleaning activities in villages around the college are appreciable.
- ❖ Water conservation committee is needs to be framed and monitored
- ❖ Energy Conservation group also needed
- ❖ Separate group is needed to plan and cultivate location based plants to reduce the water consumption of the Garden
- ❖ College should take initiative to educate the nearby village peoples about global warming and waste management through their programs

18. Water Audit Findings

- ❖ Water consumption monitoring system in the college campus needs to be initiated.
- ❖ The college does not have waste water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.
- ❖ Fixing aerators to water taps to reduce the water consumption is on the way
- ❖ Display boards against the misuse of water use are needs to be improved.

19. Energy Audit

- ❖ The communication process for awareness in relation to energy conservation is found adequate.
- ❖ Monthly use of electricity in the college is very optimum
- ❖ Objectives for reducing energy, water and fuel consumption are merged.
- ❖ There are fans of older generation and non energy efficient which can be phase out by replacing with new energy efficient fans.
- ❖ New projects are going out with Energy efficient product (LED) is a good sign
- ❖ Regular monitoring of equipments and immediate rectification of any problems needed and monitored.

20. Waste Audit

- ❖ Solid waste management systems established are needs to be improved.
- ❖ The college has proper communication with the local body for regular collection of solid waste from the campus.
- ❖ Waste bins in the class rooms, veranda, canteen and campus are adequate.
- ❖ Bio gas plant is available
- ❖ Proper composting systems are working well
- ❖ Green chemistry labs are needs to be introduced.

21. Green Campus Audit

- ❖ Tree cover of the college with respect to the stakeholder strength is enough.
- ❖ Regular planting of trees in the campus are adequate.
- ❖ Display boards to all plants identified are needs to be improved.
- ❖ Water uses for gardens are adequate. Still we can reduce.
- ❖ There is only very few fruit trees in the college to attract birds.
- ❖ Registry for flora and fauna on the campus is needs to be improved
- ❖ College needs to plant more herbal plants

22. Carbon Foot Print Audit

- College has not yet taken any initiative for carbon accounting.
- Encourage students to use cycles.
- 632 liters of fossil fuel is burned every day for the functioning of the college. This is too high carbon emission, but it is compensated by high amount of Plants and trees
- Usage of 28 gas cylinders per month is very high. Try to implement bio-gas plant

23. Preparation of Action Plan

Policies referring to college's management and approach's towards the use of resources need to be considered. The college should have a green policy/environmental policy for its sustainable development. The environmental policy formulated by the management of the college should be implemented meticulously. The college should have a policy on awareness raising or training programs (for ground staff or kitchen staff for example) and college also should have a procurement policy (the College's policy for purchasing materials).

24. Follow Up Action and Plans

Environment Audits are exercises which generate considerable quantities of valuable management information. The time and effort of cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings.

Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

25. Environmental Education

The following environmental education program may be implemented in the college before the next Environment auditing:-

- ❖ Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, paddy cultivation, tree planting, energy management, landscape management, pollution monitoring methods, and rain water harvesting methods.
- ❖ Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- ❖ Activate the environmental clubs
- ❖ Set up model rainwater harvesting system, rainwater pits, vegetable garden, medicinal plant garden, paddy fields etc. for providing proper training to the students.
- ❖ Conduct exhibition of recyclable waste products
- ❖ Implement chemical treatment system for waste water from the laboratories.

26. Awareness on Carbon Generation

- ❖ Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- ❖ The awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

27. Conclusion and Full List of Recommendations

The Environment audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a college.

The Environment audit reports assist in the process of attaining an eco friendly approach to the sustainable development of the college. Hope that the results presented in the Environment auditing report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices. A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development.

