Sustainability Solutions

Certificate

OF SUCCESSFUL COMPLETION OF GREEN AUDIT

awarded to

Institute of Pharmaceutical Education and Research,

Borgaon (Meghe), Wardha, Maharashtra, India

for session 2018-19, 2019-20 and 2020-21

Assessment topics are stated below

1. Organization Level Efforts
2. Creation of Awareness
3. Lighting
4. Cooling and Ventilation
5. Operation of Electronic Equipment's
6. Water Management
7. Water Quality
8. Renewable Energy
9. Transportation
10. Purchasing Practices
11. Energy and Carbon Footprint
12. Waste Management
13. Plantation Details

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Date
2021-06-03

INTEGRATED GREEN AND ENERGY AUDIT

FOR THE ASSESSMENT YEAR 2018-19, 2019-20

AND 2020-21 IN LINE WITH NAAC REQUIREMENTS

Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha

03/06/2021
Version 01

By:
Energy and Green Audit Team,
Sustainability Solutions

From Chairman's Desk

The Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha is managed by the Vidarbha Youth Welfare Society, Amravati. The V. Y. W. Society was established in the year 1965. With the objective to uplift the rural students in academic excellence particularly in the field of Science and Technology.

Our experience taught us that educational institutions have the accountability to sustain the Nation's growth. Our responsibility is not just limited to education; we inculcate principles and values. Human society is in the middle of Environmental, Social, and Economic challenges. The major ones are climate change, the greenhouse effect, polluted air, water, soil, etc. The key question is, "How do we do it?" We apply the principles of Inclusivity, Materiality, and Responsiveness.

Our principles are our constant source of inspiration. As management, we completely understand that sustainable development through higher education will play a pivotal role in building our nation. After graduation or post- graduation, the students become leaders of tomorrow and get dispersed from the world of education into their specific carrier. They take with them the Sustainable practices and approaches as a kit to solve problems. We are developing our student's so that they are prepared to face global challenges and convert them into opportunities. We strive to put forward living examples for our students, society, peers, and other reasonable stakeholders by adopting environmentally friendly steps. We endeavor to hand over the future generation with a cleaner and safer, socially stable, and economically prosperous world.

The audit's purpose was an independent review of the practices followed in our campus w.r.t. the Sustainable Policies. We will take the learnings from this independent review as a "value addition" to promote better environmental performance and continually improve the College Campus and Community. We will adhere to PDCA's proven principles (Plan, Do Check, and Act) to identify, prioritize, allocate resources, initiate action, monitor results, and implement corrective actions to attain Sustainability, encompassing Environmental, Social topics.

I am Thankful to the entire Green Audit Team of IPER (Mr. Swapnil Thanekar, Mrs. Bhakti Thanekar and Mr. Ashish Soni) for taking sincere efforts and hard work for this green audit. We are ascertained that the report will help society, staff, students, and all concerned in the College Campus and will motivate for sustainable and green practices throughout.

Dr. N. R. Dhande
President, V.Y.W.S. Amravati

From Principal's Desk

Colleges have broad impacts on the world around them, both negative and positive. The activities pursued by colleges can create a variety of adverse environmental impacts. But college are also in a unique position as educational institutional to be leaders in pursuing environmentally sustainable solutions. Green Audit is linked to Sustainable development process. Through green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the progress of Green Audit process.

The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, and effects of carbon neutrality, planting of trees, hazardous waste management and E- waste management. Finally, green audit is a requirement of NAAC assessment to the Colleges and Universities. It is necessary to conduct green audit in college campus because students have to be aware of the green audit, its advantages to save the planet and thereby get motivated to become good citizens of the country. Green audit and sustainable development process help to reduce wastage and associated cost as well as increase the product quality. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more relevant.

Green audit can be useful tool for a college to determine how and where they are using most of energy, water or other sources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of the impact of green methods on campus. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. All across the world, colleges and universities are looking to a sustainable future by working to become carbon neutral. Universities are taking responsibility for their environmental impact and are working to neutralize those effects. To become carbon neutral, universities are working to reduce their emissions of greenhouse gases, reduce their use of energy, use more renewable energy, and emphasize the importance of sustainable energy sources.

I am thankful to the entire Green Audit team of IPER (Mr. Swapnil Thanekar, Mrs. Bhakti Thanekar, and Mr. Ashish Soni) and team of college NSS unit for taking sincere efforts and hard work for this green audit. We are ascertained that the report will help society, staff, students, and all concerned in the College Campus and will motivate for sustainable and green practices throughout.

I. P. E. R. WARDHA

Dr. R. O. Ganjiwale
Principal IPER, Wardha

Acknowledgement

Green Audit Assessment Team thanks the management of Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha for assigning this important work of Green Audit. We appreciate the cooperation of our Team for completion of study. Our special thanks to:

Chairman – Dr. Nitin R. Dhande

Principal – Dr. Rajendra O. Ganjiwale

IQAC Coordinator – Dr. Lalit G. Rathi

Professor – Dr. Shagufta A. Khan

Asst. Professor – Mr. Girish D. Dahikar

Asst. Professor – Dr. Nilesh A. Karande

Asst. Professor – Mr. Sunil P. Dewani

Asst. Professor – Mr. Ashish B. Budhrani

Associate Professor – Dr. Manisha P. Puranik

Librarian – Mrs. Anita A. Karlekar

Assistant Librarian – Mrs. Mrunal Y. Ghogare

Computer Operator – Mr. Anant W. Bhaik

Laboratory Technician – Mr. Prashant B. Ankar

Laboratory Technician – Mr. Vijay M. Dahiwalkar

Store In charge – Mr. Chandrashekhar S. Chaudhary

All the members of College Development Committee, Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha. Team of students as stated under Annexure-I

For giving us necessary inputs to carry out this very vital exercise of Green Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

Profile of Audit Team Members and Independent Reviewers

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Certified Energy Auditor, M. Tech (Heat & Power Engineering), Expert Global Reporting Initiative, GHG Expert

Ms. Bhakti Thanekar

Certified Energy Auditor, B. Tech (Chemical Engineering), Principal Consultant - Energy and Safety

Mr. Ashish Soni

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Mr. Ajinkya Anjikar

M. Tech, Chemical Engineering, IIT Hyderabad (Observer, Reviewer)

Mr. Sushant Deshkar

Electrical Engineer, Assessment Team Member

DISCLAIMER

Green Audit Team has prepared this report for Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha based on input data submitted by the representatives of College and after having complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the calculations are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any director consequential loss arising from any use of the information, statements or forecasts in the report.

Technical Review by:
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Scope of Work

Topics to be covered as part of the assessment are:

✓ Solar Passive Architecture

- How the buildings are constructed to utilize the solar energy efficiently. This includes use of day light as lighting source and avoidance of GHG intensive technology example AC as source of cooling due to solar heat gains.

✓ Implementation of measures to reduce wastage of energy

- This includes effective and objective evidences to create awareness towards wastage of electric energy. Hoardings, placards, messages, posters etc. planted at key locations in college, hostels and cafeterias. PCRA (Petroleum Conservation Research Association, Govt. of India) and BEE (Bureau of Energy Efficiency) posters are exhibited.
- It can also be extended to include papers presented by the students on avoidance of electricity at college or day to day life.
- Appointment of joint committees of teachers and students to save electricity
- Controlling of Power Factor by installation of APFC and getting rebate (up to 5% or MSEDCL norms) from MSEDCL for maintaining unity Power factor

✓ Energy Efficient Procurement

- This includes evaluation of energy efficient procurement practices. This does not exactly mean that you need to buy the most efficient, but you need to buy the most efficient which is financially viable. Example AC with efficiency star ratings, Transformer etc.
- Replacement of lighting sources to CFL or LED
- Replacement of Copper Ballast with Electronic Ballast
- Centralized controls of lighting, auditorium etc. to avoid any misuse of electricity
- Procurement of LED monitors to phase-out CRT Monitors
- Shift to paperless regime wherever not required, example attendance muster replaced by biometrics, DG logbook replaced by computerized logbook, daily reports converted from paper to paperless, HoD meetings converted to paperless formats, and all such examples.
- Installation of Solar panels, Power Purchase Agreements with Solar Power Plant owners to buy environmentally friendly energy Source etc.
- Documentary evidences as feasible to calculate the above impacts and finally into the value of avoidance of tCO_2 emitted to atmosphere.

