GREEN ENERGY AUDIT REPORT

OF

MJ Educational Society

Prepared by:
MCJ Energy Engineers Pvt. Ltd.
244, Chouhan Estate, G.E. Road
Supela, Bhilai- 490023
Email- mcjain1948@gmail.com

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Acknowledgement

We express our sincere gratitude to **M.J Educational Society, Bhilai** for giving us the opportunity to be a part of their mission towards Energy Conservation.

We are thankful to the Principal, all Staff and Students of college with whom we interacted during the field studies for their whole-hearted support in undertaking survey and analysis of energy flows to assess the energy reduction and saving potential. The willingness of these key personnel to participate in this program and acknowledge the call for energy efficiency is more than half the issues received.

Green Energy Audit Team Member

Accredited Energy Auditor: Mr. Moolchand Jain (AEA-030)

Energy Engineer: Mr. Akhilesh Jain

Energy Engineer: Mr. Rakesh Kumar Sahu

Energy Engineer: Mr. Aditya Verma

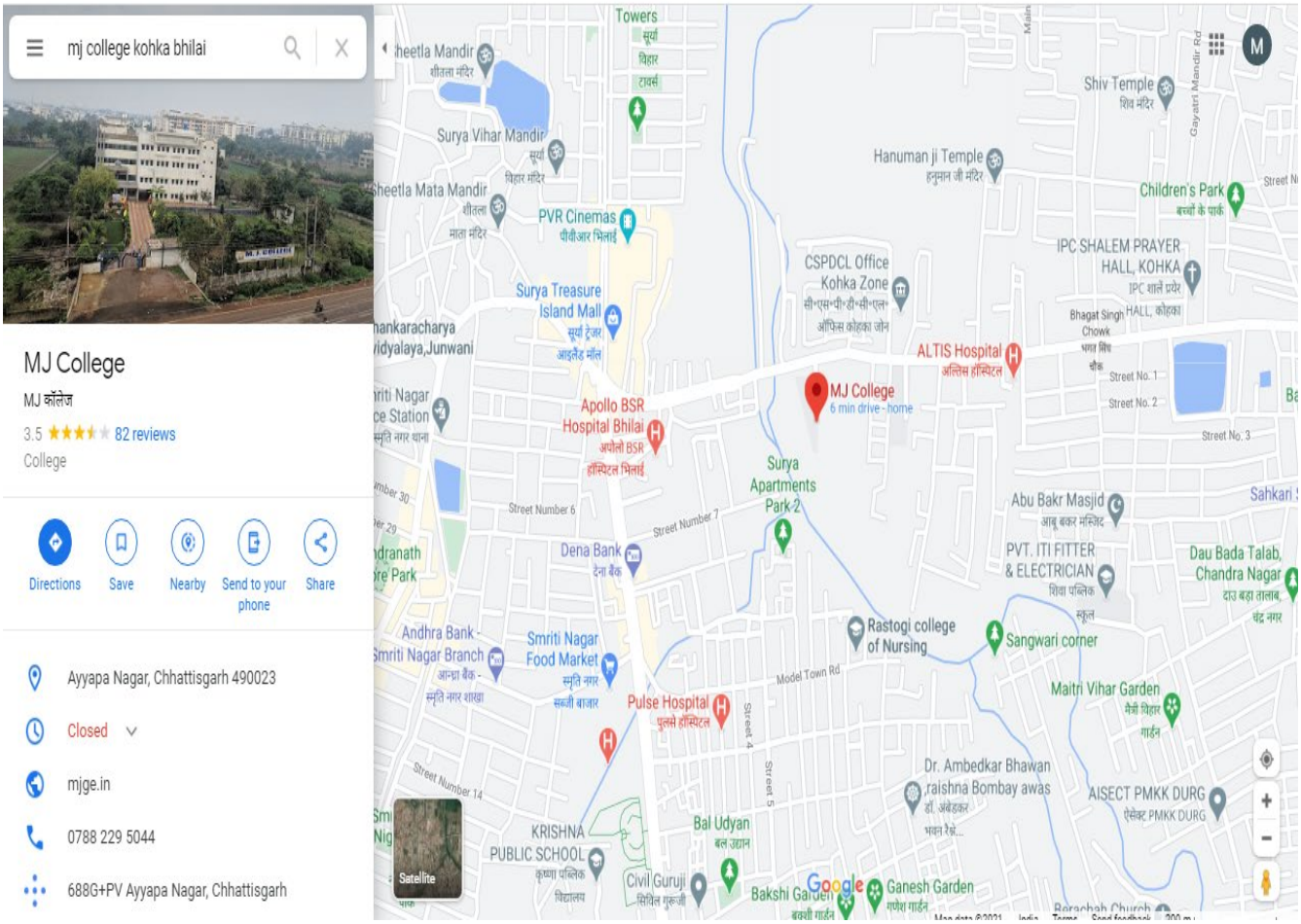
The management is also keen to implement the sustainable practices based on findings and suggestion from Green Energy Audit report. The management is fully committed to inculcate virtues amongst students in preservation of nature and conservation of energy.

Regards-
M. C. Jain
Accredited Energy Auditor (AEA-030)

Accredited Energy Auditor AEA 0030 BEE M.C. JAIN

Location of the campus

M J Educational Society
Kohka- Junwani Road, Near CSEB Substation
Bhilai, Distt: Durg (C.G.)- 490023
Tel No: 0788-2295044, 2295033



CHAPTER 1
INTRODUCTION

About MAA Jagdamba Educational Society, Bhilai
Maa Jagdamba Educational Society was established in the year 2000 with an aim to build a humane society through excellence in education and health care to create Employable person, to bridge the gap between the demand and supply of skilled professionals in the society.
Our governing body consists of members who are educationist, industrialist and social workers. Our aims and objectives are corelated, hence we get a great support from our board and staff members who put in their hard work to complete the given challenges. Every year one annual meeting is held to adopt and define new strategies of working.

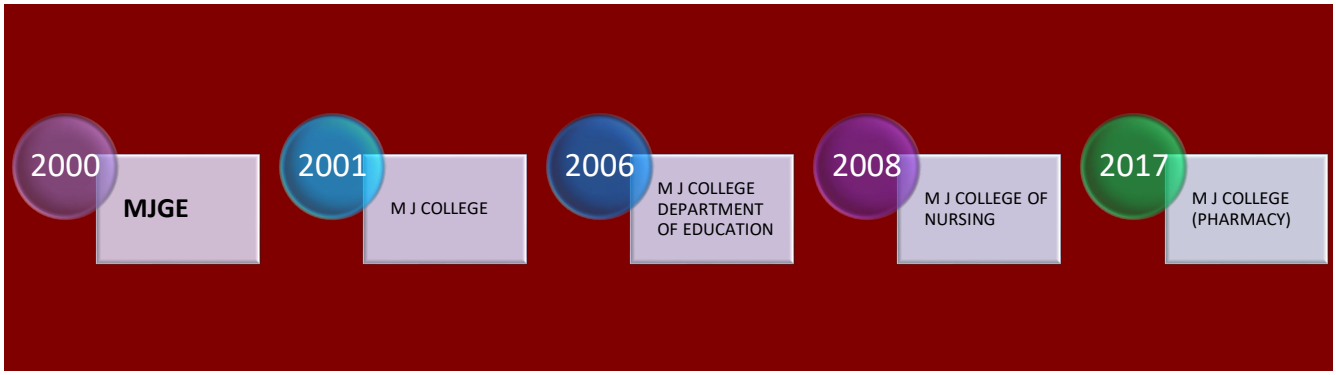
VISION
Transforming lives and communities through learning.

Mission
To develop M J Group of Education (MJGE) as a Centre of Excellence imparting quality education, generating competent, skilled manpower to face the scientific and social challenges, with a high degree of credibility, integrity, ethical standards and social concern at affordable price.

Our purpose
Our purpose is to produce proficient professionals and scholars who promote meaningful change in local, national, indigenous, and international communities, to educate and support our students in the critical evaluation and adoption of science-based practices, and to accelerate multidisciplinary research to be applied innovatively within education, health, and human service organizations around the nation as well as the world.

Our Motto
Enlightenment through Knowledge with our logo caption "**POWER OF KNOWLEDGE**"

MILESTONES



Core Values
Built on the vision that education serves as a keystone in improving society and building better futures for all, we commit to our core values of:

Accountability: The roles and responsibilities are assigned and people are held accountable for their deeds. We feel our liability towards the society and our actions add values to the Institute.

Faculty Empowerment: Institute promotes and encourages faculty in their individual academic development and provides scope for enhancement in their participation in general governance.

Integrity: All the activities should be conducted in an ethical manner. Teaching and Research shall be carried out in an environment of academic freedom and honesty.

Responsibility: Everybody in the Institute is expected to discharge his/her duties with due responsibility.

Respect of Individual: While carrying out the interactions at all levels, the dignity and respect of an individual is observed.

Service to Nation: Institute is committed to developing the skilled manpower to serve the Nation.

Transparency: The general records of maximum aspects of the functioning are maintained online to encourage transparency.

Environmental stewardship: Committed in practicing green technologies for sustainable development of the Nation.

Salient Features of MJGE

OUR PEDAGOGY

Our educational programs prepare students for the real world and offer the opportunity for practical, hands-on experience, internships and projects. Take advantage of this experience to gain the practical skills employers are looking for and open your mind to career opportunities. Academics at MJGE keep pace with workplace demands and ensure that students are work ready and in touch with what's expected in a professional environment.

ACADEMIC EXCELLENCE

Our academic programs enjoy a great reputation in the research and industry. To maintain our leadership position, we focus on inducting the best faculties from the industry and academia. Our faculty is known for its strong academic orientation contributing to the creation of knowledge in a dynamic for every changing environment. Classes are built around experiential learning where students are pushed to their limits to take conceptual framework and apply them.

OUTCOME-BASED EDUCATION (OBE)

Outcome based education is a student centric teaching and learning methodology in which the course delivery, assessment and strategies are planned to achieve stated objectives and goals. It focuses on measuring student performance i.e. outcomes at different levels.

Leadership & Management Board

- Mr. Ashok Gupta: Chairman (President-M. J. Educational Society)
- MRs. (Dr.) Manjula Gupta, Member, Society Nominee
- Mr. Abhishek Gupta: Member Secretory
- Mr. Aditya Gupta: Member, Society Nominee
- Mrs. Mamta Gupta, Member, Society Nominee

- Mrs. Bhumika Gupta, Member, Society Nominee
- Mrs. Shreelekha Virulkar: Member, Society Nominee

Our Organizations
M J College (NAAC Accredited)

M J College was established in the year 2001 and it is affiliated to Hemchand Yadav Vishwavidyalaya, Durg (C.G.). It is a **NAAC accredited** reputed institution dedicated for the promotion of education culture, and human values, in fact all round human development. Our mission is to provide a unique learning experience which will enable the students to realize their innate potential and mould their overall personality. The basic motive is to empower the students to face the challenges of life with courage and commitment.
Our purpose is also to impart quality and value-based education to the students of all creeds and caste of society. The college strives to develop students' intellectual powers, cultivate their interests and talents to make them useful and responsible for society.
We offer Diploma, Graduation and Post-Graduation courses in nearly all streams. We offer following courses:

Diploma Courses	Under Graduate Courses	Post Graduate Courses
Diploma in Computer Application Diploma in Hardware Technology Diploma in Elementary Education	Bachelor of Commerce Bachelor of Science Bachelor of Business Administration Bachelor of Computer Application Bachelor of Education	Master of Commerce Master of Science (Mathematics) Master of Science (Computer Science) Master of Education

M J College (DEPARTMENT OF EDUCATION)
M J College department of education was established in 2006 to provide quality teachers for knowledge-based society with the moto "Teachers are nation builders". We provide quality education to the pupil teacher to improve their teaching skills and to play an important role in making educated society with moral values. Under the department of education, we offer Diploma in Elementary Education, Bachelor of Education and Master in Education courses.

