Title of Practice: Green Campus – Clean Campus

Objectives of the Practice

Green campus initiatives are becoming integral part of the modern-day education system (NEP) and the education institute always play an important role in promoting in Eco friendly and sustainability of Environment. The college has initiated the green campus program in order to support a sustainable and climate-friendly environment. The main objectives for these initiatives are environmental awareness and education, the use of sustainable energy and energy efficient measures, comprehensive recycling and composting and green landscaping in the college premises. There is the following objective of the above practice as given below.

- To maintain an eco-friendly campus.
- To create a healthy atmosphere.
- To create awareness among the people about the surroundings.
- To maintain the campus clean and green.
- The institute has a green campus and it focuses on clean and eco-friendly campus.
- The faculties and students are regularly advised to reduce waste to a lower extent.

The Context

The main focus of this practice is to ensure the sustainability of eco-friendly environment, sufficient water materials and other resources for our future generation. But the main challenge is the proper translation of the education for sustainable development into practice so that it can be more effective. The College is conscious about undertaking plantation work and maintaining cleanliness in and around the campus and hence has a good effect on the environment of the college. The college regularly organized various activities to aware and motivate the student and faculty to maintain cleanliness on the campus. Educational institutions have a great impact on the personality of any child. The cleanliness drive campaign will encourage the students to keep the surroundings clean and to make this college the most beautiful college in the entire area. Hence, the college organized various programs for the above objective such as Swachha Bharat Abhiyan, Plantation, Ankur Programe, USHA Abhiyan for Renewable Solar Energy etc.

The Practice

The college has initiated and organized different activities to help to make clean campus and protect the environment and sustain its natural resources. The college has partially paperless office and e- library. The college has addressed its waste disposal problem through vermicomposting. The college has around 250 trees of different varieties, lawns, medicinal garden, botanical garden, fruit garden and beautiful flowers plants all around campus. The college continuously emphasized on the minimum use of hazardous plastic and initiate the students and college faculty to use paper bags, jute bags, etc. Garbage is collected everyday by the appointed employees and Dustbins are kept at different places for collection of waste material of the college The college administration also takes necessary action against those who do not follow the rules. For harvesting the water for daily need of college have use one bore well and one neat and clean well. The college constructed chakk dam for recharge the soil water and conservation of soil.

Evidence of Success

- The green campus developed by the college helps not only to save the environment, but also adds to the beauty of the campus.
- College developed botanical and Fruit orchard.
- College has also received district green champion award for plantation in the academic year 2021-22 from Department of Higher Education, Government of India.
- Water conservation methods implemented by the college is helping to maintain gardens and campus green and eco- friendly.
- Strictly ban on use of plastic products in the college helps to maintain the beauty of the campus and preparation of organic fertilizer through vermicomposting also maintain campus clean and beautiful.

Problems Encountered and Resources

The main problem encountered in the Green campus initiative is development and maintenance of proper infrastructure for the green practices.

The Green campus program should be considered as a necessity in every institution and separate funds should be allotted for this.

Resources required:

- Formation of water pits.
- Requirement of man power for maintenance of garden.

Solar Enegry System for sustainable environment practice

खरगोन बड़वानी

नईदुनिया सिटी

बड़वाह–भीकनगांव–कसरावद

www.naidunia.com

इंदौर, गुरुवार 26 सितंबर 2019

नवाचार

छत पर 20 किलोवाट क्षमता का सौर ऊर्जा प्लांट हो रहा स्थापित, अतिरिक्त बिजली बेची जाएगी

अब खुद की बिजली से कन्या महाविद्यालय में होगा उजाला

खरगोन। नईदुनिया प्रतिनिधि

शासकीय कन्या महाविद्यालय में अब खुद की बिजली से उजाला होगा। महाविद्यालय में सौर ऊर्जा पावर प्लांट स्थापित किया जा रहा है। इसकी क्षमता 20 किलोवाट है। खास बात यह है कि महाविद्यालय में उपयोग के बाद यदि बिजली बचती है तो उसे बेचा जाएगा। इससे अतिरिक्त लाभ होगा। फिलहाल महाविद्यालय की छत पर प्लांट स्थापित किया जा रहा है। एक सप्ताह में प्लांट स्थापित होने की उम्मीद है।

महाविद्यालय के प्रोजेक्ट प्रभारी डॉ. धर्मेंद्र भालसे ने बताया कि विश्व बैंक द्वारा रेस्को परियोजना अंतर्गत महाविद्यालय में सोलर प्लांट लग रहा है। इसकी क्षमता

खरगोन में शासकीय कन्या महाविद्यालय की छत पर रखी सोलर प्लेट्स। • नईदुनिया

इससे पूरे महाविद्यालय परिसर में 24 घंटे निर्बाध विद्युत प्रदाय किया जा सकेगा। यदि महाविद्यालय के उपयोग से अधिक बिजली उत्पादन होता है तो इसे विद्युत वितरण कंपनी के माध्यम से बेचा जाएगा। फिलहाल महाविद्यालय और छात्रावास में प्लांट से बनने वाली बिजली का उपयोग होगा। भविष्य में महाविद्यालय परिसर में स्टाफ आवास सहित अन्य कार्यों के लिए भी बिजली का उपयोग किया जाएगा। महाविद्यालय की छत पर सोलर पैनल लगाए जा रहे हैं। एक सप्ताह में इसका कार्य पूरा होने की उम्मीद है। प्रगत ऊर्जा केंद्र भोपाल द्वारा यह कार्य किया जा रहा है। महाविद्यालय से छह माह पहले 12 माह के बिजली बिल व अन्य जानकारी मांगी गई थी। इसके बाद यह परियोजना तैयार की गई।

पहले से लगा है दो किलोवाट का पैनल : महाविद्यालय में पहले से दो किलोवाट का सोलर पैनल स्थापित है। इससे वर्तमान में महाविद्यालय के कम्प्यूटर विभाग में बिजली आपूर्ति की जा रही है। शेष महाविद्यालय में विद्युत वितरण कंपनी से विद्युत आपूर्ति की जाती है। महाविद्यालय में वर्तमान में बिजली की खपत के अनुसार 10 से 15 हजार रुपए प्रतिमाह का बिल आता है, जबकि सोलर प्लांट लगने से लगभग पूरे परिसर में निशुल्क बिजली मिल सकेगी। इससे महाविद्यालय प्रबंधन व शासन को राशि की बचत होगी। उल्लेखनीय है कि आनंद नगर क्षेत्र में करीब सात एकड़ में महाविद्यालय परिसर है। छात्रावास निर्माणधीन है और कर्मचारी आवास बनना प्रस्तावित है। महाविद्यालय में करीब चार हजार छात्राएं अध्ययनरत हैं। सौ से अधिक शैक्षणिक व अन्य स्टाफ कर्मचारी है।