✓ Rain Water Harvesting

- This includes Calculation of Catchment Area (Terrace and Ground) and evaluating rough amount of water that is recharged into the water recharge pits if applicable.

✓ Hazardous Waste Management and E-Waste Management

- There are various wastes that are generated within the organization. The report will give the list of the procedures for waste handling.

✓ Duration of the Green Audit

- The Green audit field observations data collection was carried from 1st March 2021 to 3rd June 2021 for the session 2018-2019, 2019-2020, 2020-2021. The submitted data was monitored by the college throughout the year and assessed by Assessment Team during the visit.

Scorecard

NAAC Criteria Key Indicator - 7.1 Institutional Values and Social Responsibilities	
Environmental Consciousness and Sustainability	Audit Team Assessment
The Institution has facilities for alternate sources of energy and energy conservation measures 1. Solar energy ✓ 2. Biogas plant 3. Wheeling to the Grid 4. Sensor-based energy conservation ✓ 5. Use of LED bulbs/ power efficient equipment ✓ Options: A. 4 or All of the above B. Any 3 of the above ✓ C. Any 2 of the above D. Any 1 of the above E. None of the above	Installation of 10 kW Solar PV System is under process. - Annexure –V: Lighting Survey 2020 – 21 Annexure –XI: Solar Passive Structure
Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words) 1. Solid waste management ✓ 2. Liquid waste management ✓ 3. Biomedical waste management 4. E-waste management ✓ 5. Waste recycling system 6. Hazardous chemicals and radioactive waste management *NA*	Refer chapter 12 and Annexure –XIII: Waste Management
Water conservation facilities available in the Institution: 1. Rain water harvesting ✓ 2. Bore well / Open well recharge ✓ 3. Construction of tanks and bunds 4. Waste water recycling NA 5. Maintenance of water bodies and distribution system in the campus NA	Refer chapter 06 and Annexure –XII: Water Management
Green campus initiatives include 7.1.5.1. The institutional initiatives for greening the	

campus are as follows: 1. Restricted entry of automobiles 2. Use of Bicycles/ Battery powered vehicles 3. Pedestrian Friendly pathways ✓ 4. Ban on use of Plastic ✓ 5. Landscaping with trees and plants ✓ Options: A. Any 4 or All of the above B. Any 3 of the above ✓ C. Any 2 of the above D. Any 1 of the above E. None of the above	Annexure –XIII: Waste Management SOP: Green Initiatives by College Chapter 13 and Annexure –XIII: Waste Management
Quality audits on environment and energy are regularly undertaken by the institution 7.1.6.1. The institutional environment and energy initiatives are confirmed through the following 1. Green audit ✓ 2. Energy audit ✓ 3. Environment audit ✓ 4. Clean and green campus recognitions/awards 5. Beyond the campus environmental promotional activities ✓ Options: A. Any 4 or all of the above ✓ B. Any 3 of the above C. Any 2 of the above D. Any 1 of the above E. None of the above	Covered as part of this report. Please refer the contents of this report Covered as part of this report under Chapter -11 and Annexure –XVI Covered as part of this report. Please refer the contents of this report Please refer Annexure – XIV: List of Awareness Program Undertaken by College

Integrated Energy and Green Audit: Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha.

Clean Campus[1]

Sr. No.	Aspect	Reference
1.	Cleanliness in and around the campus and waste minimization	➢ Chapter No. 1 & Annexure No. IV ➢ Chapter No. 1 & Annexure No. XIV
2.	Water conservation and management including ➢ Waste water management and reuse ➢ Rain water harvesting, etc	➢ Chapter No. 12 & Annexure No. XII ➢ Chapter No. 6 & Annexure No. XII
3.	Environment-friendly activities adopted and practiced by the campus	➢ Chapter No. 1 & Annexure No. IV ➢ Chapter No. 1 & Annexure No. XIV
4.	Greenery within the campus to provide pollution free air and carbon-sink	➢ Chapter No. 13 & Annexure No. XIV

Smart Campus[2]

Sr. No.	Aspect	Reference
1.	Impact of deployment of digital technology in order for the students, faculty and management in the campus to reduce consumption of natural resources (such as paper, gas, energy etc).	➢ Digital library ➢ Digital attendance ➢ Digital Meetings ➢ Digital notes ➢ Digital papers ➢ Online conferences and classes ➢ Efficient electronic equipment's like LED screens, LCD projectors, Printers, Xerox machine, Fax machine ➢ Procurement of energy efficient equipment ➢ Solar unit
2.	Alignment of the latest digital trends like IoT, Big Data and Cloud Networking to achieve various aspects of sustainability in the campus, specifically to contribute to United Nations SDGs	Our college uses Google forms, Google classroom, Cisco WebEx (https://iperelearn.tech/), Zoom app for

[1] http://www.aicte-india.org/csc2019
[2] http://www.aicte-india.org/csc2019

		online classes. This helps us to share data/ links to all students within fraction of second and result will be prepared in less time duration which saves our time, man power and paper work. In this Pandemic situation, we are conducting online classes through Google meet, Cisco WebEx (https://iperelearn.tech/), Zoom app. Through Google drive, Cisco WebEx (https://iperelearn.tech/) we can give access to limited students of particular class only. We provide the notes of different theory subject and practical's to the students on Google classroom, Cisco WebEx (https://iperelearn.tech/) and WhatsApp's group These technologies help us to shares the data in short duration of time to all students and also help in saving papers. ➢ Installation of smart photo sensor to regulate the night lighting ➢ Digital notes ➢ LAN is used for Admission process, data entry, accounting and all administration process
3.	Create an ecosystem to 'smartly' connect and share the information with each other at campus, institute and national level. Any international level connect will provide a distinct advantage. The smart connects, though the cloud networking, so established should address concerns of environmental challenges including contribution to United Nations Sustainable Development Goals.	To share the data among all the Teachers and students, we are using Google, Cisco WebEx (https://iperelearn.tech/). Google Drive is a file storage and synchronization service developed by Google for sharing of information to all users or to specific users. Google drive and WhatsApp helps to share Notes/ Notices/ University important notices by single click to specific group of students/ to all students/ to the teachers. We are sharing notes to the students in the form of PDF or in DOC format which

		ever possible in their Google class, Cisco WebEx meeting. College had organized webinars, online parents meet, online alumni meet, during COVID lock down. We had connected peoples (Guest, Speakers and participants) from all over the India in one platform. We had taken online feedback from parents, students regarding curriculum completion and from alumni regarding progress of the institution. This platform is helpful not only to connect the peoples but also it is useful in sharing the needful information and, also saves paper and with less use of man power. We had collected all data in soft format. Our faculty members had online attended National conferences during lock down period.