M J College of Nursing

M.J College of Nursing is a herald that MAA JAGDAMBE Educational society has extended its devotion to the young aspirants to realize their dream of becoming a nurse. Attracted by the opportunity to study and conduct advanced research with renowned professors and fellow scholars in one of the most dynamic cities, students also come from the neighboring States. The M. J. College of nursing established in 2008 by M.J. Education Society is an earnest attempt to impart quality education to the youth of our country. The Institution aims to provide quality education to student without making any discrimination of caste, creed, colour & social status. We provide career focused quality education and training and Nursing Profession in such an environment which stimulates to independent thinking to become future professionals and manager. We help our economically weak students.

We help our economically weak students. The college has been duly Approved by Govt. of Chhattisgarh Recognized by INC and CNRC, and Affiliated to Pandit Deendayal Upadhyay Memorial Health Science & Ayush University of Chhattisgarh., Raipur.
A team of experienced administrators and teachers, state-of-the-art infrastructure, well-equipped laboratories and library, tie- up with major hospitals, comfortable transportation and hostel make our college an easy choice. We highly appreciate your presence in our college. Welcome to MJCON.
College offers a 4-year graduation programme i.e. Bachelor of Science in Nursing B.Sc. (N) with intake capacity of 50 seats and three-year course GNM with intake capacity of 30 seats.

M J College (Pharmacy)

M J College (Pharmacy) is established in 2017 imparting Diploma course and has been successfully running the course ever since. In the year 2019, we have added a new mile stone of Graduation course i.e. Bachelor of Pharmacy. Our college building includes spacious and ventilated Class rooms, well equipped Laboratories, Machine room, Tutorial rooms, a well-stocked Library, Auditorium, Administrative area, including other amenities. The departments are well-equipped with modern and sophisticated equipment. Our building design is fully furnished with modern facilities designed to suit the requirements of pharmacy profession.
College is approved by AICTE and the Pharmacy Council of India (PCI), New Delhi and is affiliated to Chhattisgarh Swami Vivekananda Technical University, Bhilai, Chhattisgarh.
College offers 2-year diploma in pharmacy with intake 60 and Bachelor in Pharmacy with intake 100.

MJGE Amenities:

- Well-equipped labs with state-of-the-art facility.
- Library facility with large number of books and journals.
- Computer Lab with network facility and high-speed internet.
- Language lab.
- Psychology lab.
- Craft lab.
- Canteen Facility.
- Bus facility.
- Hostel facility for girls.
- The college has a well-established and maintained museum for Pharmaceutics, Pharmacognosy, Pharmaceutical chemistry and Pharmacology.

Achievements:

Hall of Fame:

Mr. Amitava Jana	B. Ed. 81.3%,	University Rank - 9th (2011-12)
Ms. Amrita Puri	B. Ed. 84.16%	University Rank - 1st (2012-13)
Ms. Sarita Talukdar	B. Ed. 80.9%	University Rank - 8th (2012-13)
Ms. HemlataSahu	B. Ed. 80.4%,	University Rank - 10th (2012-13)
Ms. Charneet Kaur Bhamra	B. Ed. 81.1%,	University Rank - 3rd (2017-19).

Other Achievements:

- 5th Position in "Best Practices" University level competition organized by Hemchand Yadav Vishwavidyalaya, Durg for the social activities done by the colleges (2020).
- Dr. Anil Kumar Choubey, Principal I/C, M J College was awarded 2nd Position in University level National Education Policy – 2020 video lecture competition organized by Hemchand Yadav Vishwavidyalaya, Durg. (2020)
- 2nd position in Group dance in "Masti ki Pathsala" National level inter college competition organized by S S Khanna Girls college, Allahabad (2020).
- 2nd position in Group Song in "Masti ki Pathsala" National level inter college competition organized by S S Khanna Girls college, Allahabad (2020).
- Best Social & Community Services Certificate of Achievement in college category by Auropath Global Awards 2019 (2nd November 2019).
- Dr. Shweta Bhatia, HoD Education Department was awarded Best Social & Community Services Certificate of Achievement in individual category by Auropath Global Awards 2019 (2nd November 2019).
- Dr. K. S. Gurupanch, Principal, M J College was awarded "Rastra Gaurav Samman" by Samta Sahitya Academy at Gangtok, Sikkim (2019).
- Best dance award to Mr. Sagar Bagh in inter college dance competition organized by Apollo College, Durg. (2020)
- Certificate of Appreciation – Youth For Akatmak – 2/10/2018.
- Certificate of Participation – UNICEF 2018.
- Award of Active Participation in SVEEP – Mission to Vote 2018.
- Special Award in Essay Competition organized by Shri Ramchand Mission to Mr. Vishal Soni and Ms. Afreen Bano. (2019)
- Certificate of Appretiation by Red Cross Blood Bank Society (06/10/2017)
- Traffic Awareness Award to Mr Avinash Kaur by Dainik Bhaskar and Zillet. (2019)

MoU's with different International/National organizations:

- International Institute of Inspirational Economy, Bahrain for the development of mental and competitive skill of students.
- S. S. Khanna Girls College, Allahabad for Student Exchange Programme.
- Prayas Shravan Viklang Sansthan, Bhilai.


विश्वविद्यालय, दुर्ग


nd Art Youth Festival


AUROPATH
Organizer
GLOBAL
AWARDS 2019


AUROPATH
GLOBAL
AWARDS 2019
Organizer


SAMATA SAHITY

From Gallery:

Tree Plantation

Sports

Helping Hands during lockdown period on Teachers Day at Arpan (School for mentally Challenged students)

Social Activity through NSS Camp

Training for Disaster management

Social Concern: Woman Health (Sensitization for Sanatory Pad)

Yoga Day Celebration

Student Union

NEWS Gallery:

Campus Infrastructure

The college, situated 3 km from Durg, is well connected by rail and roads. Spread over approx. an area of 1.5 acres, the college has 3 buildings (Block A, B & C) with RCC Building Structure. The following details:

Sl. No.	Name of Building	Purpose
1.	Block A	Classrooms, staff rooms, Administrative Office, Principal Office, Executive Waiting Room, Libraries, Account Section, Labs, Computer Lab, Physics Lab Toilets etc.
2.	Block B	Girls Hostel, Mess, Toilets, Warden office etc.
3.	Block C	Class rooms, staff rooms, Principal Office, Auditorium, Physiology Lab, Pharmaceutical Labs, Toilet etc.
4.	Canteen	At Campus Area

CHAPTER 2

PRE-AUDIT STAGE

In an organization like college campus, one of the top operating expenses is often found to be electrical energy. Green Energy Audit is an inspection, survey and analysis of energy flows for energy conservation in a building or system to reduce the amount of energy input to the system without affecting the day to day work. A well-done energy audit will help the organization to understand more about the way's energy is used in their premises and help to identify areas where waste can be minimized and where scope for improvements exists.

The objectives are:

- **To minimize the energy cost/ waste without affecting the efficiency in day to day output.**
- **To protect the environmental effects.**

About MCJEEPL

M/s. MCJ ENERGY ENGINEERS PVT. LTD. started in year 1987 as M/s. M.C. Jain & Associates which was later on converted into M/s. MCJ Energy Engineers Pvt. Ltd in 2003 with a vision to improve the energy usage pattern in India. Over the years, we have amassed immense experience in the field of energy consultancy and now have in our arsenal many successful energy efficiency projects performed at the request of Indian corporations.

We are a team of highly skilled professionals from multiple disciplines. Our team has experienced Energy Auditors who are certified by B.E.E. (Bureau of Energy Efficiency), Ministry of Power, Govt. of India.

- **Scope and Goals of Green Energy Auditing**

  A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Energy Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of social and environmental processes. It is necessary to conduct green audit in college campus because it helps the students to be aware of the green audit, its advantages and thereby grow up as good citizens. Thus, Green audit becomes necessary at the college level.

- **General and Specific Objectives of Green Energy Auditing**

  The general objective of green energy audit is to prepare a baseline on energy and other resources, measures to mitigate resource wastage and improve resource quality and sustainable practices.

The specific objectives are:

- To monitor the energy consumption pattern of the college.
- To assess the quantity of water usage within the college campus.
- To suggest sustainable energy usage and water conservation practices.
- To find out various sources of organic and solid waste generation and mitigation possibility.
- To inculcate values of sustainable development practices through green energy audit mechanism.

- **Benefits of the Green Energy Auditing**

  - ✓ More efficient resource management
  - ✓ To provide basis for improved sustainability
  - ✓ To create a green campus
  - ✓ To enable waste management through reduction of waste generation, solid-waste and water recycling
  - ✓ To create plastic free campus and evolve health consciousness among the stakeholders
  - ✓ Recognize the cost saving methods through waste minimizing

- ✓ Empower the organizations to frame a better environmental performance
- ✓ Enhance the alertness for environmental guidelines and duties
- ✓ Impart environmental education through systematic environmental management approach and improving environmental standards
- ✓ Benchmarking for environmental protection initiatives
- ✓ Financial savings through a reduction in resource use
- ✓ Development of ownership, personal and social responsibility for the College and its environment
- ✓ Enhancement of college profile
- ✓ Developing environmental ethic and value systems in youngsters.
- ✓ Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.

❖ **Target Areas of Green Auditing**

- **Energy Audit**

  This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances. Efficient use of energy is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment.

- **Water Audit**

  This indicator addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

- **Bio degradable and hazardous Waste Audit**

  This indicator addresses biodegradable waste from college and hostel canteen, paper waste to hazardous wastes of laboratories and worn-out electric & electronic goods, and plastic wastes. Hazardous materials represent significant risks to human health and ecological integrity.

CHAPTER 3
GREEN ENERGY AUDIT STAGE

Methodology of Green Auditing

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the document, interviewing responsible persons and energy consumption data analysis, measurements and recommendations. The methodology adopted for this audit was a three-step process comprising of:

Data Collection – In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements. Following steps were taken for data collection:

- ✓ The team visited each department, centre, Library, canteen etc.
- ✓ Data on general information was collected by observation and interview.
- ✓ The power consumption of appliances was measured and recorded

Data Analysis - Detailed analysis of data collected include: calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Chhattisgarh State Electricity Board (CSEB). Data related to water usages were also analyzed using appropriate methodology.

Recommendations – On the basis of results of data analysis and other observations, some steps for reducing power and water consumption are recommended. Proper treatment methods for waste are also suggested.

The target areas such as water, energy, waste, green campus and carbon footprint.

Review of documents and records

Documents such as electricity bills were examined and data was collected.

CSEB METER READING/ PERFORMANCE

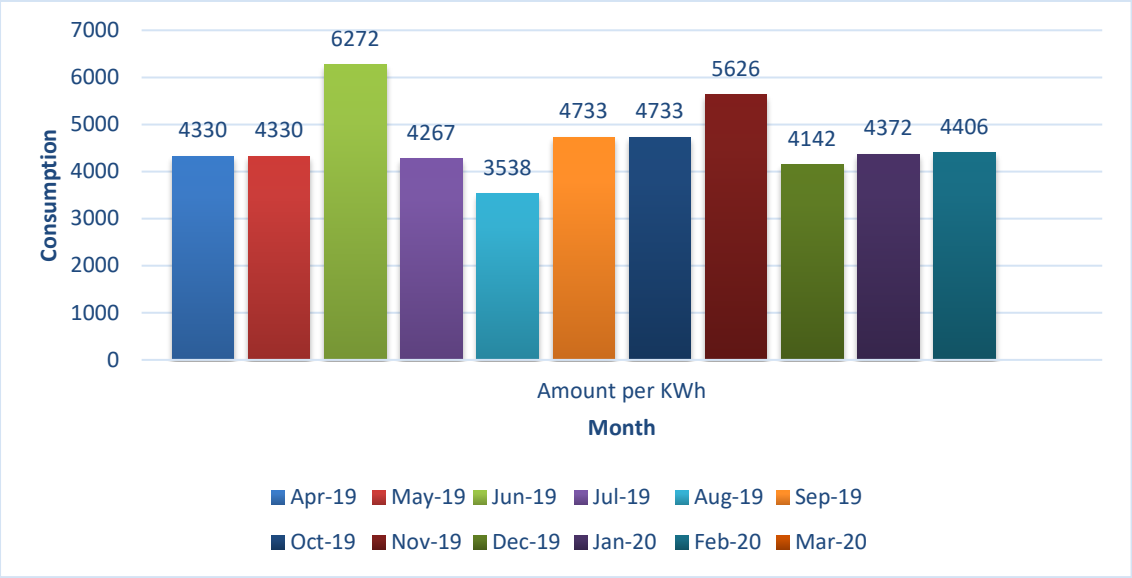
Sanction Load - 24810.0 Watt

Financial Year 2019-2020

So. No.	Month	Initial Reading (kwh)	Final Reading (kwh)	Differential (kwh)	Avg. PF	MD (kw)	Amount (Rs.)	Amount Rs/kwh	Remark
1.	Apr-19	352641	356971	4330	0.96	15.62	43350.00	10.01	
2.	May-19	356971	361724	4753	0.96	18.68	34010.00	7.16	
3.	Jun-19	361724	367996	6272	0.96	18.73	41750.00	6.66	
4.	Jul-19	367996	372263	4267	0.96	6.99	54000.00	12.66	
5.	Aug-19	372263	375801	3538	0.98		38510.00	10.88	
6.	Sep-19	375801	375801	4733			44910.00	9.49	Meter Defective
7.	Oct-19	375801	375801	4733			44920.00	9.49	
8.	Nov-19	375801	270113	5626		17.00	52500.00	9.33	
9.	Dec-19	270116	274258	4142	0.92	13.5	37770.00	9.12	Meter Change
10.	Jan-20	274258	278630	4372	0.96	14.80	40750.00	9.32	
11.	Feb-20	278630	283036	4406	0.97	14.10	41030.00	9.31	
12.	Mar-20	283036							Door Lock
TOTAL				**4652.00**			**43045.45**		