> महाविद्यालय में सोलर प्लांट स्थापित होने पर प्राकृतिक ऊर्जा का उपयोग हो सकेगा। महाविद्यालय में भी निर्बाध बिजली उपलब्ध होगी। सोलर प्लांट स्थापना का कार्य किया जा रहा है। एक सप्ताह में यह कार्य पूरा होने की उम्मीद है।
>
> **-डॉ. एमके गोखले, प्राचार्य, शासकीय कन्या महाविद्यालय, खरगोन**

हरियाली महोत्सव

Environmental Day

Clean Campus Drive

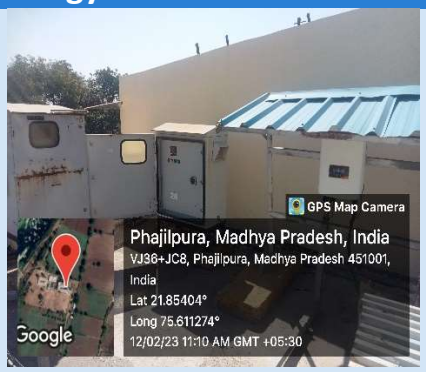
The Institution has facilities and initiatives for Following Points –

- **Policy Documents of Alternate sources of energy and energy conservation measures.**

Link : http://www.gdckhargone.org/assets/resco/policydocs.pdf

Facilities for alternate Source of Energy

Resco Rooftop Solar Panels



Wheeling to Grid Solar Net Meter

LED Tube

Energy Awareness Certificate of Student in Urja Saksharta Abhiyan initiated by Govt. of M.P. Energy Dept.

- **Management of the various types of degradable and non-degradable waste**

various types of degradable and non-degradable waste

- **Water conservation**

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<td colspan="2">TubeWell</td>
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- **Green campus initiatives**

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<td>Eco Friendly Campus Maintenance by Students</td>
<td>Fruit Plants Garden</td>
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<td>Botanical Garden</td>
<td>Green Campus</td>
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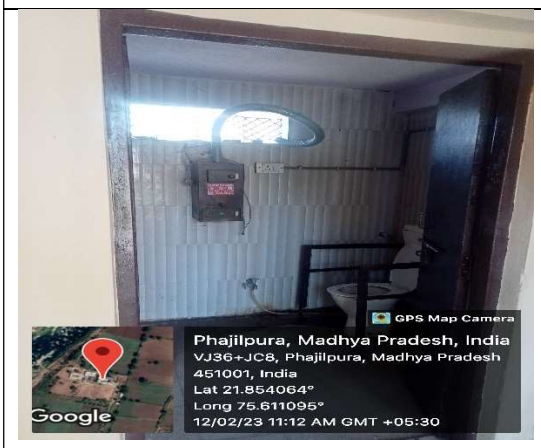
- **Disabled-friendly, barrier free environment**

	
Barrier Free Environment	**Ramp**
	
Divyang Toilet	**Wheel Chair**

- **All Audit Certificate:**

भारत सरकार /Government of India
महात्मा गांधी राष्ट्रीय ग्रामीण शिक्षा परिषद / Mahatma Gandhi National Council of Rural Education
उच्चशिक्षाविभाग/Department of Higher Education
शिक्षामंत्रालय / Ministry of Education
सत्यमेव जयते

District Green Champion Certificate

This is to certify that **GOVERNMENT GIRL S COLLEGE, KHARGONE** is hereby recognized as **District Green Champion** for **Khargone** District, Madhya Pradesh for the Academic Year 2021-22. The institution has successfully elevated the Swachhta Action Plan, adopted and implemented best practices in the areas of Sanitation, Hygiene, Waste Management, Water Management, Energy Management and Greenery Management.

Dr W G Prasanna Kumar
Chairman, MGNCRE
Ministry of Education, Government of India

तारीख / Date : 12.03.2022
ज्ञापनसंख्या/ Memo no: MGNCRE/SAP22/N35

ENERGY AUDIT REPORT
YEAR-2021-22

GOVERNMENT GIRLS COLLEGE KHARGOAN (M.P.)

CONDUCTED BY:

SABS ENERGY ENVIRO PVT.LTD

(Empaneled with Madhya Pradesh Urja Vikas Nigam Ltd. – A Govt. Undertaking)

WE BUILD A SOLID FOUNDATION FOR SAVING ENERGY

90/2 Abhinav Nagar, Teen Imali Square, Behind Vishesh Jupiter Hospital, Indore, Madhya Pradesh -452001 India

Email Address: sabsind@yahoo.co.in , info@sabsindia.com

Contact number: 8236088801, 9826012991

THE ENERGY AUDIT DOCUMENT VERIFICATION TEAM

External Audit Team		
Sr. No.	**Name**	**Position**
1	Mr. Sanjay Singh	BEE, Certified Energy Auditor, EA-1462
2	Mr. Rambabu Raghuvanshi	Lead Auditor and Energy Consultant
3	Mr. Shravan Yadav	Energy Consultant
4	Mr. Vinod Kumar Kumawat	Energy Consultant

ACKNOWLEDGEMENT

SABS ENERGY ENVIRO PVT. LTD. is thankful to the **GOVT. GIRLS COLLEGE KHARGOAN (M.P.)** for their positive support in undertaking this intricate task of energy Audit. The field studies would not have been completed on time without their interaction and timely support. We are grateful for their co-operation during field studies and provision of data for the study. The field study of this audit was carried out on 24 January 2023.

The officials of **GOVT. GIRLS COLLEGE KHARGOAN (M.P.)** coordinated and helped the audit team during the field study and assessment. **SABS ENERGY ENVIRO PVT. LTD**. expresses special thanks to the following persons of **GOVT. GIRLS COLLEGE KHARGOAN (M.P.)**

1	Principal	**Dr. M.K. Gokhale**
2	IQAC Coordinator	**Dr. M.S. Solanki**
3	Criteria In-charge	**Prof A.J. Solanki**
4	In-Charge E-Resources	**Prof. Maneesh Raghuwanshi**

And all other officers, technicians and staffs for the keen interest shown in this study and the courtesy extended.
We are thankful to the management for giving us the opportunity to be involved in this very interesting and challenging project.