Contents

List of Annexure

Abbreviations

AHU	Air Handling Unit
CFL	Compact Fluorescent Lamp
COP	Coefficient Of Performance
DG	Diesel Generator
ECRM	Energy Consumption Reduction Method
HVAC	Heating, Ventilation, And Air Conditioning
ISO	International Standardization Organization
ITHD	Current Voltage Total Harmonic Distortion
km	Kilometer
kV	Kilo Volt
kW	Kilo Watts
Lab	Laboratory
LED	Light-Emitting Diode
MNRE	Ministry of New and Renewable Energy
MSEDCL	Maharashtra State Electricity Distribution Co. Ltd.
MEDA	Maharashtra Energy Development Agency (MEDA)
TR	Tons of Refrigeration
VTHD	Voltage Total Harmonic Distortion
MSRTC	Maharashtra State Road Transport Corporation

Reference list of Websites

Sr. No.	Websites
1	IEEE 519 - http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=2227
2	http://mnre.gov.in/solar-energy/ch2.pdf
3	BEE - http://www.beeindia.in/
4	ECBC - http://beeindia.in/content.php?page=schemes/schemes.php?id=3
5	http://www.energymanagertraining.com/new_index.php
6	http://www.usailighting.com/stuff/contentmgr/files/1/92ffeb328de0f4878257999e7d46d6e4/misc/lighting_comparison_chart.pdf
7	https://www.bijlibachao.com/lights/use-energy-efficient-lights.html
8	http://www.imd.gov.in/section/climate/climateimp.pdf
9	http://www.bijlibachao.com/air-conditioners/air-conditioner-selection-understand-tonnage-eer-cop-and-star-rating.html
10	http://www.thehindubusinessline.com/opinion/time-to-focus-on-more-crop-per-drop/article9778971.ece
11	http://cgwb.gov.in/District_Profile/Maharashtra/Wardha.pdf
12	http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Roof%20Top%20Rain water%20Harvesting_Presentation_2006.pdf
13	http://www.imd.gov.in/section/climate/climateimp.pdf
14	http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf
15	http://cdm.unfccc.int/
16	http://database.v-c-s.org/
17	https://www.iperwardha.com/
18	https://www.mahadiscom.in/
19	https://www.mahaurja.com/meda/
20	https://offset.climateneutralnow.org/vchistory/details?orderId=15798

Introduction of the College

The IPER, Wardha is managed by the Vidarbha Youth Welfare Society, Amravati. The V. Y. W. Society was established in the year 1965, with the objective to uplift the rural students in academic excellence particularly in the field of Science and Technology. The society runs 70 Institutions from pre – primary to post – graduate level covering various faculties like Arts, Commerce, Science, Social Sciences, Engineering, Dental and Pharmaceutical Sciences.

The Institute of Pharmaceutical Education and Research (IPER), a pioneering Pharmacy Institution in Vidarbha region of Maharashtra, was established in 1991. The Institute provides Education leading to Degree, Post Graduate and Ph. D program in Pharmaceutical Sciences. Around 400 students from all corners of India are studying in the Institute. A beautiful and attractive campus of IPER is stretched in an area of 5 acres. Well-equipped laboratories, rich library, qualified and experienced staff and high academic standards have made IPER as one of the Premier Pharmaceutical Institutions in Maharashtra and India.

The Institute is approved and accredited:

- All India Council for Technical Education, New Delhi (AICTE).
- Pharmacy Council of India, New Delhi (PCI).
- National Board of Accreditation, New Delhi (NBA).
- Government of Maharashtra, Mumbai (GOM).
- Permanently affiliated to R. T. M. Nagpur University, Nagpur (RTMNU).
- Accredited by National Assessment and Accreditation Council, Bangalore (NAAC) with Grade “A”.

Objective of Green Audit

The Green Audit Team focused on Material[3] Issues pertaining to college which have the highest influence on the Green Attributes of the College. To evaluate steps taken by college management towards green campus below material issues are discussed chapter wise:

1. Organization Level Efforts
2. Creation of Awareness
3. Lighting
4. Cooling and Ventilation
5. Operation of Electronic Equipment's
6. Water Management
7. Water Quality
8. Renewable Energy
9. Transportation
10. Purchasing Practices
11. Carbon Footprint
12. Waste Management
13. Plantation Details

Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader.

[3] Definition: as per Global Reporting Initiative: **GRI 101:** FOUNDATION2016
An organization is faced with a wide range of topics on which it can report. Relevant topics, which potentially merit inclusion in the report, are those that can reasonably be considered important for reflecting the organization's economic, environmental, and social impacts, or influencing the decisions of stakeholders. In this context, 'impact' refers to the effect an organization has on the economy, the environment, and/or society (positive or negative). A topic can be relevant – and so potentially material – based on only one of these dimensions.

1. Organizational Level Efforts

Is the college having campus green team?	Yes, the Green Campus Committee is already in place. This committee is highly active and meets twice in a year.
If yes, who are the stakeholders?	Yes, it included stakeholders. The stakeholders include ➢ Management ➢ Teaching Faculty ➢ Students ➢ Lab Technician ➢ Computer Operator The Green Campus Committee is shared with the Audit Team. Refer Annexure III.
Does it meet regularly?	The Team meets once in a semester. This was confirmed during site visit interviews and the review of the minutes of meeting.
Can the Green Campus Team suggest new environmental initiatives to College Management?	Suggestions on improvement of environmental performance are always welcomed by College Management. Rain water harvestings, tree plantation at various locations around the college etc. was also discussed as part of brain storming sessions within the meetings. These discussions were converted into live projects by the college management. The annexure to this report captures the live projects of the college.
Has the college established an environmental mission/vision for its campus?	The Management of College is persistent and resolved to make the campus eco-friendlier in due course of time. Various efforts are already initiated towards implementation sustainable initiatives, application of efficient technologies to save energy, plantation etc. There is no separate environmental mission / vision.
Is the college encouraging sustainable behaviour via: o education campaigns? o Posters, placards, messages o incentives? o contests? o awards?	College conducts various activities to create awareness amongst the students and society on environment safety and protection. College has established 'Green Campus Committee' which has conducted various Environmentally Friendly Activities / Trainings for college: ➢ Yoga Day was celebrated at IPER on 21st June 2018 in which 218 students participated. ➢ Tree Plantation Drive was organized at IPER on 16th July 2018 in which 120 students participated. ➢ Poster competition on "Awareness on Scrub Typhus" was organized at IPER on 25th September 2018. ➢ Blood Donation Camp was organized at IPER on 1st January 2019 in which 55 students donated blood.

	➢ Yoga Day was celebrated at IPER on 21st June 2019 in which 225 students participated. ➢ Tree Plantation was organized at IPER on 11th July 2019 in which 100 students participated. ➢ Blood Donation Camp was organized at IPER on 1st January 2020 in which 35 students participated. ➢ Health Check-up camp was organized at IPER on 11th March 2020 in which 240 students participated. ➢ Tree Plantation Drive was organized at IPER on 12th July 2020 in which 100 students participated. ➢ Blood Donation Camp was organized at IPER on 1st January 2021 in which 50 students participated. ➢ National Safety Day was observed at IPER from 4th March 2021. Please refer Annexure IV for details. Community Based Initiative's by college: ➢ Swachata Janjagaran Rally & Samuhik Shapath under Swachha Bharat Abhiyan was organized with collaboration of Wardha Nagar Parishad in September – October 2018. ➢ Awareness campaign on COVID -19 was organized by IPER from 18th March 2020 till date for the society in which 100 students are taking active part. ➢ Virtual Yoga Day was celebrated as "Yoga @ Home and Yoga with Family" on 21st June 2020 in which 220 students participated. Please refer Annexure XIV for details.
Is the college staff modelling sustainable behaviour for students, peers, and community?	During interviews it was confirmed that there are 50 staff members in the college, out of which: **Teaching & Non-Teaching:** ➢ 90% staff of the college commute by their own 2-wheeler. ➢ 10% staff of the college travel by their own 4-wheeler. Please refer above assessments for additional details
Do students model sustainable behaviour for staff, peers, and community?	Total 362 students are enrolled for 2019-20 session Approximately: ➢ 60% students of the college commute by their college own 2-wheeler & sharing basis. ➢ 30% students reside in hostel within the college campus. ➢ 8% students of the college commute by walking.

