INDAS MAHAVIDYALAYA

NAAC 1st Cycle A.Y. 2018-19 to 2022-23

NAAC Key Indicator 7.1

Metric No. 7.1.3: ENERGY AUDIT REPORT

(Supportive Documents)

Mo. & WhatsApp No.– 9002299249
Email: indasmahavidyalaya@gmail.com
Website: indasmahavidyalaya.in

INDAS MAHAVIDYALAYA

Village : - Khosbag, Post : - Indas
District : - Bankura, Pin : - 722205

Ref. No. Date: 14.07.2023

To
Mrs. Sukanya Dutta
Head of the Department
Department of Electrical Engineering
Supreme Knowledge Foundation
Hooghly, West Bengal

Dear Sir,

I want to let you know that Indas Mahavidyalaya wants to undertake an energy audit from your department for the AY 2022–2023. Therefore, I need your consent to carry out the audit, ideally in the last month of July 2023.

Your co operation in this regard is highly appreciated.

Regards,

14.07.2023

Dr. Rajib Bag
Principal
Indas Mahavidyalaya

Received
14/7/23

SUPREME KNOWLEDGE FOUNDATION GROUP OF INSTITUTIONS WBSCTVESD SKF

Supreme Knowledge Foundation Group of Institutions

HOD (EE,

SUPREME KNOWLEDGE FOUNDATION GROUP OF INSTITUTIONS
Approved by AICTE, Affiliated to MAKAUT & WBSCTE & VE & SD & Recognised by UGC
1, Khan Road, Adjacent to Mankundu Rly. Stn., City: Chandannagar, Dist: Hooghly – 712139, West Bengal, India
Ph no. 033-26831141 Email: administration@skf.edu.in Website: www.skf.edu.in

To

Date: 17.07.2023

Dr. Rajib Bag
Principal
Indas Mahavidyalaya

Dear Sir,

It is very admirable that your college wants our department to do an energy audit. I now grant formal permission for the two members and myself to undertake an energy audit at your college on July 31, 2023.

Regards,

17/7/23

Mrs. Sukanya Dutta

Supreme Knowledge Foundation Group of Institutions

Head of the Department
Department of Electrical Engineering
Supreme Knowledge Foundation

SUPREME KNOWLEDGE FOUNDATION GROUP OF INSTITUTIONS W B S C T V E S D SKF

	Indas Mahavidyalaya **Indas, Bankura**	SUPREME KNOWLEDGE FOUNDATION

ENERGY AUDIT REPORT

INDAS MAHAVIDYALAYA

PREPARED BY

Department of Electrical Engineering
Supreme Knowledge Foundation
AICTE Approved, MAKAU Affiliated and NBA Accredited

CONTENT

LIST OF TABLE

LIST OF FIGURE

ACKNOWLEDGEMENT

Department of Electrical Engineering, Supreme Knowledge Foundation takes this opportunity to appreciate & thank the management of **Indas Mahavidyalaya, Bankura** for giving us an opportunity to conduct energy audit for the college.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation in the course of study.

31/7/23

Sukanya Dutta
Head of the Department
Department of Electrical Engineering
Supreme Knowledge Fouundation, Mankundu, Hooghly, West Bengal

Supreme Knowledge Foundation Group of Institu

HOD (

SUPREME KNOWLEDGE FOUNDATION GROUP OF INSTITUTIONS
W B S C T V E S D
SKF

EXECUTIVE SUMMARY

The executive summary of the energy audit report provided in this part briefly outlines the determined energy conservation measures and other project recommendations that may be implemented in phases to save energy and boost productivity on the college campus.

ENERGY MANAGEMENT INITIATIVE TAKEN BY COLLEGE

- Management has started replacing "conventional FTL (46 Watt) by energy efficient LED Tube Lightfixture (20 Watt). **It's Appreciable.**

- College has made Green Monitoring Committee for Conduct awareness and training programsfor faculty, student and non-teaching staffs.