We would be happy to provide any further clarifications, if required, to facilitate implementation of the recommendations.

SABS ENERGY ENVIRO PVT LTD

MR. SANJAY SINGH
EA-1462
Certified Energy Auditor
M. Tech (Energy Management)

SABS ENERGY ENVIRO PVT. LTD.

Sr. No. SABS/EA/21-22/212 Dated 09/02/2023

Certificate

This is to certify that **GOVT. GIRLS COLLEGE KHARGOAN (M.P.)** has conducted, Energy Audit in the academic year 2021 - 2022 to assess the energy initiative planning, efforts, activities, implemented in the college campus like Light, Fan, AC etc. , conservation of Energy, Energy Management and various Awareness activities. SABS Energy Enviro Pvt. Ltd. has verified campus data of **GOVT. GIRLS COLLEGE KHARGOAN (M.P.)** This Energy Audit also aims to assess impact of energy initiatives for maintenance of eco-friendly campus.

Mr. Sanjay Singh
EA-1462
CERTIFIED ENERGY AUDITOR, BEE
Bureau of Energy efficiency
Ministry of Power Govt. of India

List of Contents

EXECUTIVE SUMMARY

College Details:

Particulars	Units	Details
Name of the College	-	**GOVT. GIRLS DEGREE COLLEGE**
Location	-	Khargoan (M.P), India
Owner	-	Government
Contact Person	-	Dr. M.S. Solanki
No. of Shifts	Nos.	1
Daily Operating Hours	Hrs./day	8
Annual Working Days	Days/yr.	300
Source of Electricity	-	MPPKVVCL
Total connected maximum Load	kW	42.16
Total Sanctioned Load	(kW)	20
Average Energy Charge in per unit	Rs. /kWh	7.10

a) Existing Major Energy Consuming Technology and Electricity billing analysis:

The major equipment installed in **GOVT. GIRLS COLLEGE KHARGOAN** like Lighting fixtures, Fans and other appliances.

Table 1: Connected Load (kW)

S.N.	Types of Loads	Load in kW	Percentage %
1	Lighting System	4.57	11
2	Fan System	7.43	17
3	Air-conditioning System	1.86	4
4	Water Pump System	7.60	18
5	Other Appliances	21.15	50
Total Power in kW		**42.16**	**100**

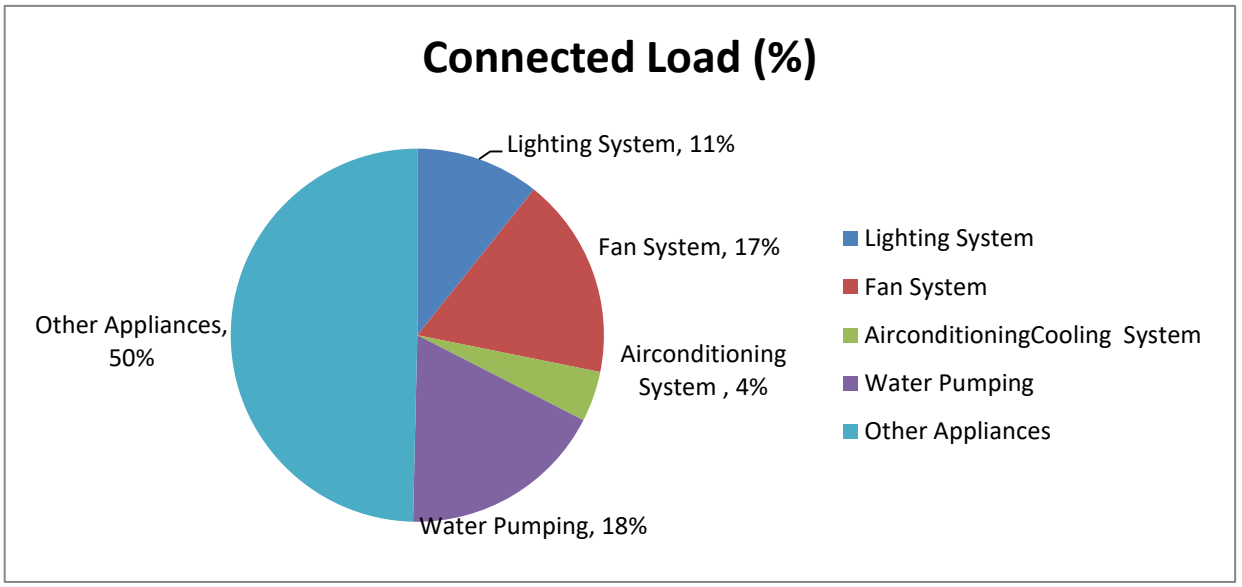


Figure 1: Electricity Connected Load details of campus in different zone

- As per electricity bills observation and analysis, **Total Sanction load is 20 kW** in 2021 College premises.
- As per electricity bills observation and analysis, Contract demand missing in 2022 some month.
- As per electricity bills observation and analysis, **electricity bill Power Factor varies from 0.8 - 0.96.**
- As per electricity bills observation and analysis, all had different contract demand.

b) Proposed Energy Saving Technologies with Cost Economics

❖ Lighting System

- We **suggest using LED Lighting luminaries** at some location as per site visit.
- We **are suggesting to purchase all electrical** equipment as per star leveling program by Bureau of energy efficiency, which will get huge amount of electricity saving.
- We are suggesting conducting regular **Cleaning and maintenance of lighting fixtures** in every 5-6 months to increase performance of Lighting and also improve their Lux level.
- As per data collection and site visit, Total Connected lighting load at College Campus is **4.57 kW.**
- As per data collection and observation, **Total no. of lighting fixture is 95**.

❖ Ceiling and Exhaust Fan System

- We are **suggesting to purchases new energy efficient BLDC fan as per Star leveling program byBureau of Energy Efficiency, which will get** huge amount of electricity saving.
- Energy Saving calculation **and recommendation for the existing Conventional** Ceiling fans with BLDC super energy efficient fan has been given in this report.