Financial Year 2020-21

So. No.	Month	Initial Reading (kwh)	Final Reading (kwh)	Differential (kwh)	Avg. PF	MD (kw)	Amount (Rs.)	Amount Rs/kwh	Remark
1.	Apr-20	283036	287038	4002	0.95	9.80			
2.	May-20	287038	288523	1485	0.97	8.70	12790.00	8.61	
3.	Jun-20	288523	289989	1466	0.86	5.60	16040.00	10.94	
4.	Jul-20	289989	291170	1181	0.94	6.70	13470.00	11.41	
5.	Aug-20	291170	292603	1433					
6.	Sep-20	292603	294651	2048	0.96	9.90	20490.00	10.00	
7.	Oct-20	294651	296335	1684	0.95	9.40	17450.00	10.36	
8.	Nov-20	296335	297625	1290	0.98	6.40	14110.00	10.94	
9.	Dec-20	297625	299294	1669	0.95	6.70	17240.00	10.33	
10.	Jan-21								
11.	Feb-21								
12.	Mar-21								
TOTAL				**1806.44**			**15941.43**		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Consumption
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Amount per KWh
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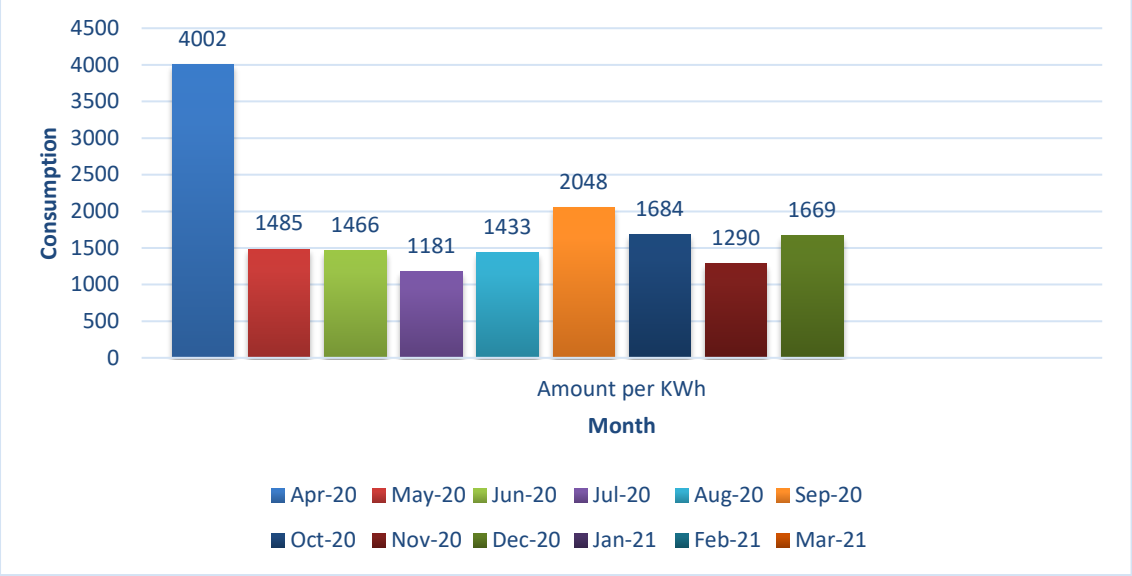
Oct-19 Nov-19 Dec-19 Jan-20 Feb-20 Mar-20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Consumption
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Amount per KWh
Month
Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20
Oct-20 Nov-20 Dec-20 Jan-21 Feb-21 Mar-21

CHAPTER 4
POST AUDIT STAGE

ELECTRICAL PERFORMANCE:

- **CSEB**

Date	Time	U1[V] Avg. value	U2[V] Avg. value	U3[V] Avg. value	I1[A] Avg. value	I2[A] Avg. value	I3[A] Avg. value	PF Avg. value	P[kW] Avg. value	Q[kvar] Avg. value	S [kVA] Avg. value	THD-F_U1 [%] Avg. value	THD-F_U2 [%] Avg. value	THD-F_U3 [%] Avg. value	THD-F_I1[%] Avg. value	THD-F_I2[%] Avg. value	THD-F_I3[%] Avg. value
Average value in the period		402.51	402.43	403.25	11.019	10.614	12.872	0.9837	7.893	1.439	8.024	3.11	2.89	2.99	9.13	16.06	6.03
Maximum value in the period		403.45	403	404.44	11.812	12.439	13.722	0.986	8.522	1.541	8.643	3.17	2.91	3.04	10.54	16.86	6.18
Time of maximum value		3:04:28 PM	2:56:28 PM	3:06:28 PM	3:02:28 PM	3:06:28 PM	3:04:28 PM	3:06:28 PM	3:06:28 PM	3:04:28 PM	3:06:28 PM	2:56:28 PM	2:56:28 PM	2:56:28 PM	2:56:28 PM	2:58:28 PM	3:06:28 PM
Minimum value in the period		401.68	401.76	400.43	9.821	10.151	12.213	0.9822	7.495	1.359	7.617	3.07	2.86	2.97	8.39	13.31	5.82
Time of minimum value		2:56:28 PM	3:06:28 PM	2:56:28 PM	2:56:28 PM	3:04:28 PM	3:00:28 PM	3:04:28 PM	2:56:28 PM	2:56:28 PM	2:56:28 PM	3:06:28 PM	2:58:28 PM	2:58:28 PM	3:00:28 PM	3:06:28 PM	2:56:28 PM
26/02/2021	14:54:28																
26/02/2021	14:56:28	402	403	400	9.82	10.39	12.64	0.98	7.50	1.36	7.62	3.17	2.91	3.04	10.54	16.46	5.82
26/02/2021	14:58:28	402	402	402	10.23	10.27	12.41	0.98	7.51	1.40	7.64	3.13	2.86	2.97	9.90	16.86	5.91
26/02/2021	15:00:28	403	402	404	11.25	10.19	12.21	0.98	7.70	1.42	7.83	3.09	2.89	2.97	8.39	16.46	6.10
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26/02/2021	15:04:28	403	403	404	11.38	10.15	13.72	0.98	8.07	1.54	8.21	3.11	2.89	2.97	8.89	16.73	6.08
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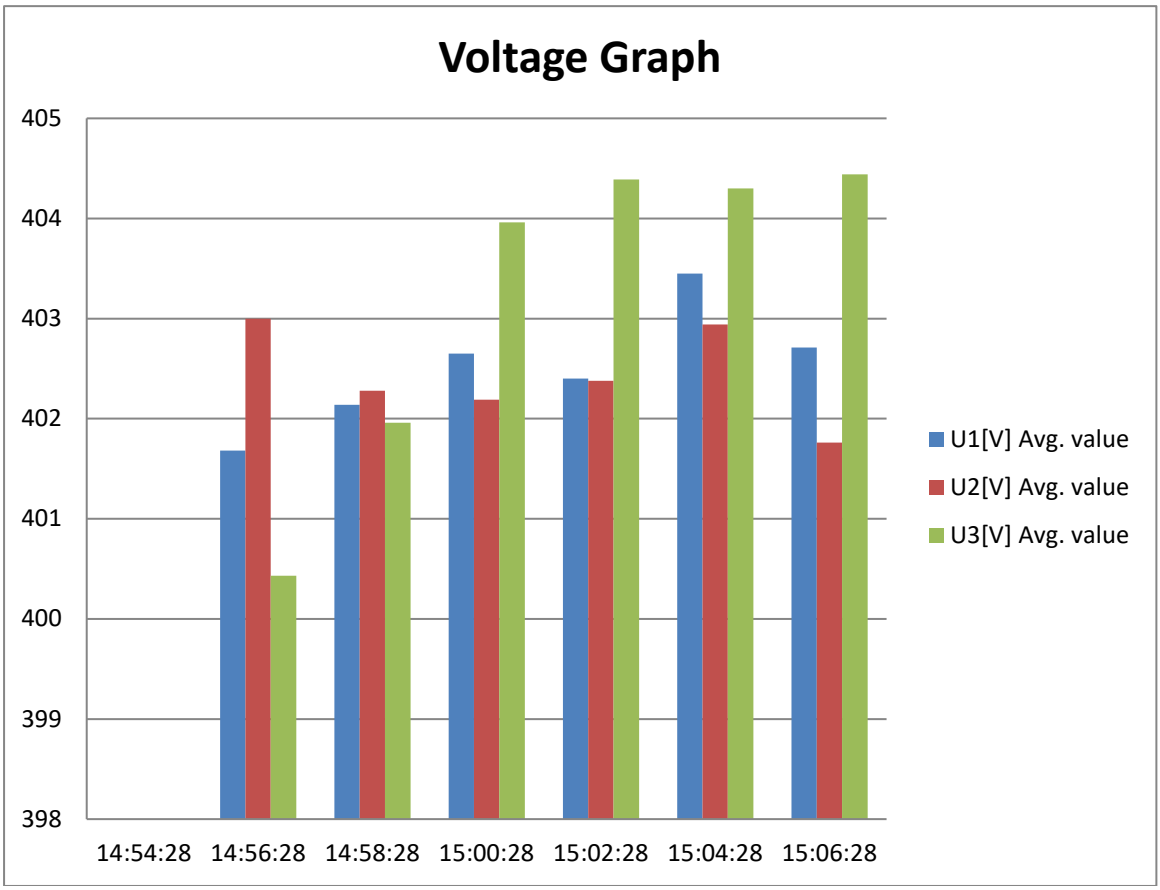
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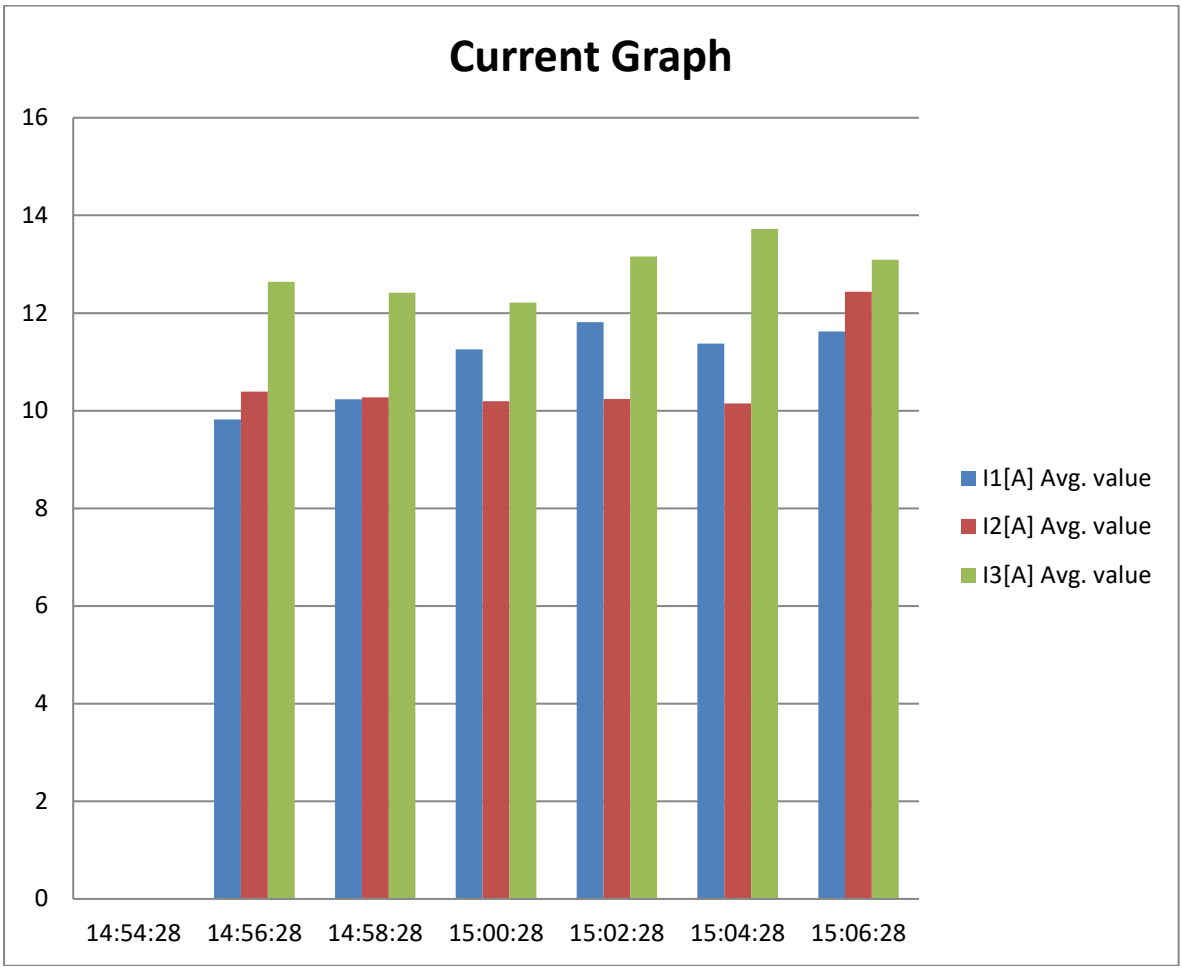
U2[V] Avg. value
U3[V] Avg. value