AREAS FOR IMPROVEMENT

Ceiling Fan and Exhaust Fan:

- Replacement of "conventional ceiling fan 80 Watt" by energy efficient star rated fan or BLDC based energy efficient fan (20 to 25 Watt) in "admin building, class rooms, Auditorium Hall laboratories and faculties cabin" have great potential for energy saving.
- Replacement of "conventional exhaust fan 60Watt" by energy efficient star rated fan or BLDC based energy efficient Fan (20 to 40 Watt) in College building class rooms, laboratories and faculties cabin have great potential for energy saving.
- Expected energy saving and simply payback period is subject of load factor and annual operating hours. Expected energy saving and simply payback period is subject of load factor and annual operating hours.

Energy Management Workshop and Training:

- Develop energy management policies for college. Establish a procurement policy thatis energy saving and eco-friendly.
- Conduct awareness and training programs for faculty, student and non-teaching staffs. Conduct seminars, workshops and exhibitions on energy management education.

Chapter 1: INTRODUCTION

1.1. About College

Indas Mahavidyalaya has been established on 2006 with an object to provide an opportunity for higher education for the local people. But it has already achieved the proposed goal and its fame has been reached beyond the horizon through our students. Our activity, specifically based on three pillars viz crystal thought, sound decision & compassionate activity. Collective works of the people from every strata in this locality help to start its journey.

Indas, the nature land of many gems is famous for its glorious cultivation and cultures performance in the Bankura district. One can enter in Indas by road through different directions or routes from other parts of the Bankura district as well as from neighour districts like Burdwan, & Hooghly. Indas is already connected by Indian Rail (Masagram to Bankura).

Keeping pace with the progression of the civilization and human resources in global scenario our institution has been started its journey with both the Arts & Science stream simultaneously. One can easily realize the gospel truth on the basis of his own artistic and scientific skill.

Our Institution has taken the initiatives to develop the elegance in our students by co-curricular activities. The collective activities from all spheres in our institution guide our students to realize the famous dictum "Learning without through is labour lost and thought without learning is perilous". The college is recognized under 2(f) and 12(b) under UGC act 1956 and affiliated to the Bankura University, Bankura, West Bengal.

Our college provides 07 U.G. Hons. Courses, General B.A. and B.Sc. Courses, and two University approved Certificate Courses. The institution is dedicated to offering a comprehensive education to create people with moral character, emotional and mental balance, physical capability, social awareness, and involvement in cultural activities so they can become upstanding members of society. The 42 number of regular teaching faculty, including the principal, has helped to create a good academic environment. The institution consists of 02 contractual non-teaching staff members and 05 permanent non-teaching staff members.

Vision

Enlighten Society through holistic education.

Mission

Persuade Excellence in Higher Education.

Objectives

- To provide conducive academic atmosphere among students.
- To improve overall academic performance of students.
- To inculcate discipline as a value among students.
- To develop competent manpower among students.
- To render service to society.

1.2. GREEN MONITORING COMMITTEE

Mo. & WhatsApp No.– 9002299249
Email: indasmahavidyalaya@gmail.com
Website: indasmahavidyalaya.in

INDAS MAHAVIDYALAYA
Village : - Khosbag, Post : - Indas
District : - Bankura, Pin : - 722205

Ref. No. Date: 27.05.2023

GREEM MONITORING COMMITTEE

Green Monitoring Committee Consists of the Following Committee :

Advisory committee:

1. Dr Rajib Bag, Principal
2. Dr Uday Chand Saha , IQAC, Coordinator
3. Dr Tapas Roy, TCS

Functional Committee

1. Dr Sk Hafizul Haque, Coordinator
2. Dr Madhu Sudan Chakraborty
3. Dr Satyabrata Chaudhuri
4. Dr Safia Yasmin
5. Mrs Sangita Das
6. Mr Atanu Ghar
7. Mr Vikram kumar Das
8. Mr M Rafiqul Amin
9. Mr Chiranjib Ghosh

Dr. Rajib Bag
PRINCIPAL
Principal
Indas Mahavidyalaya
Indas, Bankura

1.3. Energy Audit Team

The study team constituted of the following senior professors from **Supreme Knowledge Foundation**

1. **Mrs. Sukanya Dutta** [HOD, Department of Electrical Engineering
2. **Mr. Manas Mukherjee** [Assistant Professor]
3. **Mr. Sagnik Dutta** [Assistant Professor]

1.4. About Energy Audit

Energy audits assist in learning more about how energy is used in any factory or institute, as well as identifying places where waste may occur and opportunities for improvement exist. The overall energy efficiency from generator to consumer is increased to 50%. As a result, one unit saved by the end user equals two units created in the power plant. (1 unit divided by 0.5 efficiency equals 2 units)

The Supreme Knowledge Foundation, Hooghly, West Bengal, conducted a "Energy Audit" at the site to identify gaps in the energy consumption pattern for the Indas Mahavidyalaya, Bankura. A technical report has been prepared in accordance with the most efficient way to assess the strengths and weaknesses of energy management practices and to find a solution to a problem is to conduct an energy audit. Energy auditing is one type of professional method to living responsibly.