- We are suggesting **conducting regular Cleaning and maintenance** of Fans at least in every 6 months toincrease performance of Fan.
- We are also suggesting improving the Air delivery of Fans by replacing the existing ones with new energy efficient BLDC Fans as per 5 stars leveling of Bureau of energy efficiency.
- The total load for Ceiling and exhaust Fan is **7.43 kW**.
- Total No. of Fan fixtures are **110.**

❖ Pumping System

- We observed during Energy Audit and site visit**, 3 Pump of Capacity 5 HP within** College campus for drinking water, Flushing and gardening purpose.
- Power consumption of 2 hp & 3 hp pump was **7.60 kW as** per site visit and measurement.
- We are suggesting purchasing **5 star rated pumps which will get huge** amount of savingas per Star leveling program by Bureau of Energy Efficiency 2020.
- We are **suggesting installing Solar Pumping system which** will get huge amount of savings.

❖ Other Different Type of Connected Load:

There are different types of other equipment like Computer, Printer, Xerox machine, Water Cooler, Refrigerator and other lab equipment installed at various locations and they also contribute to electricity consumption.

- Total Connected load **42.16 kW** and Total **290 no.** equipment installed.
- Light load **4.57 kW and 95 no.** of lighting fixtures.
- Fan load **7.42 kW and 110 no.** of fixtures.
- We suggest to **purchase equipment as per Star leveling program** by Bureau of EnergyEfficiency 2020 which will get huge amount of electricity saving.
- Maintenance of all the equipment should be done regularly.

CHAPTER ONE
INTRODUCTION OF THE COLLEGE

1.1 Introduction

GOVT. GIRLS COLLEGE KHARGOAN, was established in 1984. It is a Government Girls College located at Anand Nagar in Khargoan, Madhya Pradesh, India. It is recognized by the University Grants Commission (UGC) and affiliated to Vikram University at the time of establishment and afterward since 1995. It has been accredited with "B" grade by the National Assessment and Accreditation Council (NAAC) in April 2016.

The Vision and Mission of GOVT. GIRLS COLLEGE KHARGOAN are as under:

VISION:

To provide quality education to the Girls students of Nimar region.

MISSION:

To develop the college as an excellent institution in the field of higher education, to provide quality and value-based education to the students of the region and deprived sections of the society, so that by bringing changes in their lives and developing leadership potential, they can be involved in the inclusive development of the nation. Make partners.

CHAPTER TWO
SITE VISIT AND INSPECTION

2.1 Site visit and site inspection

Energy audit team visited **GOVT. GIRLS COLLEGE KHARGOAN** premises and completed electrical measurement and appliances data collection.

Figure 2: Government Girls College, Khargoan Site Visit

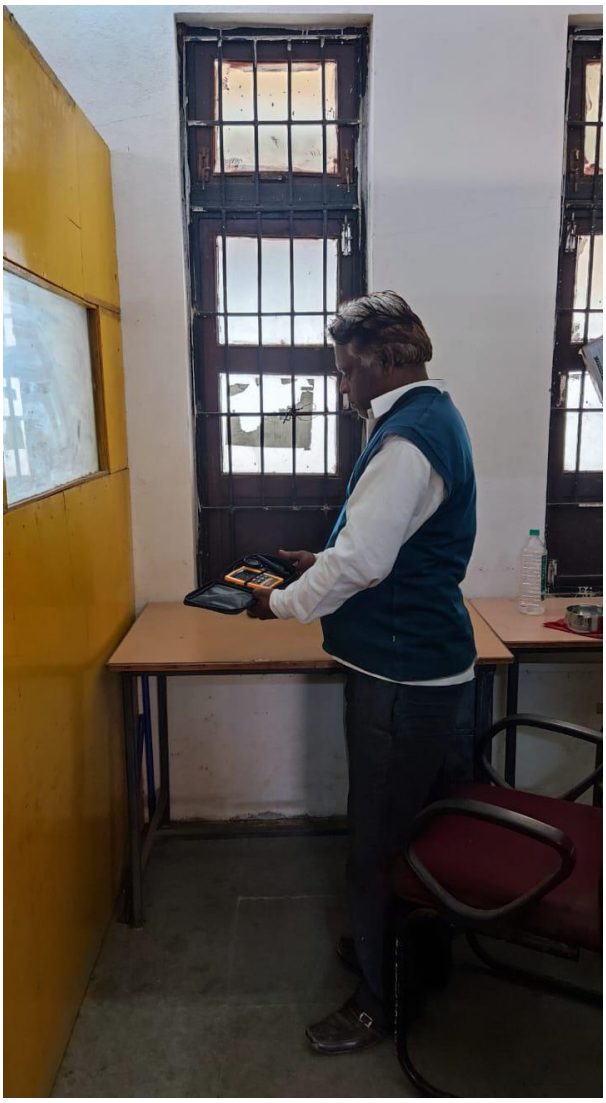


Figure 3: Government Girls College, Khargoan, Lux measurement

CHAPTER THREE
ENERGY AUDIT

3.1 Introduction of Energy Audit

Energy Audit is an effective means of establishment present efficiency levels and identifying Potential areas of improvement in energy consumption.

Energy audit of utility systems largely helps in the areas which are given below:

Reducing the energy consumption with resultant reduction in electricity bills.

Audit involves data collection, data verification and detailed analysis of the data.
The analysis leads to recommendations, which are short term (with minimum investment), medium term (with moderate investment) and long term (with capital expenditure).
The cost benefit analysis of various energy conservation proposals enables managements to take decisions regarding implementation schedules.

Energy conservation is a worldwide objective to save human beings from possible disaster. Under the mandate of The Energy Conservation Act 2001, the Bureau of Energy Efficiency and Government of India is implementing various programmers to provide momentum to the energy conservation movement in the country. Energy Auditing is most vital part of the conservation of energy. In order to improve the efficiency of the Energy consuming system, energy auditing is the first necessary action to be taken by the concerned firm. Through the energy auditing actual parameters can be detected at each step, which can be compared with the standard achievable parameters. For proper Energy auditing and energy accounting, parameters need to be monitored on regular basis.

3.2 Methodology & Approach

The audit involved basic design data collection for various electrical & thermal utilities, meetings with concerned departmental engineers & managers carrying out various field measurements, performance analysis and loss analysis covering all major energy consuming sections of **GOVT. GIRLS COLLEGE KHARGOAN** to realistically assess losses mainly in energy consuming utility areas and potential for energy savings. The major areas of study include:

- Building electricity bills analysis.
- Electrical supply and distribution system analysis
- Lighting system analysis.
- Water pumping system analysis.
- Buildings envelop analysis.
- Specific Energy Consumption.