Current Graph
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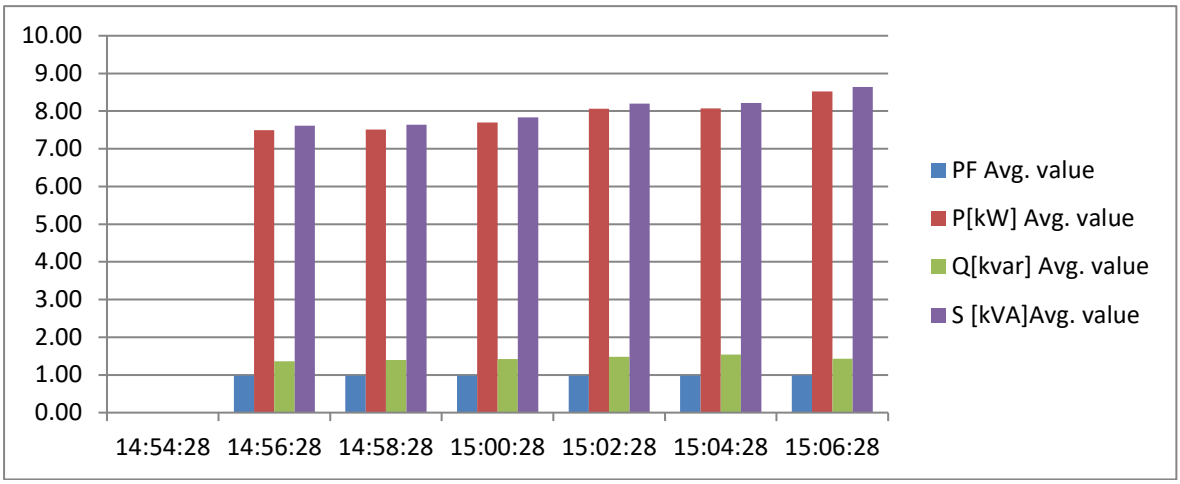
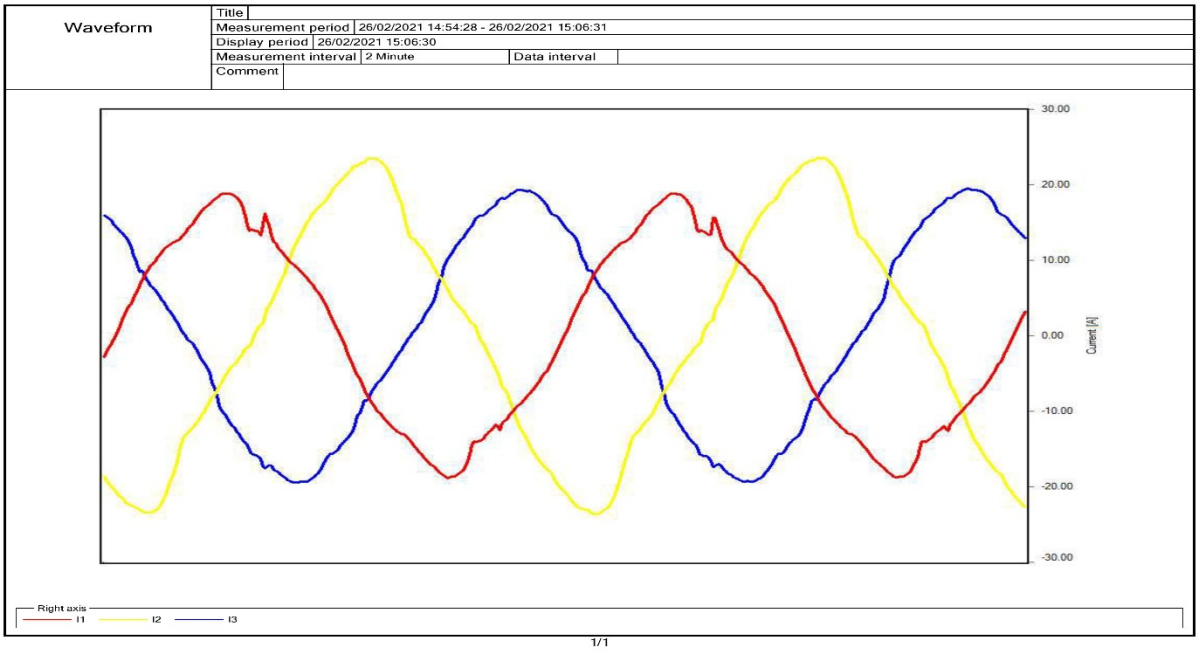
I3[A] Avg. value