1.5. Objectives of Energy Auditing

The energy audit serves as the foundation for the overall energy conservation program, encompassing primarily energy use analysis and the evaluation of energy saving methods. Its goals are as follows:

- Determining the cost and quality of various energy inputs.
- Evaluating the current pattern of energy usage in various cost centers of operations.
- Establishing a link between energy inputs and output.
- Identifying prospective thermal and electrical energy economy zones.
- Emphasizing waste in key areas.
- Establishing prospective energy-saving targets for individual cost centers.
- Implementation of energy-saving measures and realization of savings.

1.6. Methodology adopted:

Methodology adopted for achieving the desired objectives viz.: Assessment of the current operational status and energy savings include the following:

- Discussions with relevant officials to identify significant areas of attention and other associated systems.
- A team of engineers visited the site and spoke with the relevant officials to collect data and information about the plant's operations and load distribution, as well as the general premises. The data was evaluated to determine a baseline pattern of energy consumption.
- Measurements and monitoring were performed using appropriate devices, including continuous and/or time-lapse recording, as well as visual observations, to detect the energy usage pattern and system losses.
- Cost and consumption trend study.
- Wherever possible, significant utility equipment's capacity and efficiency are tested.
- Calculation of various losses
- Computation and in-depth analysis of the acquired data, including the use of computerized analysis and other techniques as applicable, were performed in order to draw conclusions and develop appropriate energy conservation plans/strategies for improvements/reductions in specific energy use.

1.7. Present Energy Scenario:

Indus Mahavidyalaya, Bankura uses energy in the form of electricity purchased from West Bengal State Electricity Corporation Ltd. In Rural Meter Connection. The college has sanctioned load 35.29 KW.

Total billing amount has been found to be about INR 35000/- for 12 months analysis period from April– 2022 to Mar–2023. The overall average energy charges as Rs. 14.97 per unit in last 12 months.

Chapter 2: POWER SUPPLY SYSTEM

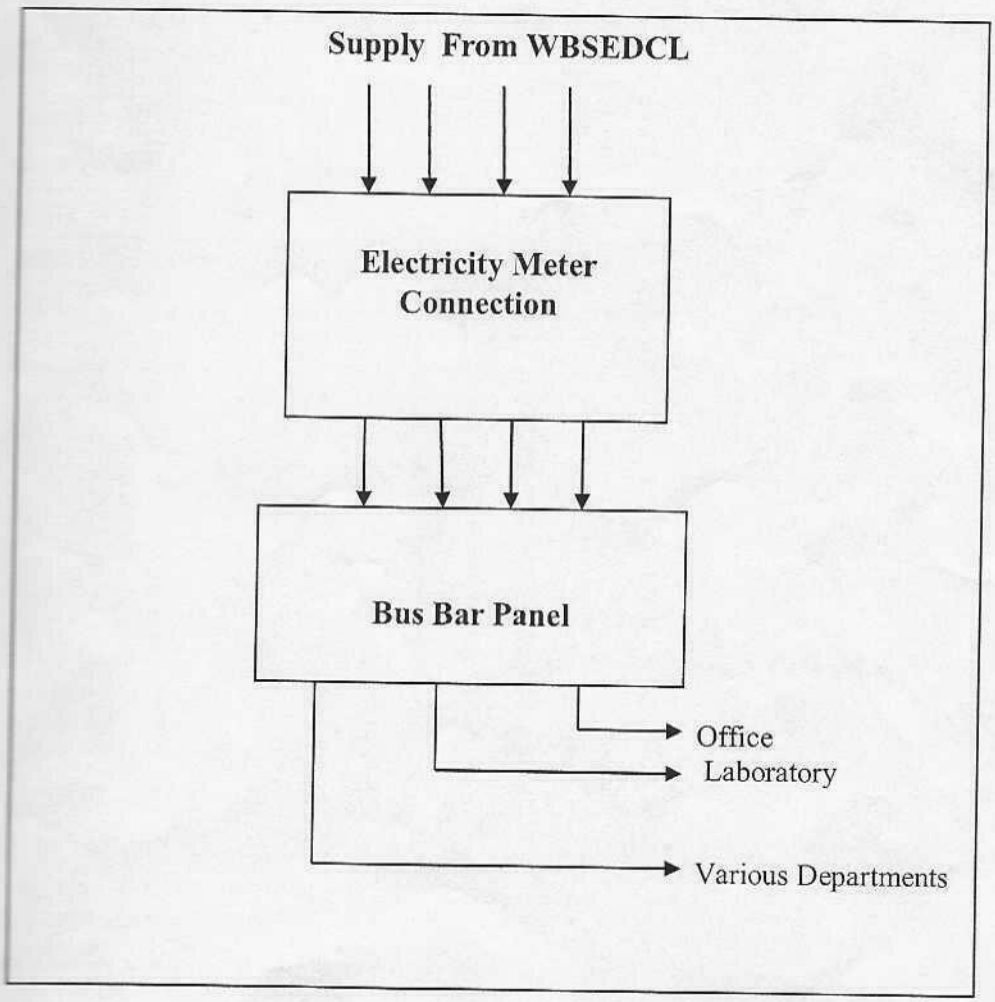
2.1. Power Station:

The power supply for the college is from INDAS with the help of 25 KV feeders under sanctioned load 35.29 KVA.

Phase	Red (R)	Yellow (Y)	Blue (B)
Voltage (V)	394	390	387
Current (A)	13.25	7.06	4.14

Load Balancing is required
(Check connected load on all Three Phases and Distribute equally)

2.2. Single Line Diagram:



3.Electricity Bill Analysis

Energy audit team was analyzed last 12 Month's electricity bill of College. Detailed of unit Consumption, annual payable amount and annual per unit charges are determined as follow:

3.1. Monthly electrical energy consumption (Year – 2022-2023):

The monthly electrical consumption for the college is given in the table 3.1

Table 3.1 Energy consumption and billing amount (Year 2022-2023)

Sl. No.	Month and Year	Total Consumed Units (KVAH)	Amount (Rs.)
1	April, 2022	106	1801
2	May,2022	107	1802
3	June,2022	107	1802
4	July,2022	103	1782
5	August,2022	105	1783
6	September,2022	105	1783
7	October,2022	216	3463
8	November,2022	216	3463
9	December,2022	216	3463
10	January,2023	862	8421
11	February,2023	862	8421
12	March,2023	862	8421

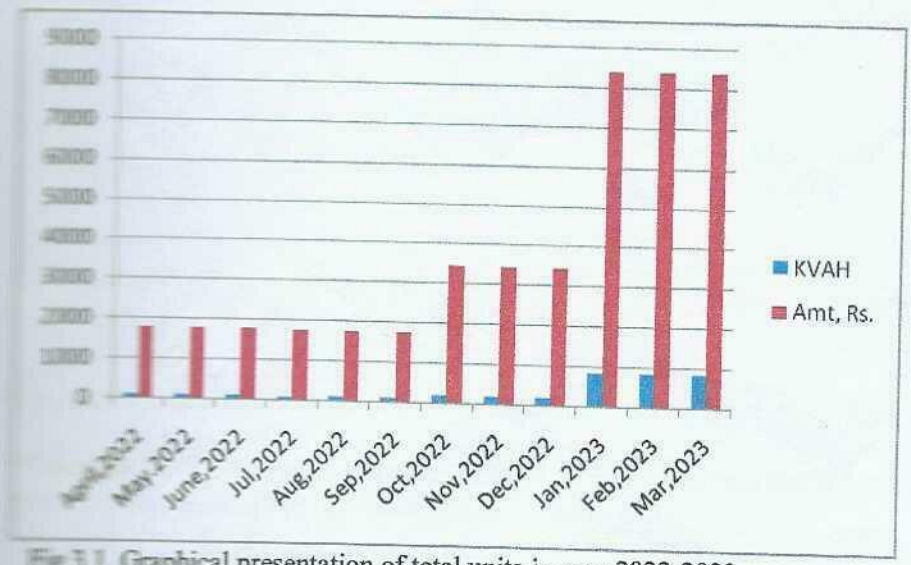


Fig.3.1. Graphical presentation of total units in year 2022-2023

3.2. Overall Unit Charges year 2022-2023

3.Electricity Bill Analysis

Energy audit team was analyzed last 12 Month's electricity bill of College. Detailed of unit Consumption, annual payable amount and annual per unit charges are determined as follow:

3.1. Monthly electrical energy consumption (Year – 2022-2023):

The monthly electrical consumption for the college is given in the table 3.1

Table 3.1 Energy consumption and billing amount (Year 2022-2023)

Sl. No.	Month and Year	Total Consumed Units (KVAH)	Amount (Rs.)
1	April, 2022	106	1801
2	May,2022	107	1802
3	June,2022	107	1802
4	July,2022	103	1782
5	August,2022	105	1783
6	September,2022	105	1783
7	October,2022	216	3463
8	November,2022	216	3463
9	December,2022	216	3463
10	January,2023	862	8421
11	February,2023	862	8421
12	March,2023	862	8421

Fig.3.1. Graphical presentation of total units in year 2022-2023

3.2. Overall Unit Charges year 2022-2023

Table 3.2 Overall Energy Consumption (Year 2022-2023)

Sl. No.	Month and Year	Per Unit charge (Rs./KVAH)
1	April, 2022	16.9
2	May,2022	16.8
3	June,2022	16.8
4	July,2022	17.3
5	August,2022	17.3
6	September,2022	17.3
7	October,2022	16
8	November,2022	16
9	December,2022	16
10	January,2023	9.77
11	February,2023	9.77
12	March,2023	9.77
	Average	**14.97**

Overall Energy Charges Rs./KVAH Year 2022-2023

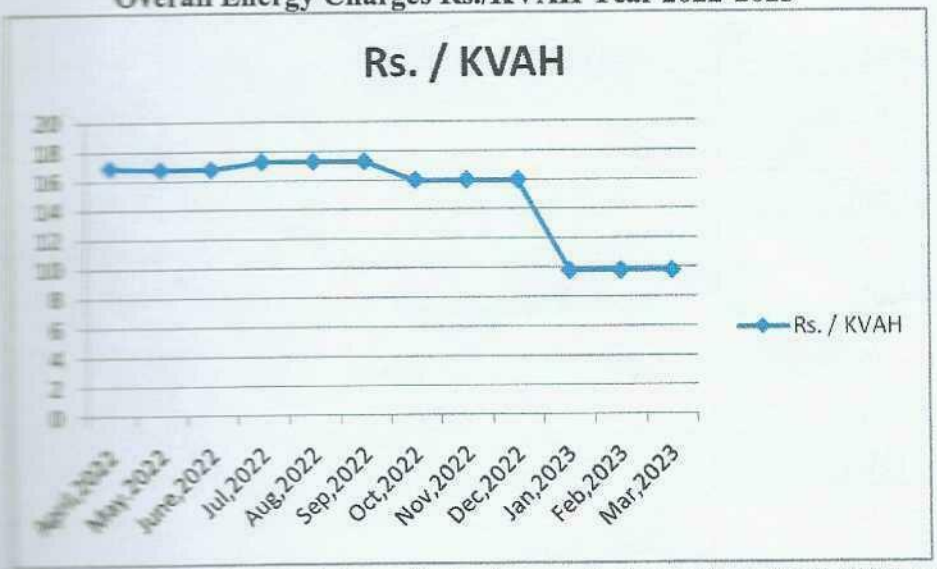


Fig 3.2. Graphical presentation of actual per unit charge from April 2022 to March 2023

Observation: It was found out that the total energy consumption in last 12 month was 3867 unit. Average annual energy charges Rs. 14.97/KVAH.