During study several interactions were made with the office personnel and technicians to share the actual operational features of equipment, maintenance of equipmentbreakdown, time of machineries, safety measures etc. At the same time required data was collected from various departments and reviewed the same with the operational actual data.

The study focused on improving energy use efficiency and identifying energy saving opportunities for various equipment. The analyses included simple payback period and life cycle cost calculations where investments are required to be made to implement recommendations, to establish their economic viability.

3.3 Instruments used in Energy Audit

We have a wide array of latest, sophisticated, portable, diagnostic and measuring instruments to support our energy audit investigations and analyses. The audit study made use of various portable instruments along with plant online instrumentations, for carrying out various measurements and analyses. The specialized instruments that were used during the energy audit include:

- Power Analyzer.
- Ultra-Sonic Flow Meter.
- Digital power clamp meter & multi-meter (2745 KUSAM MECO)
- Digital Hygrometer HD-304 HTC
- Digital Lux Meter (LX-101A HTC TM)
- Digital Anemometer (AVM -07 HTC)
- IR Thermometers for temperature measurement HTC TM (IR -50 to 1550 0C)
- Digital distance meter
- Measuring Tap meter

CHAPTER FOUR

ELECTRICITY BILL ANALYSIS

4.1 Month Wise Energy Consumption

GOVT. GIRLS COLLEGE KHARGOAN. Receives power from, Madhya Pradesh Paschim Kshetra Vidyut Vitran Company Limited Indore.

The maximum demand, energy consumption, fixed charges, energy charges and total bill in Rs. for the financial year 2021-2022 are shown in below tables as per the details from the College bill. One year's data have been represented by various graphs. These indicators address energy consumption, energy sources, energy monitoring, and electricity consumption.

Tariff Schedule LV - 2

NON-DOMESTIC:
LV 2.1

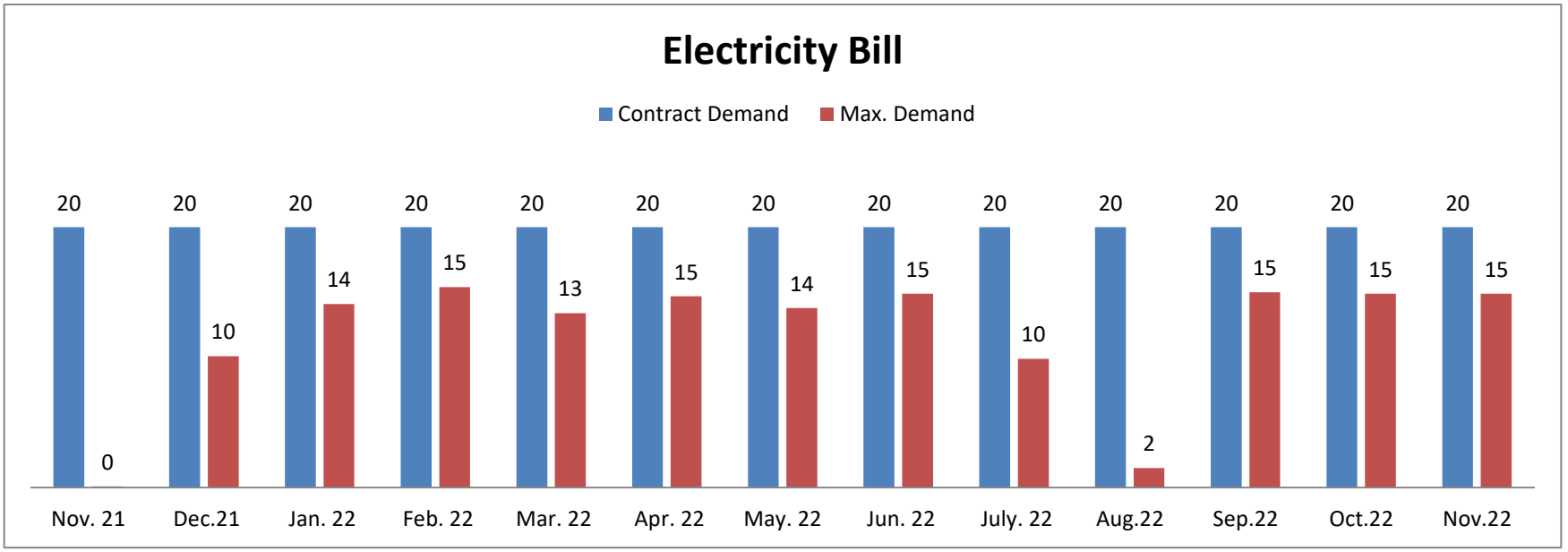
Applicability:
This tariff is applicable for light, fan and power to Schools / Educational Institutions including workshops and laboratories of Engineering Colleges / Polytechnics/ITIs (which are registered with /affiliated/ recognized by the relevant Govt. body or university), Hostels for students or working women or sports persons.

Tariff:
Tariff shall be as given in the following table:

Sub category	Energy Charge (paise/unit) Urban/ Rural areas	Monthly Fixed Charge (Rs.)	
		Urban areas	Rural areas
Sanctioned load-based tariff (only for connected load up to 10 kW)	630	150 per kW	120 per kW
Demand based tariff **Mandatory** for Connected load above 10 kW	630	270 per kW or 216 per kVA of billing demand	230 per kW or 184 per kVA of billing demand

Table 2: Electricity bill analysis

FY 2021-2022	Contract Demand kVA	Maximum Demand in kVA	Billing Demand kVA	Total consumed units kWH	kWH EXPORT AdJ.	Energy charges (Rs.)	Fixed charges (Rs.)	Power factor	Total bill (Rs.)	Average per unit charges Rs/kWh
Nov. 21	20	0	5328	0	589.9	0	0	0.99	48896	0
Dec.21	20	10	5328	0	612.9	0	0	0.99	10492	0
Jan. 22	20	14	5328	438.7	366.5	0	0	0.99	4541	10.4
Feb. 22	20	15	5328	2172	268.4	0	0	0.99	9818	4.5
Mar. 22	20	13	9438	1707	246.2	4471	5328	0.99	9317	5.5
Apr. 22	20	15	16678	2599	806.4	12365	5328	0.99	25988	10.0
May. 22	20	14	12817	1518	335.6	8159	5328	0.99	12712	8.4
Jun. 22	20	15	12040	1889	829.7	7311	5328	0.99	11927	6.3
July. 22	20	10	470	658	639.2	132	5328	0.99	295	0.4
Aug.22	20	2	8507	1017	544.1	3264	5328	0.93	8410	8.3
Sep.22	20	15	11233	1395	467.7	6396	5328	0.99	11233	8.1
Oct.22	20	15	17052	2116	320.9	12384	5328	0.98	16905	8.0
Nov.22	20	15	18093	2180	336	12724	5328	0.90	18093	8.3
Total				**17690**	**6363.5**				**188627.1**	**7.10**