10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
14:54:28
14:56:28
14:58:28
15:00:28
15:02:28
15:04:28
15:06:28
PF Avg. value
P[kW] Avg. value
Q[kvar] Avg. value
S [kVA]Avg. value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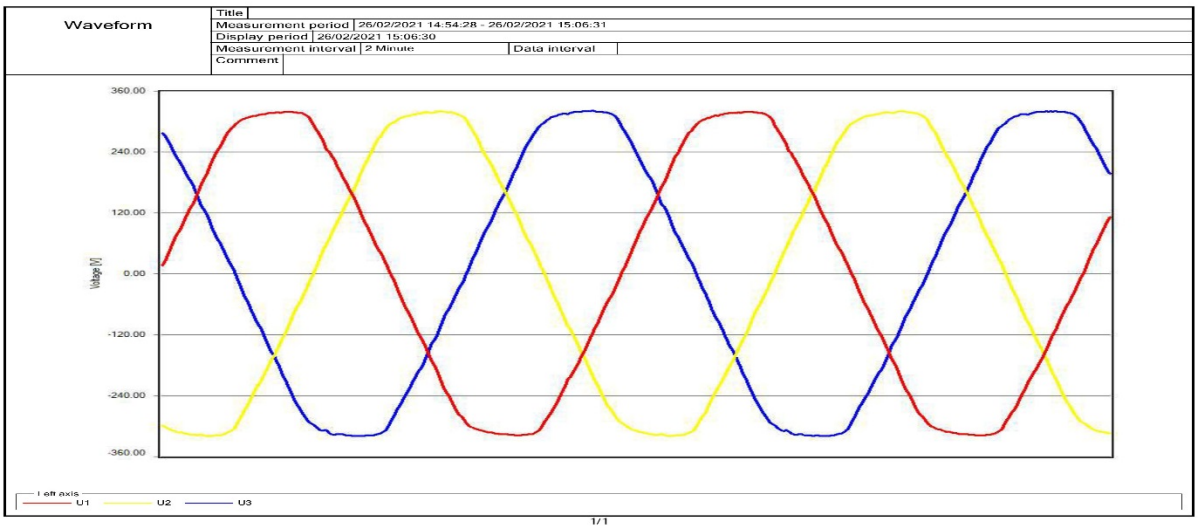
Display period 26/02/2021 15:06:30
Measurement interval 2 Minute
Data interval
Comment
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
Current [A]
Right axis
I1
I2
I3
1/1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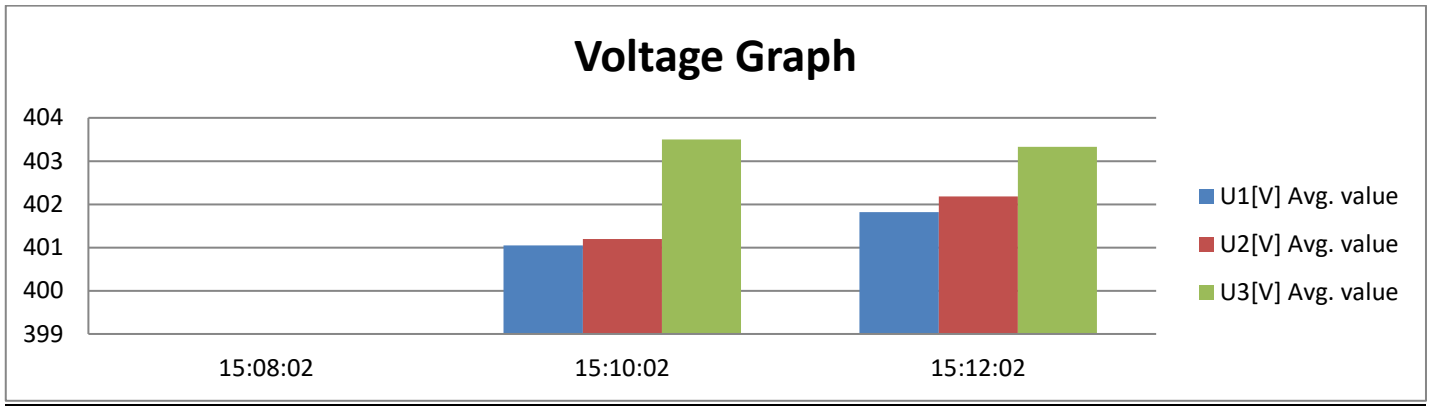
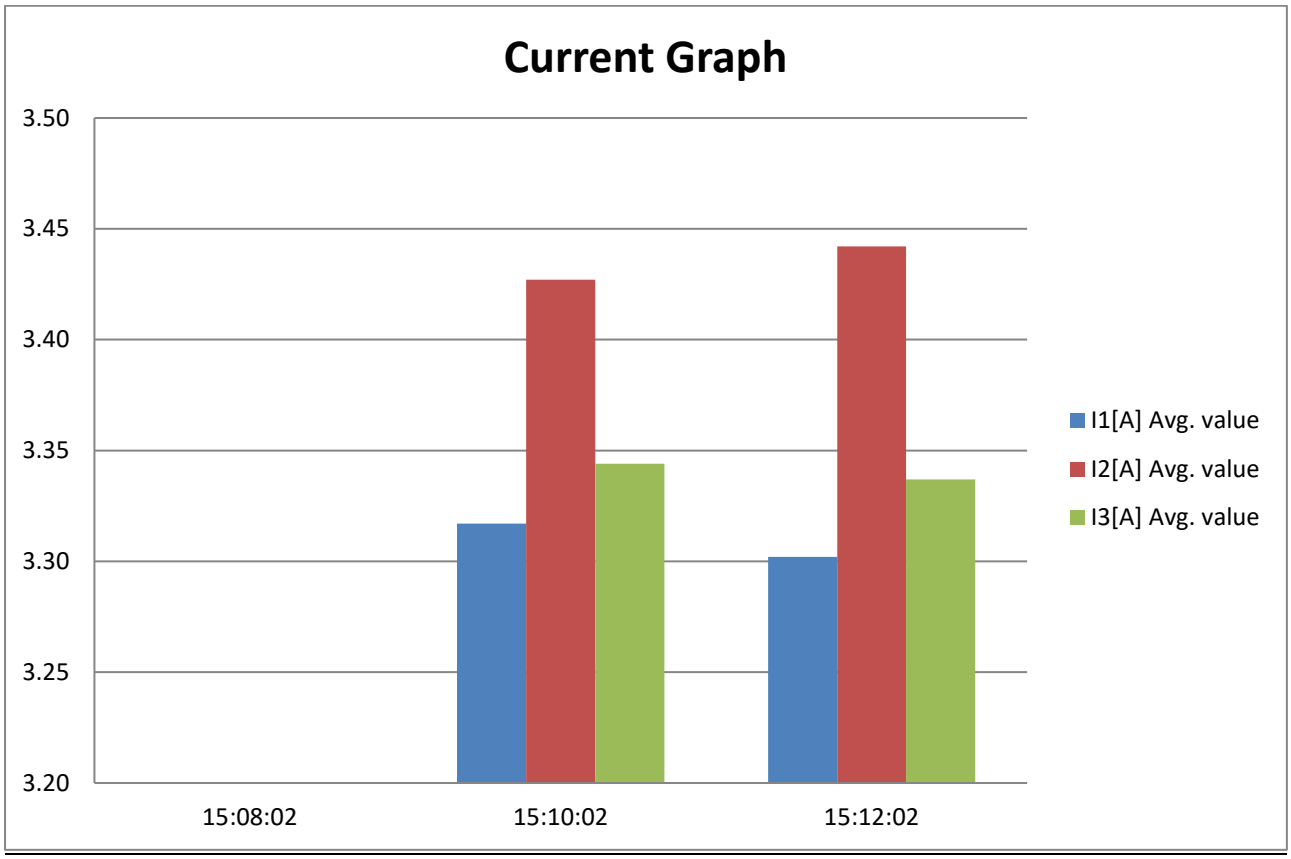
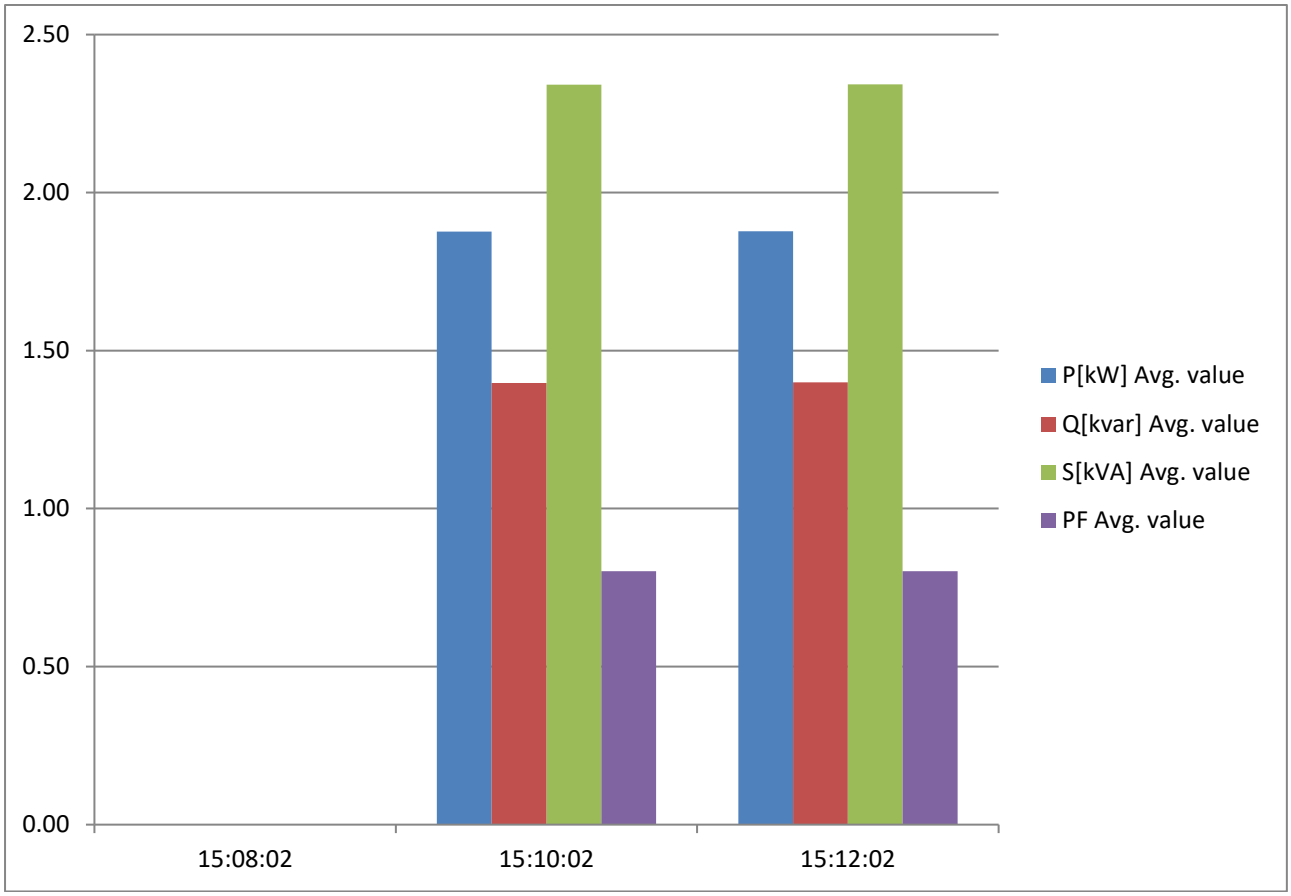
Display period 26/02/2021 15:06:30
Measurement interval 2 Minute
Data interval
Comment
360.00
240.00
120.00
0.00
-120.00
-240.00
-360.00
Voltage [V]
Left axis
U1
U2
U3
1/1

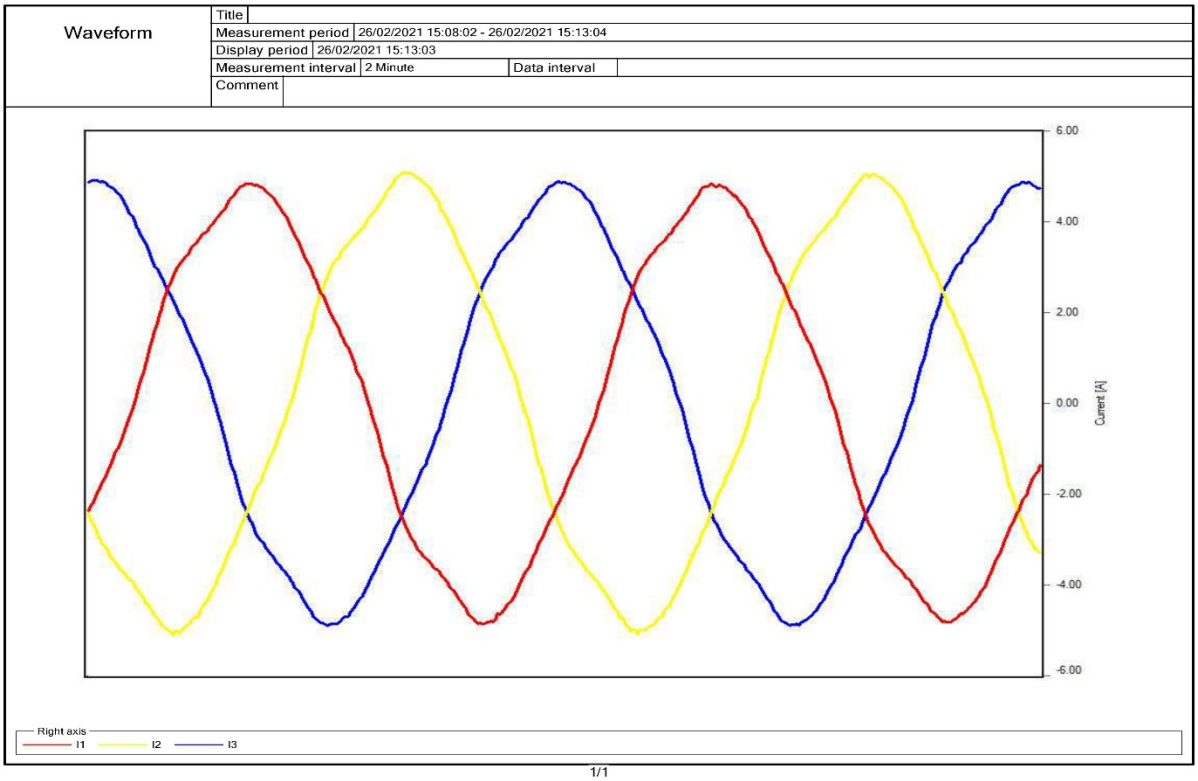
➢ GARDEN PUMP

Date	Time	U1[V] Avg. value	U2[V] Avg. value	U3[V] Avg. value	I1[A] Avg. value	I2[A] Avg. value	I3[A] Avg. value	PF Avg. value	P[kW] Avg. value	Q[kvar] Avg. value	S[kVA] Avg. value	THD-F_U1[%] Avg. value	THD-F_U2[%] Avg. value	THD-F_U3[%] Avg. value	THD-F_I1[%] Avg. value	THD-F_I2[%] Avg. value	THD-F_I3[%] Avg. value
Average value in the period		401	402	403	3.31	3.44	3.34	0.80	1.88	1.40	2.34	3.12	2.89	3.07	4.69	4.59	4.66
Maximum value in the period		402	402	404	3.32	3.44	3.34	0.80	1.88	1.40	2.34	3.15	2.89	3.08	4.73	4.60	4.67
Time of maximum value		**3:12:02 PM**															
Minimum value in the period		401	401	403	3.30	3.43	3.34	0.80	1.88	1.40	2.34	3.08	2.89	3.05	4.65	4.57	4.65
Time of minimum value		**3:10:02 PM**															
26/02/2021	15:08:02																
26/02/2021	15:10:02	401	401	404	3.32	3.43	3.34	0.80	1.88	1.40	2.34	3.08	2.89	3.05	4.65	4.60	4.65
26/02/2021	15:12:02	402	402	403	3.30	3.44	3.34	0.80	1.88	1.40	2.34	3.15	2.89	3.08	4.73	4.57	4.67




Current Graph
3.50
3.45
3.40
3.35
3.30
3.25
3.20
15:08:02
15:10:02
15:12:02
I1[A] Avg. value
I2[A] Avg. value
I3[A] Avg. value