3.3.Connected Load of College

Details of connected load are given in the table 3.3

Sl No	Room No	Location	Fixures	Watt	Qty	Total Load in watt
1	**101**	ENV Sc.	Fan	70	3	210
			Computer	120	1	120
			Led Tube Light	20	3	60
2	**102**	BOT	Fan	70	3	210
			Led Tube Light	20	2	40
			Led Lamp	12	1	12
3	**103**	ZOOLOGY	Fan	70	5	350
			Led Tube Light	20	2	40
4	**104**	HISTORY	Fan	70	5	350
			Led Tube Light	20	2	40
			Led Lamp	12	2	24
5	**105**	STAFF ROOM	Fan	70	10	700
			Led Tube Light	20	4	80
			Led Lamp	12	2	24
6		OFFICE	Fan	70	17	1190
			Computer	120	4	480
			Printer	150	3	150
			Scanner	150	2	150
			Xerox	500	1	500
			Led Lamp	20	15	300
7		PRINCIPAL CHAMBER	Fan	70	3	210
			Printer	150	1	150
			Computer	120	1	120
			Led Tube Light	20	1	20
			Led Lamp	20	4	80
8		OFFICE BATHROOM	Led Tube Light	20	1	20
			Led Lamp	5	4	20
9		OFFICE	Fan	70	2	140

		BALCONY				
			Led Tube Light	20	1	20
			Led Lamp	12	1	12
10	108	Pol. SC.	Fan	70	3	210
			Led Tube Light	20	2	40
11	109	Philosophy	Fan	70	4	280
			Led Tube Light	20	2	40
			Led Lamp	12	1	12
12	110	HALL	Fan	70	13	910
			Led Tube Light	70	7	490
			Led Lamp	12	6	72
13	111		Fan	70	4	280
			Led Tube Light	20	4	80
			Led Lamp	12	2	24
14	112		Fan	70	3	210
			Led Tube Light	20	4	80
15	113		Fan	70	3	210
			Led Tube Light	20	4	80
16	114	GYM	Fan	70	8	560
			Led Tube Light	20	4	80
17		SECURITY ROOM	Fan	70	1	70
			Led Lamp	12	1	12
18		CANTEEN	Fan	70	2	140
			Led Lamp	12	2	24
19	201	VIRTUAL ROOM	Fan	70	10	700
			Led Tube Light	20	3	60
			Led Lamp	12	2	24
20	202	GIRLS COMMON	Fan	70	2	140
			Led Lamp	12	1	12
21	203		Fan	70	3	210

			Led Tube Light	20	2	40
22	**204**	PHY. CS	Fan	70	4	280
			Led Tube Light	20	3	60
			Led Lamp	12	1	12
23	**205**	CHEMISTRY	Fan	70	4	280
			Computer	120	1	120
			Led Tube Light	20	3	60
			Led Lamp	12	1	12
24	**206**	HALL	Fan	70	20	1400
			Led Tube Light	20	9	180
			Led Lamp	12	3	36
25		GIRLS TOILET	Led Lamp	12	3	36
26		1ST FLOOR BALCONY (GIRLS TOILET)	Led Lamp	12	6	72
27		LIBRARY STADY	Fan	70	3	210
			Computer	120	1	120
			Led Tube Light	20	2	40
28		1ST FLOOR BALCONY (LIBRARY)	Fan	70	1	70
29		LIBRARY	Fan	70	5	350
			Computer	120	2	240
			Printer	150	1	150
			Led Tube Light	20	6	120
			Led Lamp	12	2	24
30	**212**	BENGALY	Fan	70	5	350
			Led Tube Light	20	2	40
31	**213**	ENG.	Fan	70	5	350
			Led Tube Light	20	2	40
32	**214**	SANSKRIT	Fan	70	5	350

			Led Tube Light	20	2	40
33	215	Computer Lab	Fan	70	5	350
			Computer	120	4	480
			Led Tube Light	20	2	40
34		Pump		746	4	2984
35		Aqua Guard		150	2	300
36		Aqua Guard		1000	1	1000
37		Science Labs	Electrical Instruments	500		500
				7255	329	20908

3.4. Total Connected Load in Watt %

Table 3.4 : Connected load in watt%

Sl. No.	Fixture	Watt%
1	Fan	51.13
2	Computer	7.46
3	LED Tube Light	9.23
4	LED Lamp	4.03
5	Printer	2.15
6	Scanner	0.72
7	Xerox	2.39
8	Pump	14.27
9	Aqua Guard	6.22
10	Electrical Instruments	2.39