OBSERVATIONS & COMMENTS:

- As per electricity bills observation and analysis, **Total Sanction load is 20 kW** in2021 College premises.
- As per electricity bills observation and analysis, Contract demand missing in 2022 some month.
- As per electricity bills observation and analysis, **electricity bill Power Factor variesfrom 0.8 - 0.96.**

CHAPTER FIVE

LIGHTING SYSTEM

5.1 Details of Lighting System

GOVT.GIRLS COLLEGE KHARGOAN. Has high lighting load and various type of indoor and outdoor lighting fixtures are installed in college campus. Lux measurement was also done at the time of audit. All the parameters are given in the below table:

Table: 4 Indoor Lighting details

Govt. Girls College, Khargone							
Sr. No.	**Location**	**Location of Fixtures**	**Types of Lighting**	**No.of Lighting fixture**	**Power (W)**	**Total Power (W)**	**Lux Level**
1 Ground Floor	Porch	Porch Area	LED Bulb	1	12	12	215-240
		Main Entrence	LED Bulb	1	12	12	75-95
	Semester Cell	Semester Cell	FTL	3	40	120	190-220
		Semester Cell	T Type LED	1	10	10	170-205
	Principal Cabin	Principal Cabin	FTL	2	40	80	30-55
		Principal Cabin	T Type LED	2	10	20	30-55
	Office	Office	FTL	4	40	160	70-90
		Office	LED	1	20	20	70-90
	Class Room-01	Commerce Section	FTL	1	40	40	115-125
		Commerce Section	LED	2	20	40	115-125
	Class Room-02	Hindi Section	LED	4	20	80	210-230
	Sports Room	Sports Room	FTL	2	40	80	65-140
	Control Room	Control Room	FTL	2	40	80	45-90
	Class Room-03	English Section	FTL	1	40	40	220-260
		English Section	LED	3	20	60	220-260
	Class Room-04	M.S.W.	FTL	3	40	120	110-125
		M.S.W.	LED	1	20	20	170-200
	Stage	Stage	LED Flood	3	500	1500	1200-1450
	Class Room-05	Sociology	FTL	2	40	80	60-80
		Sociology	LED	2	20	40	60-80
	Class Room-06	Political Science	FTL	1	40	40	600-750
		Political Science	LED	3	20	60	600-750
	Class Room-07	Economics	FTL	2	40	80	250-275
		Economics	LED	2	20	40	250-275
	Exam. Control Room	Exam. Control Room	FTL	2	40	80	105-315
		Exam. Control Room	LED	1	20	20	105-315

Govt. Girls College, Khargone							
Sr. No.	Location	**Location of Fixtures**	**Types of Lighting**	**No.of Lighting fixture**	**Power (W)**	**Total Power (W)**	**Lux Level**
First Floor	Library	Library	FTL	6	40	240	80-120
		Library	LED	3	20	60	80-120
	E-Resource Control Room	E-Resource Control Room	FTL	4	40	160	280-350
		Computer Lab.	FTL	4	40	160	280-350
	Physics Lab.	Physics Lab.	FTL	4	40	160	60-190
	Botony Lab.	Botony Lab.	FTL	4	40	160	110-130
	Zoology Lab.	Zoology Lab.	FTL	4	40	160	100-115
	Chemistry Lab.	Chemistry Lab.	FTL	4	40	160	90-115
	Home Science Dept.	Home Science R01	FTL	4	40	160	410-430
		Home Science R02	FTL	4	40	160	250-280
	Class Room-08	Class Room-08	FTL	1	40	40	120-140
		Class Room-08	LED	1	20	20	120-140
Total Power Consumption in kW						4574	
Total no. of Lighting Fixture				***95***			

Outdoor lighting:

Table: 5 Outdoor Lighting details

GOVT. GIRLS COLLEGE KHARGOAN (M.P.)					
Sr. No.	**Location**	**Types of Lighting**	**No. of Lighting fixture**	**Power (W)**	**Total Power (W)**
1	Outdoor Lighting	LED Flood Light	2	500	1000
Total Power Consumption in kW		**1.0**			
Total no. of Lighting Fixture		**2**			

OBSERVATIONS & COMMENTS

- We are appreciating that your replaced FTL with Energy Efficient LED Tube light.
- We recommend **using LED Lighting luminaries at some locations as per site visit.**
- We **are suggesting to purchase all electrical** equipment as per star leveling program by Bureau of energy efficiency, which will get huge amount of electricity saving.
- We are suggesting to conduct regular **Cleaning and maintenance of lighting fixtures** in every 5-6 months to increase performance of Lighting and also improve their Lux level.
- As per data collection and site visit, Total Connected indoor lighting load at College Campusis **4.57 kW.**
- As per data collection and site visit, Total Connected outdoor lighting load at College Campus is **1.0 kW.**
- As per data collection and observation, **Total no. of Indoor lighting fixture is 95.**
- As per data collection and observation, **Total no. of Outdoor lighting fixture is 2.**

CHAPTER SIX
FAN SYSTEM

There are various ceiling fans installed at various locations in **GOVT. GIRLS COLLEGE KHARGOAN**. And they also contribute to very high electricity consumption. All of the fans are conventional and hence are high energy consuming.