It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. An outside view, perspective and opinion often help staffs who have been too close to problems or methods to see the value of alternative approaches. An Environment audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

28. Common Recommendations

- ❖ Adopt an environmental policy for the college as in annexure D
- ❖ Establish a purchase policy for environmental friendly materials
- ❖ Conduct more seminars and group discussions on environmental education
- ❖ Students and staff can be permitted to solve local environmental problems
- ❖ Renovation of cooking system in the canteen to save gas
- ❖ Establish water, waste and energy management systems

29. Criteria Wise Recommendations

Water

- Remove damaged taps and install sensitive taps is possible.
- Drip irrigation for gardens and vegetable cultivation can be improved.
- Install Meters to monitor the water use
- Establish water treatment systems.
- Use waterless urinals
- Spray the water to the garden in the early morning of the day
- Use aerator in the taps to reduce the water consumption and wastage
- Use treated water for bus wash and other toilet use
- Conduct leak test at least once in two months
- Use water efficient garden techniques to reduce the water consumptions in garden
- Rain water harvesting system needs to be improved
- Awareness programs on water conservation to be conducted.
- Install display boards to control over exploitation of water.

Energy

- Conventional Fans needs to be replaced with energy efficient BLDC Fans.
- Conduct more save energy awareness programs for students and staff.
- Replace all conventional tubelights with LED lights
- Try to install more solar panels to reduce the green house gas emission
- Optimise the energy usage
- Automatic power on/off systems may be introduced.

Waste

- Establish a functional bio gas plant.
- A model solid waste treatment system to be established.
- Maintain a plastic free campus.
- Avoid paper plates and cups for all functions in the college.

Green Campus

- All trees in the campus should be named scientifically.
- Create more space for planting.
- Grow potted plants at both verandah and class rooms.
- Create automatic drip irrigation system during summer holidays.
- Not just celebrating environment day but making it a daily habit.
- Beautify the college building with indoor plants
- Providing funds to nature club for making campus more green
- Encouraging students not just through words, but through action for making the campus green
- Conducting competitions among departments for making students more interested in making the campus green.

Carbon footprint

- Establish a system of car pooling among the staff to reduce the number of four wheelers coming to the college.
- Increase effective use of college bus services to the students and staff.
- Encourage students and staff to use cycles.
- Establish a more efficient cooking system to save gas.
- Discourage the students using two wheelers for their commutation.
- More use of generators every day should be discouraged.

30.Audit Report

We have conducted the Environment audit at all important areas up to our maximum possible extend. Overall performance of college is found satisfactory.

For Sri Energy Solutions,



M.Rameshkumar

BEE Certified Energy Auditor

Annexure – A

Details of the Program offered

❖ U.G.Courses

- Aeronautical Engineering
- Mechanical Engineering
- Electrical and Electronics Engineering
- Computer Science and Engineering
- Electronics and Communication Systems
- Mechatronics Engineering
- Artificial Intelligence and Data Science
- Computer Science and Business systems

❖ P.G.Course

- Master of Business Administration
- Aeronautical Engineering
- Communication Systems

Annexure – B

Bus Routes

The college has operates several buses in the following route for the convenience of the students and staffs

- Vadakanchery
- Palakkad
- Pathirapala
- Ottapalam
- Gandhipuram
- Pollachi
- Thiruvazhiyod
- Mannarkkad
- Kottaiy
- Thiruvillamala
- Nemmara
- Vandithavalam
- Mangalam dam
- Malampuzha
- Kollengode
- Tiruppur
- Shoronur
- Cherupalachery
- Alandurai

Annexure – C

Air Pollution Norms

AQI	Air Pollution Level	Health Implications	Cautionary Statement (for PM2.5)
0 - 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 -100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
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151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

Annexure – D

Model Environment Policy

M/s. Nehru Institute of Engineering and Technology is committed to being environmentally aware, actively support programs that reduce our college's environmental impact and continually improve our environmental performance as an integral part of our business strategy and operating procedures.

We seek to understand the effects our business activities have on the environment by supporting initiatives such as:

- Reduction of material, water and energy consumption
- Waste minimization
- Recycling of all resources

We will encourage our students, suppliers and other stakeholders to do the same.

We recognize that we have a responsibility to the environment to meet or exceed legislative and regulatory requirements.

We will ensure that this policy and all procedures relating to it are understood, implemented and maintained by all company employees

Annexure – E



Center for Sustainability

Future Support

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

THANK YOU

From,

M/s.Sri Energy Solutions

2/57, Church Street,

Silukkuvarpatti,

Dindigul – 624 215

Mob : 90420 64932

For Query : srienergysolutions@gmail.com