2.50
2.00
1.50
1.00
0.50
0.00
15:08:02
15:10:02
15:12:02
P[kW] Avg. value
Q[kvar] Avg. value
S[kVA] Avg. value
PF Avg. value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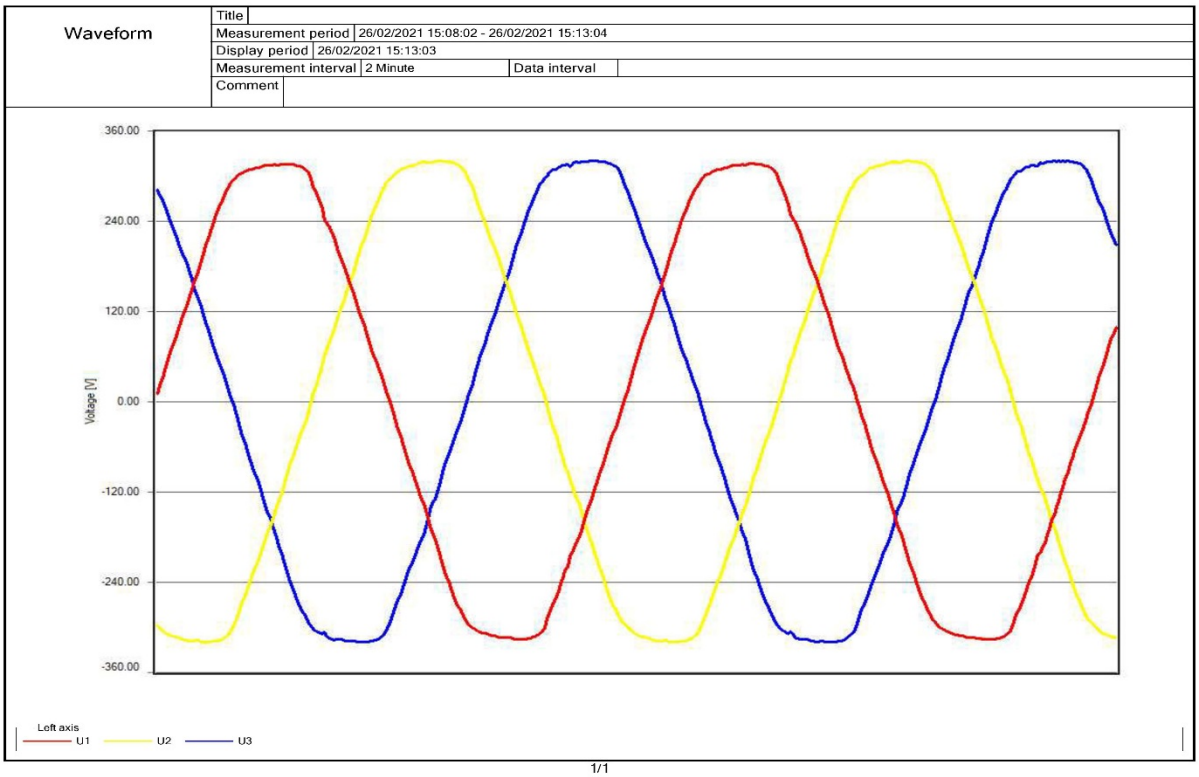
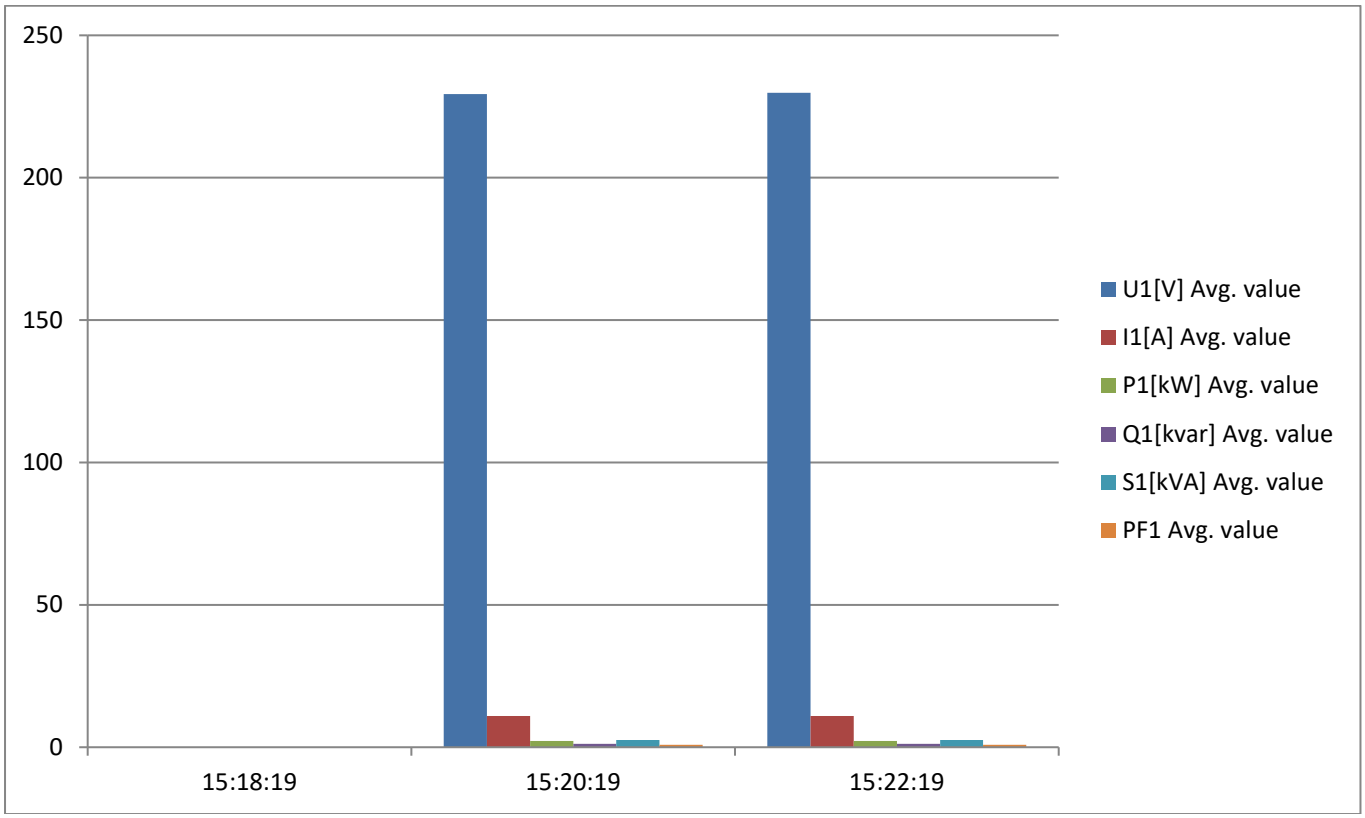
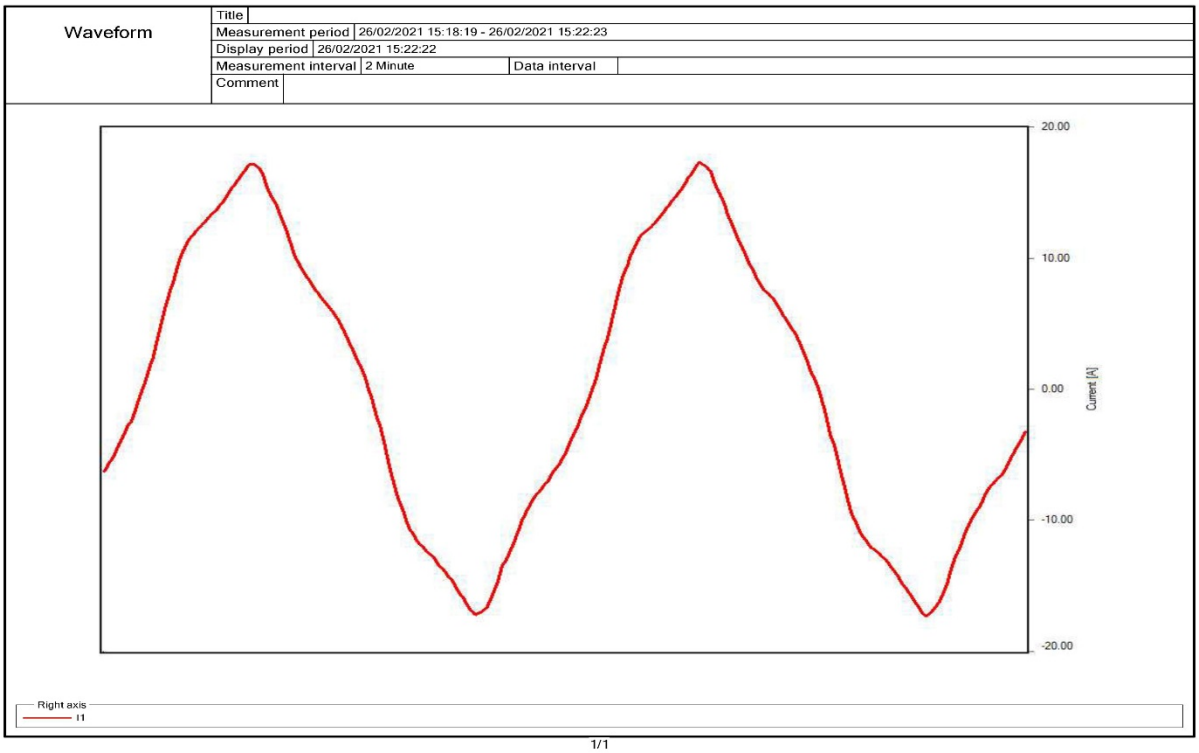
Title
Measurement period 26/02/2021 15:08:02 - 26/02/2021 15:13:04
Display period 26/02/2021 15:13:03
Measurement interval 2 Minute
Data interval
Comment
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
Current [A]
Right axis
I1
I2
I3
1/1

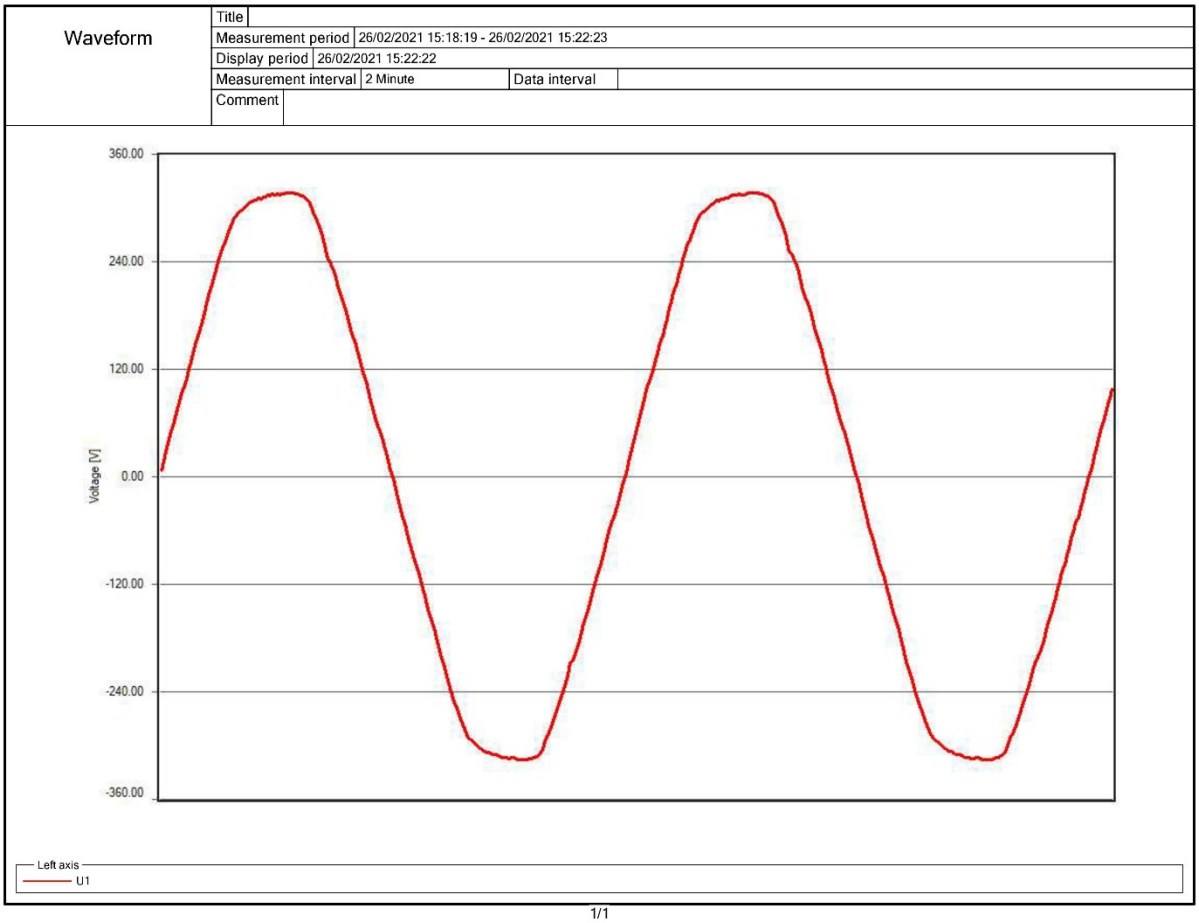

Waveform
Title
Measurement period 26/02/2021 15:08:02 - 26/02/2021 15:13:04
Display period 26/02/2021 15:13:03
Measurement interval 2 Minute
Data interval
Comment
360.00
240.00
120.00
0.00
-120.00
-240.00
-360.00
Voltage [V]
Left axis
U1
U2
U3
1/1