Table: 6 Details of Fan

Sr. No.	Location	Location of Fan	Types of Fan	No.of Fan	Power (W)	Total Power (W)
1 Ground Floor	Semester Cell	Semester Cell	Ceiling Fan	2	68	136
	Principal Cabin	Principal Cabin	Ceiling Fan	3	68	204
	Office	Office	Ceiling Fan	6	68	408
	Class Room-01	Commerce Section	Ceiling Fan	4	68	272
	Class Room-02	Hindi Section	Ceiling Fan	4	68	272
	Sports Room	Sports Room	Ceiling Fan	3	68	204
	Control Room	Control Room	Ceiling Fan	3	68	204
	Class Room-03	English Section	Ceiling Fan	3	68	204
	Class Room-04	M.S.W.	Ceiling Fan	5	68	340
	Stage	Stage	Ceiling Fan	2	68	136
	Class Room-05	Sociology	Ceiling Fan	4	68	272
	Class Room-06	Political Science	Ceiling Fan	4	68	272
	Class Room-07	Economics	Ceiling Fan	4	68	272
	Exam. Control Room	Exam. Control Room	Ceiling Fan	2	68	136
First Floor	Library	Library	Ceiling Fan	14	68	952
	E-Resource Control Room	E-Resource Control Room	Ceiling Fan	5	68	340
		Computer Lab.	Ceiling Fan	4	68	272
	Physics Lab.	Physics Lab.	Ceiling Fan	4	68	272
	Botony Lab.	Botony Lab.	Ceiling Fan	6	68	408
	Zoology Lab.	Zoology Lab.	Ceiling Fan	5	68	340
		Zoology Lab.	Exaust Fan	2	55	110
	Chemistry Lab.	Chemistry Lab.	Ceiling Fan	6	68	408
		Chemistry Lab.	Exaust Fan	2	55	110
	Home Science Dept.	Home Science R01	Ceiling Fan	4	68	272
		Home Science R02	Ceiling Fan	3	68	204
	Class Room-08	Class Room-08	Ceiling Fan	6	68	408
		Class Room-08				7.43
Total no. of Fixture				***110***		

Total Power Consumption in KW	**7.43**
Total no. of Fan Fixture	**110**

OBSERVATIONS & COMMENTS

- We recommend **to purchases new energy efficient BLDC fans as per Star leveling programby Bureau of Energy Efficiency, which will get** huge amount of electricity saving.
- Energy Saving calculation **and recommendation for the existing Conventional** Ceiling fans with BLDC super energy efficient fan have been given in this report.
- We are suggesting **conducting regular Cleaning and maintenance** of Fan at least in every 6months to increase performance of Fan.
- We are also suggesting improving the Air delivery of Fans by Replacing them with New energy efficient BLDCFan as per 5 stars leveling of Bureau of energy efficiency.
- The total load for Ceiling and exhaust Fan is **7.43 kW**.
- Total No. of Fan fixtures is **110**

CHAPTER SEVEN

OTHER EQUIPMENTS LOAD

7.1 Different Type Other Equipment

There are different types of other equipment like Printer, PC, Water Cooler, Refrigerator and other lab equipment installed at various locations in **GOVT. GIRLS COLLEGE KHARGOAN**, and they also contribute to electricity consumption.

Table 7: Different type of equipment system

Other equipments location wise						
Sr. No.	**Location**	**Location of Product**	**Type of Product**	**Number of Product**	**Power (Watts)**	**Total Power (Watts)**
	Semester Cell	Semester Cell	PC	1	100	100
			Printer	2	650	1300
			Photocopier	2	1800	3600
	Principal Cabin	Principal Cabin	PC	3	100	300
			Printer	1	650	650
	Sports Room	Sports Room	PC	1	100	100
	Control Room	Control Room	PC	2	100	200
			Printer	1	650	650
	Exam. Control Room	Exam. Control Room	PC	1	100	100
			Printer	1	650	650
	E-Resourse Centre	E-Resourse Centre	PC	25	100	2500
			Photocopier	1	1400	1400
			Projector	1	250	250
	Computer Lab.	Computer Lab.	PC	21	100	2100
			Projector	1	250	250
	Physics Lab.	Physics Lab.	PC	1	100	100
			Printer	1	650	650
	Botany Lab.	Botany Lab.	PC	1	100	100
			Fridge	1	300	300
	Zoology Lab.	Zoology Lab.	PC	1	100	100
			Printer	1	650	650
			Fridge	1	300	300
			Projector	1	200	200

Other equipments location wise						
Sr. No.	**Location**	**Location of Product**	**Type of Product**	**Number of Product**	**Power (Watts)**	**Total Power (Watts)**
	Chemistry Lab.	Chemistry Lab.	PC	1	100	100
			Printer	1	650	650
			Water Cooler	1	500	500
			Fridge	1	300	300
	Home Science	Home Science	PC	1	100	100
			Printer	1	650	650
			Projector	1	200	200
			Microwave	1	900	900
			Fridge	1	300	300
			Water Cooler	1	500	500
			Washing Machine	1	400	400
Total Connected Load in kW			21.15			
Total no. of Connected Electrical Appliances			83			

OBSERVATION AND COMMENTS

- Total Connected load **21.15 kW** and Total **83 no.** equipment installed.
- We suggest to **purchase equipment as per Star leveling program recommended** by Bureau of Energy Efficiency2020, which will result in huge amount of electricity saving.
- Maintenance of all the equipment should be done regularly.

CHAPTER EIGHT

PUMPING SYSTEM

8.1 Details of Pumps

There is 3 no. of 5 HP capacity of submersible pump installed within college campus for drinking water, Flushing and gardening purpose.

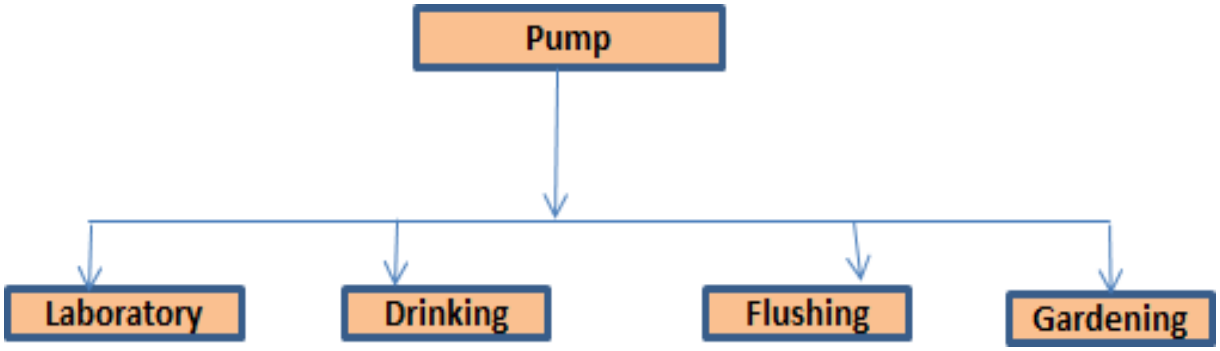


Table 10: Details of pumping system

GOVT. GIRLS COLLEGE KHARGOAN (M.P.)					
Sr. No.	**Location of Pump**	**Types of Pumps**	**No. of Pump**	**Power (HP)**	**Total Power (KW)**
1	Right Hand side	Bore well	1	3	2.25
2	Garden	Submersible	1	2	1.50
Total Power in KW					3.75

Observation and Comments

- We observed during Energy Audit and site visit, **2 Pump of Capacity 2 HP & 3 HP within** Collegecampus for drinking water, Flushing and gardening purpose.
- Power consumption of 2 Nos. pump was **4.70 kW as** per site visit and measurement.
- We are suggesting purchasing **5 star rated pumps which will result in huge** amount of saving as per Star leveling program of Bureau of Energy Efficiency 2020.
- We are **suggesting installing Solar Pumping system which** will result in huge amount of savings.