	➢ 2% students of the college commute by public transport (State Transport). Please refer above assessments for additional details Students participate in activities conducted by college on environment and sustainable development. In addition, please refer above assessments.
Is the college sharing learning internally via o Posters, placards, messages? o assemblies? o classroom presentations? o training/professional development? o posters/bulletin boards? o newsletter? o website?	Data is shared via posters, placards and messages. The assessment team is appraised that the awareness poster includes topics related to minimization of energy usage by avoiding wastage, improvements on energy efficiency, minimization of water wastages, proper disposal of wastes. Please refer Annexure XIII for details.
Does the college offer energy conservation lessons?	Yes, College organizes lectures and motivates students for Energy and Environment conservation.
Is the college sharing its learning externally via o Paper presentations? o newsletter? o website?	The students are encouraged to present projects on topic related to environmental aspects. College is extensively engaged in the research work. The college is also going to make the Green Audit Report public so that learning's of college are shared.
Further Scope of Improvement: ➢ **At organization level, the college needs to establish long term improvement objectives to further reduce energy consumption, water consumption and reflect the same in form of dedicated Environment Policy.**	
Conclusion: ➢ **Active involvement of Organization is observed.** ➢ **Adequate awareness amongst the students and other stakeholders (faculty, other staffs, service providers, etc.) is observed and reflected from their behavior.** ➢ **Responsible Step taken by offsetting Green Gases by purchase of credits. Please refer chapter 11 and annexure XV.**	

2. Creation of Awareness

Are the objectives of green audit clearly understood by the institute	Yes To spread awareness amongst the students and the surrounding community about the environmental impact due to operations associated with their teaching institution. ➢ To sensitize them how to address the situation at the local and personal level by conducting programs, camps and other means as feasible ➢ To reduce the negative environmental footprint on the environment ➢ To explore possibilities to use renewable energy sources to avoid GHG emissions and also reduce power cost ➢ To introduce renewable energy and to continuously improve its share in total energy mix ➢ To continue the use of efficient LED based lighting ➢ To introduce the automatic controls on the lighting systems ➢ To mitigate the carbon emission ➢ To increase the green cover ➢ To vigorously and responsibly position the institute for active contribution in Clean India Mission undertaken by the Governments. ➢ To identify ways and means to sustainably contribute and reduce gaps and become environment friendly ➢ To support community to combat various environmental and social issues as feasible.
Are there posters/guidance displayed to remind students and staff of good practices?	Yes
Are the students aware of energy sources?	The major source of energy is electricity (grid electricity) followed by usage of diesel in the DG as back in case of failure of grid electricity. Students are aware of these sources of energy which are utilized by the college.
Is college tracking its electrical energy usage?	There is a single meter, which measures the electricity imported by the college. The readings of electricity consumption are included as part of this report under chapter 11.
Is college offering energy conservation lessons and programs?	➢ College has created awareness among the faculty and students to reduce energy wastage. ➢ The college has appropriately disabled the screen savers and programmed the computers for sleep mode operations. ➢ The usage policy of photocopiers, fax machines and other equipment users is "POWER ON" when in use and "POWER OFF" when not in use. There is no idle power consumption.

	Please refer Annexure V and VI for details.
Do students and staff know where their water comes from?	The source of water is well & bore well. Well & bore well water is utilized for drinking (after purification), in the wash rooms and for cleaning purpose.
Is college encouraging responsible water use via: o posters, placards? o incentives? o contests? o awards?	Yes, by posters, placards, contests and winner of contest are awarded.
How is trash managed outside the campus?	The waste is given to the Municipal Corporation for disposal.

Further Scope of Improvement

- **College may calculate the water footprint to compare its performance with national and international consumption standards and communicate with its stakeholders.**

Conclusion

- **Visible communication on environmental issues.**
- **Effective use of notice boards and signs.**
- **Water footprint may be calculated in future.**
- **College is installing 10kW Solar PV system.**

3. Lighting

How college is utilizing daylight?	The college building is situated in such a manner that it is getting the full advantage of good airflow enabling good ventilation and sun light. It is a building having large windows and open space in all directions. During the day time, it is possible to carry out activities without air conditioners and air fans during operational days.
Is college utilizing any incandescent lights? Can they be replaced with compact fluorescents (energy saving bulbs)?	The college timings are from 9:30 AM to 5:30 PM. Thus, requirement of daytime lighting (powered by electricity) is limited. Energy efficient lighting system is followed. the contemporary best practices will recommendations on lighting by Bureau of Energy Efficiency, Book-3, Chapter 8, table 8.1

Table 8.1 Luminous Performance Characteristics of Commonly Used L

Type of Lamp	Lumens / Watt		Colour Rendering Index	Typical Application
	Range	Avg.		
Incandescent	8-18	14	Excellent (100)	Homes, restaurants, general lighting, emergency lighting
Fluorescent lamps	46-60	50	Good w.r.t coating (67-77)	Offices, shops, hospitals, homes
Compact fluorescent lamps (CFL)	40-70	60	Very good (85)	Hotels, shops, homes, offices
High pressure mercury (HPMV)	44-57	50	Fair (45)	General lighting in factories, garages, car parking, flood lighting
LED lamps	30-50	40	Good (70)	Reading lights, desk lamps, night lights, spotlights, security lights, signage lighting, etc.

	Thus, LED's are considered for installation as night lights, security street lights by the college. The term reading light[4] normally refers to lamps or lights which focus light dedicated for readings, thus LEDs were not considered for class room lightings initially. Fluorescent lamps were utilized for class rooms (as the same are stated to be suitable for office illumination level requirements). LED lights started replacing the conventional tube light as a replacement measure after failure. LED lighting survey was also undertaken by the Audit Team. Please refer below assessments in details. During the onsite visit the Audit Team visited each department and physically counted the installed lights by their types (Fluorescent tube lamp, CFL and LED). It is confirmed that there is no incandescent light installed for lighting purpose. As per the published article: http://www.usailighting.com/stuff/contentmgr/files/1/92ffeb328de0f4878257999e7d46d6e4/misc/lighting_comparison_chart.pdf LED light has lumen/ watt in the range of 80-100 whereas CFL has lumen/ watt in the range of 70-90
Has the college evaluated existing lighting for opportunities to reduce lighting in over-lit areas?	The lighting arrangements are well balanced with arrangements to switch ON and OFF lights independently. There are therefore practically no over lit areas.
Are the light switched duly labelled to make more obvious which switches relate to which appliances?	Switch arrangements are lucid. The fan switches are adjacent to fan speed regulators. Light switches are arranged in order of lighting. The buttons are marked.
Are the lights switched off to make use of daylight? (e.g. lights parallel to windows or in corridors)	There is minimum or practically negligible use of lights during day time as the building structure has possibility of daylight usage. The lux level in the classrooms was measured and found above 250. On the outcast days some places register lower lux level. The locations were pinned and college management confirmed to take subsequent corrective actions.
Is the college utilizing natural lighting when possible?	Yes, natural lighting is first preference.
For the spaces like store rooms, toilets, kitchen areas, copying rooms, corridors etc is there scope for automatic lighting controls?	The college avails the sensor-based lighting arrangements to control the night illumination. The lighting sensors automatically switch on and switch off lights depending on the lux levels. **Recommendation:** **The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements.**
Can main lighting ever be switched off and dedicated lighting be used?	As such there are no dedicated lamps which can replace overhead lighting. However, redundant lighting can be switched off when it is not required.
Are the light fittings clean?	The staff is responsible for day to day cleaning was interviewed during onsite visit. Cleanliness is well maintained. In-house light fittings are cleaned regularly some