➢ **ROAD PUMP**

Date	Time	U1[V] Avg. value	I1[A] Avg. value	P1[kW] Avg. value	Q1[kvar] Avg. value	S1[kVA] Avg. value	PF1 Avg. value	THD-F_U1[%] Avg. value	THD-F_I1[%] Avg. value
Average value in the period		230	10.99	2.25	1.15	2.52	0.89	2.85	10.47
Maximum value in the period		230	11.01	2.25	1.15	2.53	0.89	2.86	10.51
Time of maximum value		**3:22:19 PM**							
Minimum value in the period		229.34	10.978	2.242	1.146	2.518	0.8904	2.84	10.42
Time of minimum value		**3:20:19 PM**							
26/02/2021	15:18:19								
26/02/2021	15:20:19	229	10.98	2.24	1.15	2.52	0.89	2.86	10.51
26/02/2021	15:22:19	230	11.01	2.25	1.15	2.53	0.89	2.84	10.42




Waveform
Title
Measurement period 26/02/2021 15:18:19 - 26/02/2021 15:22:23
Display period 26/02/2021 15:22:22
Measurement interval 2 Minute
Data interval
Comment
20.00
10.00
0.00
-10.00
-20.00
Current [A]
Right axis
I1
1/1


Waveform
Title
Measurement period 26/02/2021 15:18:19 - 26/02/2021 15:22:23
Display period 26/02/2021 15:22:22
Measurement interval 2 Minute
Data interval
Comment
360.00
240.00
120.00
0.00
-120.00
-240.00
-360.00
Voltage [V]
Left axis
U1
1/1

CSEB Energy Meter Profile

Date: 26.02.2021 Time: 3:00 pm

Phase	Voltage	Current	Active Power	Apparent Power	Reactive Power	Power Factor
	Volt	Ampere	kW	kVA	kVar	
R	403	9.83	2.23	2.28	0.422	0.98
Y	403	10.21	2.61	2.66	0.432	0.98
B	402	12.73	2.93	2.99	0.515	0.98
	403	**10.92**	**7.77**	**7.93**	**1.37**	**0.98**

Bore Well Pump (Garden 3 - Phase)

Date: 26.02.2021 Time: 3:15 pm

Phase	Voltage	Current	Active Power	Apparent Power	Reactive Power	Power Factor
	Volt	Ampere	kW	kVA	kVar	
R	401	3.32	0.621	0.77	0.45	0.81
Y	401	3.44	0.64	0.79	0.471	0.81
B	402	3.34	0.611	0.77	0.48	0.79
	401	**3.37**	**1.87**	**2.33**	**1.40**	**0.80**

Bore Well Pump (Road Pump 1 - Phase)

Date: 26.02.2021 Time: 3:30 pm

Phase	Voltage	Current	Active Power	Apparent Power	Reactive Power	Power Factor
	Volt	Ampere	kW	kVA	kVar	
R	230	11.16	2.27	2.58	1.207	0.88

Bore Well Pump (Garden 3 - Phase)

Date: 26.02.2021

Time: 4:00 pm

Description	UOM	Value
Flow	m^3/hr.	5.74
	Lt./hr.	5740
Velocity	m/sec.	1.73
Energy	kWh	7.77
Energy Cost	Rs. /kwh	9.00
Total Cost	Rs.	69.93
Water Cost	Rs. /Lt.	0.01
	Paisa/Lt.	1.22

Bore Well Pump (Road 1 - Phase)

Date: 26.02.2021

Time: 4:15 pm

Description	UOM	Value
Flow	m^3/hr.	3.71
	Lt./hr.	3710
Velocity	m/sec.	2.93
Energy	kWh	1.87
Energy Cost	Rs. /kwh	9.00
Total Cost	Rs.	16.83
Water Cost	Rs. /Lt.	0.005
	Paisa/Lt.	0.45

Checklist of Electrical & Electronics Equipment's in college

No.	Devices	No.
1.	Number of CFL bulbs	25
2.	Number of Florescent Tube	387
3.	Number of Florescent Tube (T5)	62
4.	Number of LED bulbs	80
5.	Fans	297
6.	ACs	3
7.	Computers& Laptop	45
8.	Refrigerators	3
9.	Water Cooler	4
10.	Water pump 1- phase	1
11.	Water pump 3- phase	1
12.	Photocopier with Scanner	5
13.	Printers	5
14.	LCD projector	6
15.	Television	6
16.	Number of Generators	1
17.	Number of water heaters	4
19.	Labs Equipment for Nursing & Pharmacy (approx.)	135
20.	Smart Class	1

Appliance	Power use (Watt)	Usage per day (Hours)	Number of appliances
Number of CFL bulbs	25	8	25
Number of Florescent Tube	40	8	387
Number of Florescent Tube (T5)	28	8	62
Number of LED bulbs	15	8	80
Fans	60	8	297
ACs	1500	4	3
Computers& Laptop	250	8	45
Refrigerators	350	24	3
Water Cooler	500	8	4
Water pump 1- phase	760	2	1
Water pump 3- phase	1200	2	1
Photocopier with Scanner	75	2	5
Printers	250	2	5
LCD projector	120	During Seminar	6
Television	200	3	6
Inverters (EPBAX)	40	24	1
Water Geysers	2000	During Winter	4
Labs Equipment for Nursing & Pharmacy (approx.)	400	During Practical's	135
Smart Class	60	2	1

The total energy utilization of the college for different purposes was approximately 4652kwh/month during 2019-20 & 1800 kwh/month during April 2020- Dec 2020. Adoption of solar energy system will be a good energy management system for the college.

Average Electricity charges per month was Rs. 43000 during 2019-20 & Rs. 16000 during April 2020-Dec 2020. Energy saving through the replacement of Florescent Tube & T5 Tubelights to LED light may be a good energy management system for the college. Awareness programs for the staff and students to save energy may also increase sustainability in the utilization of various energy source. Although staff are encouraged to switch off their cabin lights, monitors and other equipment, the college administrative staff should switch off the unwanted lights or equipment at the end of every day. All the Florescent Tube & T5 Tube lights should be replaced with LED lights. Some lightings such as the toilets should be controlled by PIR (passive infrared light) sensors. Lighting in the

library should be predominately LEDs.

PERFORMANCE ANALYSIS OF ILLUMINATION

Illumination Survey of MJ College Campus

Date of Audit: - 26.02.2021 to 27.02.2021

Date of Survey: 26.02.2021			
S.no.	**Area**	**Lux**	**Result**
BLOCK- A			
1	Waiting Room	204	Excellent
2	Staff Room	177	Excellent
3	Common Room	133	Excellent
4	Account Room	97	Very Good
5	Exam Control Room	115	Excellent
6	Class Room-I (FF)	124	Excellent
7	Class Room-II (FF)	99	Very Good
8	Class Room-III (FF)	55	Good
9	Library (FF)	189	Excellent
10	LAB-I (FF)	168	Excellent
11	Computer Lab (FF)	73	Good
12	Multipurpose Hall	72	Good
13	Lecture Hall (2nd floor)	103	Excellent
14	Practical Room (2nd floor)	114	Excellent
15	MCH Lab (3rd floor)	86	Very Good
16	Community Health Room	95	Very Good
17	Science Lab	110	Excellent
18	Nutrition Lab	67	Good
19	Nursing Foundation Lab	96	Very Good
BLOCK- B (Girls Hostel)			
1	Room-1	95	Very Good
2	Room-2	98	Very Good
3	Room-3	102	Excellent
4	Room-4	65	Good
BLOCK- C			
1	Class Room-I	111	Excellent
2	Principle Office	98	Very Good
3	Principle Asst. Office	95	Very Good
4	Auditorium	88	Very Good
5	Physiology Lab	115	Excellent
6	Pharmaceutical Lab	81	Very Good

OBSERVATION:

The overall illumination level of the college campus is satisfactory.

ENERGY SAVING POTENTIAL FOR ILLUMINATION

Date of Audit: - 26.02.2021 to 27.02.2021

Existing Fittings	**Watt**	**Qty.**	**Total Watt**
Tube light	40	358	14320
Tubelight-40W T5	40	62	2480
CFL	15	25	375
Total	**80**	**420**	**17175**
Proposed Fittings to be Replaced with LED	**Watt**	**Qty.**	**Total Watt**
Tubelight-40W to LED Tube 18W	18	358	6444
Tubelight-40W T5 to LED Tube 18W	18	62	1116
CFL to LED Tube 18W	18	25	450
Total			**8010**
Energy Consumption Before Replacement	**UOM**		**Value**
Wattage Consumed	Watt		17175
Total Consumption	Kw		17.18
Avg. Operating hours per day	hrs./day		8
Total Energy consumed by Operating the Lights	kWh/day		137.40
Annual Energy consumption by operating the Lights (300 days/year)	kWh/year		50151
Energy Consumption After Replacement			
Wattage Consumed	Watt		8010
Total Consumption	Kw		8.01
Avg. Operating hours per day	hrs./day		12
Total Energy consumed by Operating the Lights	kWh/day		96.12
Annual Energy consumption by operating the Lights (365 days/year)	kWh/year		35084
Energy Saving in Percentage	**%**		**30.04**
Energy Saving After Replacement	**kWh/year**		**15067**
	Lakh kWh/year		**0.15**
Avg. Energy Cost @ 9 Rs. /kWh	**Rs. /year**		**135605**
	Rs. Lakh /year		**1.36**
Estimated Investment Cost of LED Illumanaries	**Approx. Each Price in Rs.**	**Qty.**	**Amount in Rs.**
Tubelight-40W to LED Tube 18W	220	358	78760
Tubelight-40W T5 to LED Tube 18W	220	62	13640
CFL to LED Tube 18W	220	25	5500
Total Investment	**Lakh**		**97900**
	Lakh Rs.		**0.98**
Simple Payback Period	**Years**		**0.72**
	Say Months		**9**