CHAPTER NINE
SOLAR SYSTEM

9.1 Details of Solar Power Plant:

There are installed 20 KW solar power system in campus for green energy generation.

Figure 4: Government Girls College, Khargoan PV Solar System

Figure 5: Government Girls College, Khargoan PV Solar System

Energy Saving Activities Conducted by the College

Energy Saving Posters in Classrooms


USHA
ऊर्जा साक्षरता
ऊर्जा
नवीन एवं नवकरणीय ऊर्जा विभाग
म. प्र. शासन
ऊर्जा साक्षरता अभियान
ऊषा मित्र
गर्व एवं सम्मान
j2XrEJevON
nikita yadav
एक प्रमाणित ऊर्जा साक्षर और जागरुक वैश्विक नागरिक हैं।
7 October 2022
यह सिस्टम जेनरेटेड सर्टिफिकेट या प्रमाण-पत्र है


नवीन एवं नवकरणीय ऊर्जा विभाग
म. प्र. शासन
ऊर्जा साक्षरता अभियान
ऊषा मित्र
गर्व एवं सम्मान
bVyLWRTAcQ
sushmita mandloi
एक प्रमाणित ऊर्जा साक्षर और जागरूक वैश्विक नागरिक हैं।
28 September 2022
यह सिस्टम जेनरेटेड सर्टिफिकेट या प्रमाण-पत्र है


नवीन एवं नवकरणीय ऊर्जा विभाग
म. प्र. शासन
ऊर्जा साक्षरता अभियान
ऊषा मित्र
गर्व एवं सम्मान
KSTNk3ZHgh
upasna dharve upasna dharve
एक प्रमाणित ऊर्जा साक्षर और जागरूक वैश्विक नागरिक हैं।
30 September 2022
यह सिस्टम जेनरेटेड सर्टिफिकेट या प्रमाण-पत्र है

Conclusion

Govt. Girls College, Khargone is a girl's college serving for Higher Education for about thirty nine years. The electrical equipment is therefore quite old and since the bulk replacement of these involves PWD, Indore the institute has not actively engaged in the process of replacement. The activities involving students for energy conservation, signboards for energy conservation and participation of the students and teachers in the Energy Literacy Campaign of Govt. of Madhya Pradesh and receiving Usha Mitra Certificates are some of the genuine efforts on the part of the college for Energy conscious conservation measures. Their initiative of conducting an Energy Audit for attaining professional assessment and recommendations for energy saving is also commendable.
The fulfillment of recommendations of this Audit partially or fully will surely move the institute a forward in the direction of energy conservation significantly.

It is advisable to use electrical equipment with:

1) We appreciate of use LED Lightings in new buildings & we also recommend replacing all FTL with Energy efficient LED lightings.

2) We appreciate the campus having good natural day light in class room & good air ventilation also at upper floors in the buildings.

3) We strongly recommended to install Solar Street light & Solar Roof top On-grid Solar PV system in college premises to increase the use of green energy.

4) Recommended to use Energy Efficient BLDC Ceiling Fan for 50% energy saving.

5) We appreciate the efforts of faculty & student; during the energy audit we found no wastage of energy in the campus.

6) We also recommend using all 5 star rated Energy Efficient Products Lights, Fan, Pump, etc.

7) We also recommended using solar pumping system for irrigation & water management in campus to reduce electrical bills.

8) We recommend using install motion sensor based lighting in area of less activity / motion / movement.

9) We also recommend using sign board of switch-off the electrical loads when not in use.

ANNEXURE – I

Standard Lux Level

Activity	Illumination *(lux, lumen/m^2)*
Public areas with dark surroundings	20 - 50
Simple orientation for short visits	50 - 100
Working areas where visual tasks are only occasionally performed	100 - 150
Warehouses, Homes, Theaters, Archives	150
Easy Office Work, Classes	250
Normal Office Work, PC Work, Study Library, Groceries, Show Rooms, Laboratories	500
Supermarkets, Mechanical Workshops, Office Landscapes	750
Normal Drawing Work, Detailed Mechanical Workshops, Operation Theatres	1,000
Detailed Drawing Work, Very Detailed Mechanical Works	1500 - 2000
Performance of visual tasks of low contrast and very small size for prolonged periods of time	2000 - 5000
Performance of very prolonged and exacting visual tasks	5000 - 10000
Performance of very special visual tasks of extremely low contrast and small size	10000 - 20000

ANNEXURE – II

Super Energy efficient BLDC Ceiling Fan

	900 mm	1050 mm	1200 mm	1400 mm
Warranty (Years)	3 Years	3 Years	3 Years	3 Years
Blade Span (mm/inch)	900/36	1050/42	1200/48	1400/56
RPM	450	430	350	270
Service Value	7.1	6.6	7.8	7.7
Input Voltage (V)	140-285	140-285	140-285	140-285
Power Consumption (W)	28	32	28	35
Frequency (Hz)	48-52	48-52	48-52	48-52
Air Delivery (CMM)	200	210	220	270
Power Factor	>0.98	>0.98	>0.98	>0.99
No. of Blades	3	3	3	3
Bearing (Double)	Deep Groove Double Sided Steel Shielding			
Remote Control (12 Keys)	Speed Control, Boost Mode, Timer and Sleep Mode			

Comparison Between Ordinary,5 Star Rated and Super-Efficient Fans

Parameters	Ordinary Fan	5 Star Rated Fan	Super-Efficient Fan
Wattage	75	50	28
RPM (speed)	380	**330**	360-380
CMM (air delivery)	230	**210**	220-230
Power factor	>0.9	>0.95	>0.99
Regulator	Yes	Yes	Not Required (Remote controlled)
Input Voltage	230	230	140-285V
Warranty	1-2 year	1-2 year	3 years
MRP	1300-1600	1800-2500	3690