[4] https://www.collinsdictionary.com/dictionary/english/reading-light

	light fittings need cleaning. However, the installed fittings were not cleaned as Covid-19 Pandemic caused shortage of staff.
Do windows and skylights need cleaning to allow in more natural light?	The window and skylight were not clean as Covid-19 Pandemic caused shortage of staff.
Has the college installed lighting occupancy sensors?	No, lights are negligibly operated during day time. The lights are operated manually. The night lights are however operated based on the sensors which operate lights based on the illumination levels.
Is there mechanism in place to immediately report inoperable occupancy light sensors?	Yes, in case of failure of the existing sensor, the night lights will not operate.
What is the % contribution of the LED lighting?	We have evaluated the % LED installation at Passage and ground and all other floor. The value is determined and presented under Annexure V.
Further Scope of Improvement ➢ **The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements.**	
Conclusion ➢ **The students and employees were interviewed and no complains was identified within respect to the sufficiency of lighting measures.** ➢ **Sufficient lux levels above 250 are common in class rooms and work-stations based on the survey of audit team.** ➢ **Negligible lighting load is observed during day time as college makes good use of daylight.**	

4. Cooling and Ventilation

How are the Air Conditioning Controls? For the local controls, how it is ensured that AC is working only ON when necessary. What is temperature setting of the AC?	The AC usage is very high as the temperature in Wardha district is (Max temperature is above 42°C[5]) hottest day in Wardha was registered with temperature of 47.3[60]C). The AC temperature is set at 28°C. Awareness is created and measures are implemented in line with the recommendations of Ministry of Power (https://www.cseindia.org/a-step-in-the-right-direction-says-cse-of-power-ministry-s-move-to-fix-starting-temperature-of-room-air-conditioners-at-24oc-and-not-lower-to-save-energy-8814)
What is the mechanism of reducing heat in-grace? Are the closing blinds or fitting reflective film to windows installed to reduce solar gain?	The building is designed to make best use of day light and avoid the heat in-grace. Blinds are available in office to control unnecessary heat in-grace.
Are all external doors and windows closed when air conditioning is on?	There are 5 number of AC's in college. Based on interviews, it is confirmed that the practice of closing doors and windows is maintainedwhen air conditioning is in operation.

[5] http://www.imd.gov.in/section/climate/climateimp.pdf
[6] https://timesofindia.indiatimes.com/city/nagpur/at-47-3-c-wardha-hottest-in-country-on-thursday/articleshow/5928566.cms

Is there a scenario where air conditioning is wasted in unused spaces, such as cupboards, corridors?	There are no such instances observed. Arrangements are duly implemented to avoid losses.
Are Efficient and energy labelled AC's utilized for cooling purposes?	There are 5 number of AC's in the college out which 3 are 2 star they run for 5-6 hours during summer and rainy season, and 2 are 3 star they run for 8 hours during all college days. **Recommendation:** **The 2 start AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above).** **Below guidelines can be considered by college in future while selecting between the AC and evaporative cooling.** **Evaporative Cooling System (for computer lab)** The Assessment team has undertaken document review and analysis of the data for the assessment of the air conditioning system. Based on the same it was found that there exists scope for the use of evaporative based cooling which is energy effective compared to the reversed Bryon cycle i.e. Vapour Compression Cycle. The basic reason for the same installed system has COP of 1.5 kW/TR of refrigeration compared to evaporative cycle which draws 0.3-0.5 kW based on the size of installation.
Further Scope of Improvement ➢ **The 2 start AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above).** ➢ **Evaporative cooling can be availed for computer lab.**	
Conclusion ➢ **The 2 star AC need to be replaced by at least 3 Star AC or better at the end of their technical lifetime.** ➢ **Evaporative cooling can be availed for computer lab.**	

5. Operation of Electronic Equipment

Are computers, printers, photocopiers and other equipment switched off at the end of the day?	Yes
Is there any mechanism by which the screens and other equipment be controlled during the day?	The college has availed the services of the Green Audit from session 2017-18 onwards. The college has appropriately disabled the screen savers and programmed the computers for sleep mode operations. Please refer to Annexure VI.

Are the screen savers disabled?	Yes, please refer above assessment.
Are computers programmed to 'power down' mode?	Computers are programmed for the sleep operation.
Is the user entrusted with the rights to modify standby settings? (E.g. TVs, LCD projectors, printers etc.)	No, the college has the administrative rights. Such changes cannot be initiated by users.
What is status of the photocopiers, fax machines and other equipment? Are they programmed on 'Energy Saver' mode during the day?	The equipment like photocopiers, fax machines are shutdown when not in use, computers are turned to sleep mode whenever not in use.
Are the power management settings enabled on all the computers/ monitors/ all-in-one machines?	All machines are governed by the college. All are equipped by power management settings as already described above.
Conclusion: ➢ **The Electrical Equipment's are well operated. Redundant operations are avoided.**	

6. Water Management

Are any water leaks identified?	The urinals are flushed periodically and manually. The urinals need to be equipped with push button taps. Please refer below recommendation.
Are taps left running? Are there any dripping taps? Do taps need maintenance?	No such instance was observed.
Are push button taps utilized?	Some toilet washrooms are not equipped with the push buttons. Please refer below recommendation.
Is water escaping from overflows either inside or outside buildings?	No such instance was identified during onsite audit. There is a dedicated pipeline to direct water / chemicals to soak pit (from labs).
Has the college installed low-flow faucets, automatic faucets, and/or faucet aerators?	**Recommendation:** **The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and/or faucet aerators as the replacement for the existing conventional taps.**
Has the college installed low-flow shower heads at Hostel?	NA
Has the college harvested rainwater?	Yes, the rain water is harvested over the college building. As the construction work is in progress the Water Harvesting System has been uninstalled and will be installed before the coming monsoon.

Is the college collecting the condensation from A/C units for onsite watering needs?	Yes. The condensed water is collected and used for gardening.
Has the college optimized its irrigation system for gardening to o operate at night or early morning hours to minimize evaporation? o water the minimum time and frequency necessary for the applicable vegetation?	Yes, the college has installed sprinkler system for gardening. As per the latest publication from "The Hindu" drip irrigation is one of the most important measures to achieve "more crop per drop". Share of Agriculture consumption is approximately 83 per cent of India's water resources, thus approximately 17 per cent water resources are available for domestic and industrial use (http://www.thehindubusinessline.com/opinion/time-to-focus-on-more-crop-per-drop/article9778971.ece).
What is amount of rain water harvested?	Total area of roof top of college building is 1599.40 m^2. The rainfall for Wardha Region (Gramin) is approximately 974.7 mm. Total rain water harvesting is 1403 m^3 at the run off coefficient of 0.9. The college has also laid the cement blocks. This enables the rain water falling on the cement blocks to flow & get harvested. The area under the cement block is 1665 m^2. The run off coefficient is considered as 0.3 based on the Manual on Artificial Recharge of Ground Water, issued by Government of India, Ministry of Water Resources, Central Ground Water Board, and September 2007. The water rain water harvested from the cement blocks is 486 m^3. Total quantity of water harvested = 1403 + 486= 1889 m^3 Please refer Annexure XVIII for details. **Potential of Rain Water Harvesting:** Total area of roof top of auditorium is 873 m^2 and hostel is 817.51 m^2. (873 + 817.51 = 1690.51). The rainfall for Wardha Region (Gramin) is approximately 974.7 mm. Total rain water that can be harvested is 1482 m^3 at the run off coefficient of 0.9. Please refer Annexure XVIII for details. **Recommendation:** **The college management needs to install rain water harvesting system on the auditorium as well as hostel.**
Are there any community based projects implemented by the college?	Yes. Activities by NSS have been undertaken by the college. Refer Chapter 1 and Annexure XIV for details.