ENERGY SAVING POTENTIAL THROUGH SOLAR WATER HEATER

Date of Audit: - 26.02.2021 to 27.02.2021

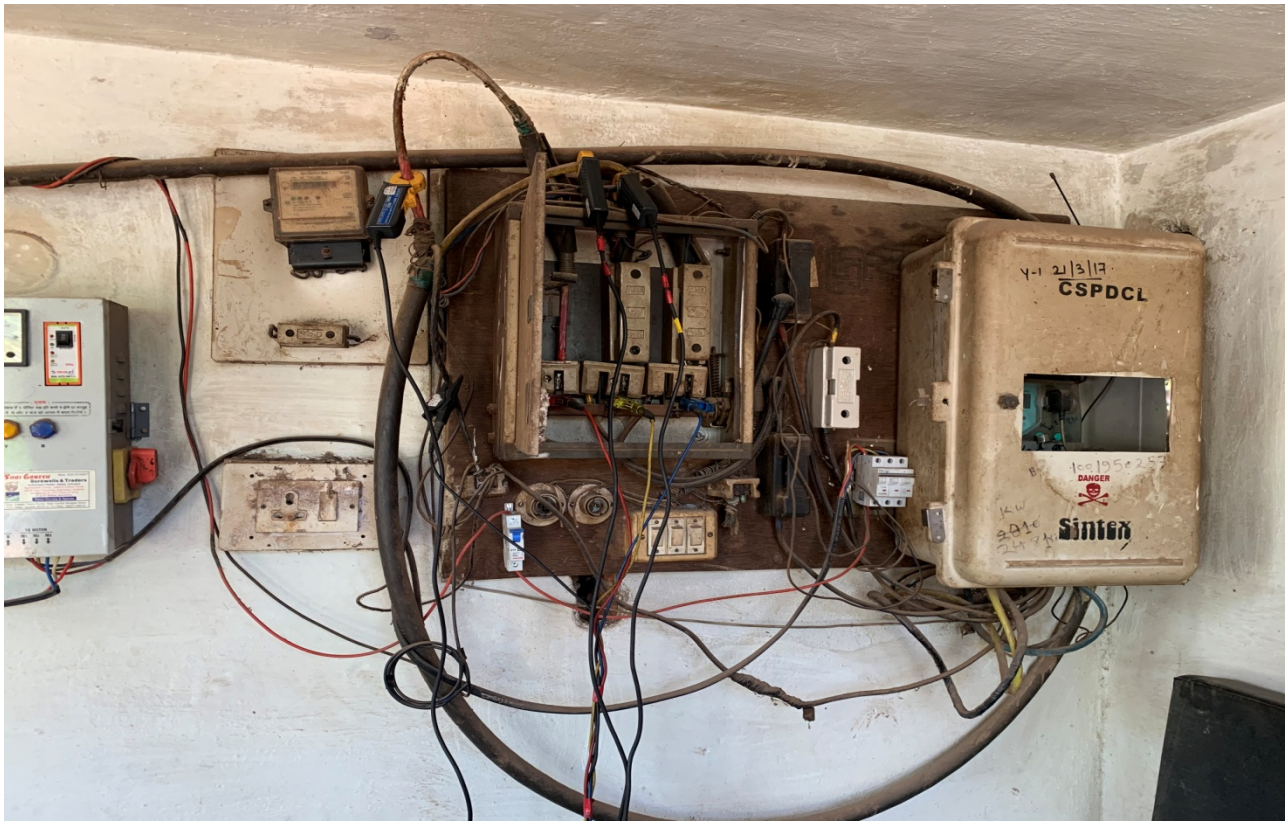
Description	UOM	Value
Number of Geysers installed at girl's hostel (Toilet)	Pics.	2
Geyser capacity	ltr.	20
Each Geyser wattage (at Girls Hostel)	Watt	2000
No. of students staying at girl's hostel	Qty.	90
Liters Consumption of per students	ltr.	10
Total Consumption of hot water	ltr. /day	900
No. of days required	days/year	90
Total Hot Water Consumption	ltr. /year	81000
Total Energy Consumption for hot water	kwh/year	8100
Avg. Energy Cost	Rs. /kwh	9
Total Amount	Rs. /year	72900
	Lakh Rs. /year	**0.73**
Proposed Solar Water Heater		
Solar water heater	Qty.	2
Cap. of each solar water heater	ltr.	20
Estimated cost of each solar water heater	Rs.	35000
Total Estimated investment of solar water heater	Rs.	70000
	Lakh Rs.	0.70
Simple Payback Period	Years	1.04
	Say Months	**12.50**

SAVING POTENTIAL THROUGH INSTALLATION OF SOLAR PLANT

Date of Audit: - 26.02.2021 to 27.02.2021

Description	UOM	Value
Proposed of Solar Plant Installation	KW	10
Avg. generation of solar plant of 1KW	Kwh/day	4
Total generation of solar plant of 10KW	Kwh/day	40
No. of working days	days	360
Total generation of solar plant of 10KW	kwh/year	14400
Estimated cost of Solar plant of 1KW	Rs.	45000
Total Estimated Investment of Solar Plant	Rs.	450000
	Lakh Rs.	**4.50**
Energy & Amount Pattern of CSEB		
Avg. consumption of college (2019-20)	kwh/month	4650
	kwh/Year	55800
Avg. Amount pay to CSEB (2019-20)	Rs. /month	43000
	Rs. /Year	516000
Avg. Energy Cost (CSEB)	Rs. /kwh	9.25
Saving Potential through Solar Plant		
Estimated loading of Energy during day time	%	65.00
Estimated loading of Energy in a year	kwh/year	36270
After installation of Solar Plant Energy usage through CSEB	kwh/year	21870.00
Estimated cost saving due to solar Plant	Rs. /year	133161
	Lakh Rs. /year	1.33
Simple Payback Period	Years	3.38
	Say Months	**40.55**

IMAGE OF CSEB METER PANEL



Observation: -

- Panel wiring to be organized and clamped properly.

Recommendation: -

- Switch fuse unit (SFU) to be replaced with MCCB.

Water Usage

Water cooler with drinking water filtration facility installed	3 water filter
Number of toilets	15
Number of toilet flush's	15
Health faucet's	10
Number of urinals for boys	10
Number of water taps	25
Number of washbasins	20
Water use in hostels (approx.)	2500liters/day
Quantity of water pumped	10,000-11,000 liters/day

Activity	**Water used per activity(liters)**	**Number of times activity done each day**	**Average water used by a person each day(liters)**	**Number of people in the College using water**	**Total house-hold water consumption per day**
Hands & facewash(hostellers)	4– 5liters	2timesaday	10liters	90	900 liters/day
Hands & facewash	0.5– 1liters	2timesaday	1.5liters	800	1200liters/day
Bath(hostellers)	30-40liters	1timesaday	35liters	90	3150liters/day
Toilet flush(hostellers)	2– 4liters	3times	9 liters	100	900liters/day
Toilet flush(Staff)	2– 4liters	1 times a day	6 liters	45	270 liters/day
Toilet(students)	0.4– 0.8liter	2timesaday	1.2liters	800	960 liters/day
Drinking(cup)	0.2– 0.4liter	2timesaday	0.6 Liter	800	480 liters/day
Cooking & Washing dishes(hostel)	-	-	-	-	500liters/day
Garden (m2/once800-1000 Liters in a week during summer)	150 -200liters /day	Twice a day	175	-	350liters/day
Leaking/dripping tap (per minute)	0.280 ml./minute	-	-	-	50liters/day
Total					**9240Liters/day**

Water Audit at M.J College, Bhilai

The water audit was done during the Fourth week of February. The college uses 9240 liters of water every day. The main source of water is ground water.

Leakage should be plugged everywhere and re-treated sewage water should be used for gardening purpose. Sewage treatment plant in hostel, mess and other places should be installed.

Awareness programs for water management will help in water conservation considerably. Water saving devices should be installed in all the toilets. New toilets to be installed with dual flush system. Alternatives including spray taps, can save approx 80% of water and energy used for hand wash. Meter readings should be done on regular basis (e.g. bi-monthly) in order to monitor electricity & water usage. A target should be fixed to reduce the water & electricity consumption.

Quantity of waste generated

- Biodegradable–0.5kg/day(office)
- Nonbiodegradable –0.2kg/day(office)
- Biodegradable–0.1kg/day(labs)
- Non-bio-degradable–0.1kg/day(labs)
- Hazardous waste – 0.5kg/day
- Canteen waste(biodegradable)–6kg/day
- Non-biodegradable–0.5kg/day
    - **Total Bio-degradable waste = 6.6kg/day**
    - **Total Non-bio degradable waste =0.8kg/day**

A. Available Waste management system:

- Number of Garbage collection buckets– 27
- Plastic waste-Burning pit
- For Solid wastes–Paper waste/ paper plates/ food wastes

B. Recommendation for Waste management system:

- The Segregation of dry and wet Garbage
- Installation of Liquid waste treatment system & reuse of gardening purpose
- Separation of Chemical/ Laboratory waste & its proper disposal system
- Compost system for solid waste management
- Sensor based water taps in wash basins & urinals
- Installation of Napkin incinerator

A composting system is required for the treatment of biodegradable waste generated from the canteen, hostels, food left over by students and staff, cleaning waste of college campus. Different methods such as pit composting, vermin composting, bacterial composting using bacterial group.

There should be proper sign boards displayed for awareness of the students for proper disposal methods of recyclables waste, plastic waste and other hazardous & non- hazardous wastes.

Individual safety of the students and staff working in the laboratories will be ensured along with the waste management guidelines. The college should insure to use the safety wears for all the laboratory staff and students. Fire extinguishers system should be installed in college campus specially in sensible areas like laboratory etc.

Greenery in Campus

- Campus tree cover (Approx.) –650Sq. m
- Total list of campus land & trees identified (Approx.)– 70

Consolidation of Green Energy Audit findings

The green energy auditing exercise provide insights on practical way to conserve energy and reduce environmental impacts. Participating in green energy auditing procedure have gained knowledge about the need of sustainability of the college campus. It will create awareness on the use of the Earth's resources at our home, college, local community. All computers purchased by the college have an Energy Star rating, which is beginning to be a standard requirement for computers.

Preparation of Action Plan

An environmental policy should be formulated by the management of the college. The college should conduct the green energy awareness or training programs for students and staff. The green energy auditing report will be a baseline for the action plan to be evolved.

Follow up Action and Plans

Green Energy Audit are exercises which generate considerable quantity of valuable environment and resource 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 organization and action plans and implementation programs based on the audit findings.

CHAPTER5
CONCLUSION AND RECOMMENDATIONS

Green Energy Audit is the most efficient way to identify the strength and weakness of energy and environmentally sustainable practices and to find a way to solve problem. Green Energy Audit is one kind of professional approach towards a responsible way in utilizing energy, economic, financial, social and environmental resources. Green Energy Audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). There is scope for further improvement, particularly in relation to waste, energy and water management. Though the college management has the possible energy & water management system. We are suggesting some more recommendations.

RECOMMENDATIONS:

a). Energy Conservation

i. Replace incandescent lamp and LCD light with LED Lights.
ii. Replace LCD computers with LED Monitors.
iii. Installation of Solar panels to generate electricity.
iv. Installation of Solar water heater for hostel.
v. Establish a policy for purchase of star rated equipments & appliances only.

b). Environmental Conservation

i. The Segregation of dry and wet Garbage
ii. Installation of Liquid waste treatment system & reuse of gardening purpose
iii. Separation of Chemical/ Laboratory waste & its proper disposal system
iv. Compost system for solid waste management
v. Sensor based water taps in wash basins & urinals
vi. Installation of Napkin incinerator
vii. Awareness & training programs on environmental management system and nature
viii. conservation.
ix. Avoid plastic/thermocol plates and cups in the college level or department level functions.
x. Introduce add-on courses eco-friendly income generating to all interested students.

Commitments after Green Energy Auditing

In the light of green energy audit, the College should, adopt some additions in the vision and mission statements promoting compliance with environmental laws and regulations for sustainable existence of the college.

Vision Statement

The college is committed to becoming an innovative leader among academic institutions in the areas of environmental education and research and in the practice of energy and environmental management. The college is obliged to the principle of sustainable development, and will use its resources in a manner that does not compromise the ability of future generations of the college and global community to meet their needs.

Mission Statement

The college is devoted to promote the energy and environment conservation in the college campus and community with the purpose to identify, quantify, describe and prioritize framework of environment sustainability in compliance with the applicable regulations, policies and standards.

CERTIFICATION

This Part shall indicate certification by Accredited Energy Auditor stating that: -

I. The data collection has been carried out diligently and truthfully.

II. All data monitoring devices are in good working condition and have been calibrated or certified by approved agencies authorized and no tampering of such device has occurred

III. All reasonable professional skill, care and diligence had been taken in preparing the energy Audit Report and the contents thereof are a true representation of the facts.

IV. Adequate training provided to personnel involved in daily operation after implementation of recommendation.

V. The Energy Audit has been carried out in accordance with the Bureau of Energy Efficiency (Manner and intervals of time for the conduct of Energy Audit) Regulation,2010

Signature :

Name of the accredited Energy Auditor: M.C. Jain 31/3/2021

Accreditation Detail: (AEA- 030)

Seal