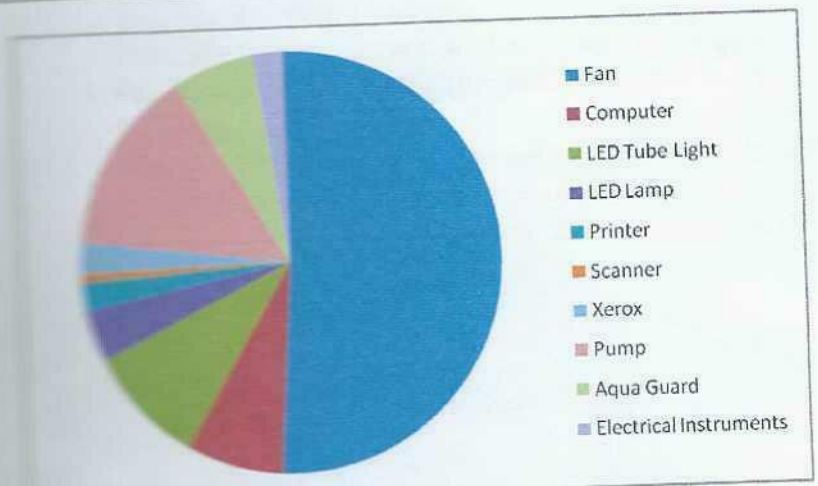


Fig 3.3. Graphical presentation of actual load in watt % from April 2022 to March 2023

Chapter 4: POLICY DOCUMENT ON ENVIRONMENT AND ENERGY USAGE

The Environment & Energy Usage Policy of Indas Mahavidyalaya aims to manage energy in such a way that its environmental impact is minimised. The strategy calls for the exploration of renewable energy resources in order to lessen the government's burden and to identify substitute natural resources as answers to the energy dilemma. It will assist us in incorporating efficiency and environmental awareness into our daily actions, allowing us to recognise our obligations and dedication to natural resource conservation and utilisation. The college is committed to raising environmental awareness and implementing green projects to save energy and safeguard the environment.

Policies:

Indas Mahavidyalaya pledges to fulfill its commitment to the environment through following levels of action by:

- Phased manner changing of normal conventional lights to energy efficient LED lights. All new lights procured will be LED lights only.
- Timely switching off and switching on of street lights.
- Minimum use of and heaters.
- Activate power management features on your computer and monitor, so that it will go into a low power "sleep" mode when you are not working on it.
- Regular checking of leakage in water pipe lines and taps.
- Save water and save electricity stickers placed at prominent places.
- Conduct of different awareness campaign on "Save Water", "Save Trees" & Save Electricity through lectures/different competitions etc.
- Vermi composting is also in practice for disposing the wet waste from canteen and also other biodegradable wastes.
- Tree plantation in Campus.
- Ensuring ban on single use plastic bags in campus.
- Encourage use of public transport & Car-pooling (i.e. reduced vehicular use in the campus).
- Waste collection bins (i.e. burnable, non-burnable & recyclable) and their management.
- Ensuring proper e-waste management.
- Initiation for paperless (e-office) & e-documents for routine work.
- Increasing use of digital library.

ENERGY AUDIT CERTIFICATE

Is Issued to

Indas Mahavidyalaya

Indas, Bankura -722205

For successful completion of Energy Audit of the college for the A.Y. 2022-2023conducted by the department of Electrical Engineering, Supreme Knowledge Foundation (SKF). This audit carried out the detailed analysis of Power consumption against sanctioned load and also indicates the initiative of power saving measure.

The College is certified to have done exceptionally well in maintaining the optimum consumption of electricity for the AY. 2022-2023.

Duration of Audit : April 2022 to March 2023

Date of Issue : 31.07.2023

1. Sukanya Dutta
   Lead Auditor, HOD, Dept. of EE, SKF

2. Manas Mukherjee,
   Team Member, Asst. Professor, Dept. of EE, SKF

3. Sagnik Dutta,
   Team Member, Asst. Professor, Dept. of EE, SKF

Supreme Knowledge Foundation Group of Institutions
SUPREME KNOWLEDGE FOUNDATION GROUP OF INSTITUTIONS
W.B.S.C.T.V.
SKF
HOD, EE

Manas Mukherjee
31/07/23

Sagnik Datta
31.07.2023.