Further Scope of Improvement:

- **The college management needs to install rain water harvesting system on the auditorium as well as hostel.**

Long Term Measure:

- **The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and / or faucet aerators as the replacement for the existing conventional taps.**
- **College needs to install the metering arrangement to measure the water drawn from well and bore wells.**

- **College can undertake determination of water footprint and calibrate its specific water consumption with the established National and International Norms.**

Conclusion:

- **The college is having 01 no. of well and 02 no. of bore wells which are the only source of water.**
- **Practically efficient measures (drip irrigation / sprinklers) are implemented for gardening.**

7. Water Quality

Is the college campus maintained clean to minimize litter polluting water table?	The college premise is kept clean. Thus, the chances of litter polluting water table are negligible. The Assessment Team has also observed that the effluent from the chemical lab is directly sent to soak pit without treatment. **Recommendation:** **College needs to perform study of all the effluent chemicals (volume, weight, impact) used and accordingly develop mitigation measures under its sustainable strategy.**
Is the college monitoring drinking water quality regularly? If yes, what is the frequency?	Yes. Third party water testing is done by the college. Water Quality Test Reports are included as part of Annexure VII to this Report.

Further Scope of Improvement:

- **College needs to perform study of all the effluent chemicals (volume, weight, impact) used and accordingly develop mitigation measures under its sustainable strategy.**

Conclusion:

- **The students, staff members and guests have access to clean, safe and potable water with the RO system.**

8. Renewable Energy

Is the college having solar, wind, or other forms of renewable energy?	Yes. Installation of 10kW solar plant is under process.
Is the college purchasing renewable power from third party or renewable energy certificates for its electricity use?	No.
Is the college offering renewable energy lessons / programs?	This already assessed under chapter 01 of this report.

Conclusion:

- **College is off setting the emissions by purchasing the carbon credits. Details are available Chapter 11**

9. Transportation

Is college encouraging transportation measures like bicycle, Bulk transport, walking?	Total 362 students are enrolled for 2019-20 session Approximately : ➢ 60% students of the college commute by their college own 2 wheeler & sharing basis. ➢ 30% students reside in hostel within in the college campus. ➢ 8% students of the college commute by walking. ➢ 2% students of the college commute by public transport (State Transport). Please refer above assessments for additional details. Students participate in activities conducted by college on environment and sustainable development. In addition, please refer above assessments. During interviews it was confirmed that there are 50 staff members in the college, out of which : **Teaching & Non-Teaching :** ➢ 90% staff of the college commute by their own 2 wheeler. ➢ 10% staff of the college travel by their own 4 wheeler. Please refer above assessments for additional details.
Is the college providing eco-friendly or less GHG intensive transportation matching services? (Example carpools, college buses etc)	Refer above response.
What are the good practices pertaining to Transport?	**Recommendation:** **College Management should encourage use of bi-cycle and mass transport systems amongst students and faculties.**

Further Scope of Improvement:

- **College Management should encourage use of bi-cycle and mass transport systems amongst students and faculties.**

Conclusion:

- **The college management, its employees and the students observe satisfactory practices of transportation/ commutation.**

10. Purchasing Practices

Describe the purchasing that confirms the better environmental performance?	Printers with duplex printing facility is installed at the computer lab and Library. There is culture of the two-sided printing. Paper is not wasted.
How does the college limit the purchase of single-serve bottles and containers?	The college has RO system; guests are served with water from RO system. Single serve bottles are not utilized unless requested by the guest.
Is the college having water fountains/stations to promote easy filling of reusable water bottles?	Yes, the water dispensers are connected to output of RO system. Clean and potable water is available to staff, student and guests.

Further Scope of Improvement:

The college should further emphasize on the purchase of:

- **no- to low-odor (VOC) markers**
- **No- to low-VOC paints? (Via Facilities)**
- **paper/paper products with maximum recycled content**
- **refillable pens/pencils**
- **compostable bags for compost collection**

Conclusion:

- **Focus of the recommendation pertaining to the environmental preference of evaporative cooling over AC needs to be considered.**
- **Both sided paper is utilized by college to avoid use of fresh papers**

11. Energy and Carbon Footprint

Has the college undertaken energy audit?	Yes, the energy audit was undertaken and electrical measurements were undertaken at the college. Please refer the Annexure –XV of this report. Energy audit is an effective tool in identifying and perusing a comprehensive energy Management program. Energy Audit highlights the areas of energy savings, thereby reducing the energy costs. The following are the major consumers of electricity in the facility: ➢ Computers ➢ Lighting ➢ Air-Conditioning ➢ Fans ➢ Pumps ➢ Other Lab Equipment
What are the steps undertaken during the energy audit?	The Assessment Team undertook the analysis of the college premise: ➢ To study electricity bills ➢ Study of lighting system and its measurement. ➢ Air conditioner ➢ Identification of energy saving opportunity and energy conservation.

What methodology was adopted?	The energy assessment involved desk review and onsite measurements. Review of energy bill received from MSEDCL was undertaken. Review of lighting, HVAC, fuel usage, pumping systems etc. was undertaken. Energy conservation and saving opportunities are identified and included below.
What are the suggested energy conservation measures?	**Below energy conservation measures are suggested** ➢ The one switch for college concept should be implemented in the college. This will avoid unwanted operation and wastage of electricity. ➢ There are 40 W tube lights with copper chokes. As per replacement policy the LED tube-light should be installed. The T8 LED tube has wattage of 20 W, thus the energy saved is 40-20 = 20 watt/fitting. As per study there are 496 tubes of 40 W in college, library and hostel. After the replacement based on failure the energy savings will be approximately 1665.6 kWh. With average electricity cost of INR 9 /kWh, the annual savings will be approximately INR 149990 per year. ➢ Air conditioner shall be operated between temperature range of 24-28^{0}C to maintain lower cooling load on compressor to save energy. ➢ The existing 2 star labelled AC's and reached end of their service life. The AC's should be replaced by the 5-star AC's.

	0.75 ton	1 ton	1.5 ton	2 ton
1 Star AC (mostly non inverter)	627	843	1246	1648
2 Star AC (mostly non inverter)	596	800	1184	1626
3 Star AC (mix of inverter and non inverter)	542	747	1104	1448
4 Star (mostly inverter)	464	646	945	1293
5 Star (mostly inverter)	450	554	840	1113

Annual Electricity Consumption (Units of kWh for 1600 hrs) based on data from BEE

	➢ All Class Rooms and labs must sensitize students regarding optimum use of electrical appliances in the room like, lights, fans, and computers. ➢ The comfort air conditioning temperature to be set between 24˚C to 28˚C. ➢ Lights in toilet area may be kept OFF during day time. Additional sensors can be installed in washrooms to automatically regulate the light and exhaust fans.
Has the college calculated its carbon footprint?	For the first time college is calculating the carbon footprint. The data applicable to Scope-2 emission (electricity purchase from grid) is available. The emissions pertaining to Scope-01 are limited to HSD use in DG, College Bus and LPG usage in Labs.
How is college promoting zero emission transportation options?	Not applicable. There is no internal transportation within the college.
Are all the applicable emission sources calculated?	The emission source pertaining to grid-based electricity source is calculated. Scope-01 emission source data pertaining to DG, HSD consumption in DG, LPG consumption in labs is calculated, Scope 2 emission on account of electricity imported from grid is considered.

Scope-01 Emissions:

Year	HSD Consumption in DG	Petrol Consumption	LPG Consumption in Labs
Session	lit	lit	kg
2018-19	95	32.59	42.6
2019-20	67.84	28.37	99.4
2020-21	92.69	57.98	14.2

Equivalent Scope-01 Emissions are as below[7]:

Year	HSD Consumption in DG	Petrol Consumption	LPG Consumption in Labs	Total GHG Emission (Scope-1)
Session	tCO_2	tCO_2	tCO_2	tCO_2
2018-19	0.35	0.11	0.16	0.61
2019-20	0.25	0.09	0.37	0.71
2020-21	0.34	0.19	0.05	0.58

Scope -2 Emissions are tabulated as follows[8]:

Year	Annual Electricity Consumption	Total GHG Emission (Scope-2)
Session	kWh	tCO_2
2018-19	100416	100.42
2019-20	82750	82.75
2020-21	57322	57.32

Total CO_2 emissions = Scope-01 + Scope-02

Year	Total GHG Emission (Scope-1)	Total GHG Emission (Scope-2)	Total GHG Emission (Scope-1+2)
Session	tCO_2	tCO_2	tCO_2
2018-19	0.61	100.42	101.03
2019-20	0.71	82.75	83.46
2020-21	0.58	57.32	57.90

Web link of purchase of carbon credits: The college has tried to offset the scope 1 and scope 2 emission by purchase of equivalent offset from United Nations Approved Projects and Subsequent Allocation. The cancelation certificate is available publicly on web link: https://registry.verra.org/mymodule/rpt/CertificateInfo.asp?rhid=130887

[7]With 10 % uncertainty
[8]With 10 % uncertainty

The certificate is attached under Annexure XV for ready reference.

CREDIT INFORMATION REPORT

CREDIT INFORMATION

Verification Period	10/03/2010-30/06/2012
Vintage Period	01/01/2011-31/12/2011
Originating Program	NA
Serial Number	10965-173964937-173964996-VCS-VCU-508-VER-IN-1-837-01012011-31122011-0
Additional Certification(s)	NA
Credit Type	VCU
Quantity of Credits	60
Serial Number Help	

ORIGINATING PROJECT INFORMATION

Project ID	837
Project Name	Natural Gas Based Combined Cycle Power Generation, at Kothapeta, East Godavari, Andhra Pradesh, India
Primary Project Type	Energy industries (renewable/non-renewable sources)
Additional Project Types (s)	NA
Project Site State/Province	Andhra Pradesh
Project Site Country	India (IN)
Project VVB	SIRIM QAS International Sdn Bhd
Project Document	View

12. Waste Management

How the college reduces its paper waste via: o encouraging digital reading, note-taking, and activities? o setting printers and computers to default to duplex (double-sided) printing? o reducing margins and white space on documents that must be printed? o printing multiple pages per sheet? o minimizing paper correspondence with families? o opting out of unwanted mail?	➢ The class room and labs are well ventilated and spacious. This minimizes suffocation to students by improving air changes and hence the air quality. ➢ The college has adopted the duplex printers, which enables the complete usage of the paper areas. ➢ College has taken initiates towards plastic free campus. The students are encouraged to use waste bins which are placed in the college. ➢ The internal correspondences and various functionalities are taken care by the electronic means like emails, sms etc.
Is the college undertaking recycling collection for additional recyclable materials—like plastic bags, CFL (spiral) light bulbs, batteries, drink pouches, candy wrappers, and electronics?	➢ The recycling / disposal system adopted by the college is as below. **Different types are generated within campus which include**. ➢ **E-Waste:** The E-waste generally includes the tube-lights, CFL, LED, computer waste, etc. are stored into the scrap bin and is given to the agency for

	proper disposal. MOU of E-waste handling is executed. ➢ **Plant Waste:** The plant waste is composted in-house. Vermi culture compost is obtained from waste leaves. Existing small compost pit was dismantled and larger one is under construction. ➢ **Sewage Waste:** The liquid waste from lavatories and other sources are disposed through sewer line. ➢ **Chemical Waste:** The chemical waste is neutralized in the labs and flown or dumped into the soak pit. As the earlier soak pit was a small, it was dismantled and appropriate size soak pit is under construction. ➢ **Cellulose and Paper Waste:** According to the Management Policy, Cellulose and paper waste is stored in a particular place and when appropriate amount of waste is accumulated a Tender is released and quotations are requested. The waste is handed over to the agency which quotes highest price. ➢ **Biomedical Waste:** The biomedical waste is incinerated in the machine and the ash is buried in the ground. Please refer Annexure XIII for details. **Recommendation:** **Proper process for biomedical waste disposal system should be initiated on urgent basis.**
Further Scope of Improvement: ➢ **Proper process for biomedical waste disposal system should be initiated on urgent basis.**	
Conclusion: ➢ **E-waste and Cellulose waste are handled in a proper manner through dedicated agencies.**	

13. Plantation by College

The College campus has several trees i.e. a college garden and a Botanical garden with various rare and medicinal important species.

Every year, plantation programme is carried out in the campus as well as outside the campus. Students are also involved in plantation programme in surrounding locality. In the current session, the Institution planted several trees in the vicinity.

There are 1998 fully grown trees as wells as shrubs in the campus.

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

BORGAON (MEGHE), WARDHA

DETAILS OF PLANTS/TREES AVAILABLE IN CAMPUS OF INSTITUTE

Sr. No.	Name of Plants / Trees	Numbers
1	Mango trees	05
2	Ashoka trees	13
3	Big trees	11
4	Cycas trees	12
5	Palm trees	20
6	Saru trees	34
7	Vidya plants	28
8	Coconut tree	01
9	Gulab plants	150
10	General trees	256
11	Medicinal plants of different varieties including different habit. (Herbal Garden)	1468
	Total	**1998**

List of trees in the campus

Annexure

Annexure – I: List of Interviewed College / Students

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

Ph. 07152 -240284 Fax 07152-241684

Dr. Nitin R. Dhande, President | Adv. Uday S. Deshmukh, Vice President | Prof. (Dr.) Hemant M. Deshmukh, Treasurer | Shri. Yuvrajsingh V. Choudhary, Secretary

Dr. R. O. Ganjiwale, I/c Principal

E-mail: iper4160@gmail.com
Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No. ADM/220/052

Date: 15/03/2021

List of teaching and non teaching staff present for Green Audit

Sr. No.	Name	Designation	Signature
1	Dr. R. O. Ganjiwale	Principal	
2	Dr. L. G. Rathi	Associate Professor	
3	Mr. G. D. Dahikar	Assistant Professor	
4	Dr. N. A. Karande	Assistant Professor	
5	Mr. A. B. Budhrani	Assistant Professor	
6	Mr. P. B. Ankar	Lab technician	
7	Mr. V. M. Dahiwalkar	Lab technician	
8	Mr. C. S. Choudhary	Store Incharge	
9	Mr. R. S. Matkar	Garden Incharge	

Dr. R. O. Ganjiwale
Principal
.. PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

List of Staff members present during Green Audit

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

Ph. 07152 -240284 Fax 07152-241684

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Dr. R. O. Ganjiwale, I/c Principal

E-mail: iper4160@gmail.com

Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No. ADM/220/053

Date: 15/03/2021

List of students present for Green Audit

Sr. No.	Name	Class	Signature
1	Mr. Nimesh Tijare	M. Pharm. II	Nimish
2	Mr. Shubham Potpite	M. Pharm. II	
3	Ms. Shifa Sheikh	M. Pharm. II	
4	Ms. Sonal Gupta	M. Pharm. II	
5	Ms. Utkarsha Dhote	M. Pharm. II	
6	Ms. Mayuri Deulkar	M. Pharm. II	
7	Ms. Jayashri Waratkar	M. Pharm. II	
8	Ms. Krunali Manmode	M. Pharm. II	
9	Ms. Achal Borkar	M. Pharm. II	

Dr. R. O. Ganjiwale
Principal
.. PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

List of Students present during audit

Annexure – II: Reference Documents / Surveys

Sr. No	Reference Documents / Surveys pertaining to
1.	Functionality of RO water plant
2.	Roof top area by College
3.	Setup for rain Water Harvesting
4.	Information regarding Garden Waste Management
5.	Information regarding Liquid Waste Management
6.	Measures for maintaining Cleanliness in Campus.
7.	Measures for Garbage Collection and disposal
8.	Plantation Measures
9.	Electricity Bills for duration of April 2017 to January 2020
10.	Nature Conservation Club Composition
11.	Declaration on Operational Controls of System Department with Respect to IT Management & Other Electronic Equipment's.
12.	Roll of Staff, Students & Management to Save Electricity In Campus.
13.	Lighting Survey undertaken by the Green Audit Team
14.	AC Survey undertaken by the Green Audit Team
15.	Water Harvesting Survey undertaken by the Green Audit Team
16.	Waste Water Management Survey undertaken by the Green Audit Team

Annexure –III: Campus Committee

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha. 442 001

Ref. No. ADM/950/005 **Date: 21/07/2020**

Green Campus Committee (2020-21)

Sr. No.	Name	Designation
1	Dr. R. O. Ganjiwale	Chairman
2	Dr. L. G. Rathi	IQAC co-ordinator
3	Dr. N. A. Karande	Member
4	Mr. A. B. Budhrani	Member
5	Mr. P. B. Ankar	Member
6	Mr. C. S. Choudhary	Member
7	Mr. V. M. Dahiwalkar	Member
8	Mr. R. S. Matkar	Member
9	Mr. Nimesh Tijare	Student representative
10	Mr. Shubham Potpite	Student representative
11	Ms. Krunali Manmode	Student representative
12	Mr. Pradeep Tatwedi	Canteen contractor
13	Mr. G. D. Dahikar	Member secretory

Dr. R. O. Ganjiwale
Chairman
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha. 442 001

GREEN CAMPUS COMMITTEE

VISION

1. To be more efficient in our energy consumption (including electricity and other energy forms), taking concrete steps to minimise waste;

2. To create a positive effect on the local environment and community through efficient use of natural resources and efficient management of wastes.

MISSION

1. Our mission is to improve environmental sustainability at Institute of Pharmaceutical Education and Research by achieving measurable energy and water savings;

2. Educating the campus community about sustainability;

3. To educate the students about medicinal values of the plants.

Dr. R. O. Ganjiwale
Chairman
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Annexure – IV: List of Awareness Program Undertaken By College

लोकमत

मानवी जीवनात योगाचे महत्त्व

विद्यार्थ्यांना मार्गदर्शन

Yoga Day was celebrated at IPER on 21st June 2018

TheHitavada

Tuesday ▪ July 31 ▪ 2018

IPER, Borgaon (Meghe)

Professors and students during tree plantaiton programme.

A TREE plantation programme was organised at Institute of Pharmaceutical Education and Research(IPER), Borgaon (Meghe), Wardha run by Vidarbha Youth Welfare Society, Amravati. About 100 saplings including herbal plants were planted by NSS Unit of the Institute. Dr R O Ganjiwale, Incharge Principal, and Dr Bhushan Kumar Sathe, Principal, Institute of Diploma in Pharmacy, Borgaon(Meghe) were present. Ganjiwale apprised students about desert greening projects for Biodiversity imporvement and reclamation of natural water system. The teaching and non-teaching staff and students took part in the programme.

Tree Plantation Drive was organized at IPER on 16th July 2018

Poster competition on “Awareness on Scrub Typhus” was organized at IPER on 25th September 2018.

Blood Donation Camp at was organized IPER on 1st January 2019

Yoga Day was celebrated at IPER on 21st June 2019

Integrated Energy and Green Audit: Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha.

Tree Plantation was organized at IPER on 11th July 2019

The Hitavada

NAGPUR ■ Monday ■ January 20 ■ 2020

IPER, Borgaon (Meghe)

A BLOOD donation camp was organised by Institute of Pharmaceutical Education and Research (IPER), Sawangi (Meghe), in co-operation with Datta Meghe Institute of Medical Sciences, Sawangi (Meghe), Wardha, to celebrate birthday of Dr P G Yeole, the Vice-Chancellor, Dr Baba Saheb Ambedkar Marathwada University, Aurangabad. Dr R O Ganjiwale, In-charge Principal, IPER, Wardha, Dr B S Sathe, Principal, Institute of Diploma in Pharmacy, Wardha, and Dr Kishor Hiwale, Pathologist, JNMC, Sawangi, were present on the occasion. Dr R O Ganjiwale delivered introductory remarks. He assured that blood of required blood group will be made available to the needy and poor patients. Total 54 students and 7 staff members participated in blood donation. Dr N A Karande, Co-ordinator of NSS, and Jyotiranjan Roul organised the camp.

Dignitaries and blood donors present in the camp.

Blood Donation Camp was organized at IPER on 1st January 2020

Health Check-up camp was organized at IPER on 11th March 2020

Tree Plantation Drive was organized at IPER on 12th July 2020

लोकमत

रविवार ०३.०१.२०२१

आयपर महाविद्यालयात रक्तदान शिबिर

वर्धा : औषध निर्माण शास्त्र व संशोधन संस्था बोरगाव (मेघे) वर्धा येथे नववर्षाच्या प्रारंभी रासेयोच्या वतीने रक्तदान शिबिर घेण्यात आले. या रक्तदान शिबिराला प्राचार्य डॉ. राजेंद्र गंजीवाले, आयडीपीचे प्राचार्य डॉ. भूषण साठे, जिल्हा सामान्य रुग्णालयाचे प्रयोगशाळा वैज्ञानिक किशोर कोटंबकर, रक्तपेढीचे वैद्यकीय अधिकारी डॉ. सेलूकर उपस्थित होते.या कार्यक्रमाचे संचालन राष्ट्रीय सेवा योजनेचे प्रमुख डॉ. नीलेश कांडे यांनी केले. कार्यक्रमासाठी प्रा. अभिराम देशमुख, विवेक राठोड, एस. पी. देवानी, नीतेश टापरे, सुमित कालते, अमन सुतारकर आदींनी रक्तदान केले. यशस्वितेकरिता महाविद्यालयातील प्रा. साधना गौतम, डॉ. राठी, डॉ. सिंघवी, प्रशांत अनकर, मातकर, शैलेश बुटले आदींनी सहकार्य केले.

Blood Donation Camp was organized at IPER on 1st January 2021

Integrated Energy and Green Audit: Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha.

लोकमत

'आयपर'मध्ये राष्ट्रीय सुरक्षा दिन

वर्धा : औषधनिर्माण शास्त्र शिक्षण व संशोधन संस्था बोरगाव (मेघे) वर्धा येथे राष्ट्रीय सुरक्षा दिन आयोजित करण्यात आला होता. कार्यक्रमाला प्रमुख अतिथी म्हणून महाराष्ट्र राज्य विद्युत वितरण कंपनी बोरगाव येथील उपकार्यकारी अभियंता चरण गावंडे उपस्थितीत होते.
कार्यक्रमाच्या अध्यक्षस्थानी प्राचार्य डॉ. राजेंद्र गंजीवाले होते. गंजीवाले यांनी प्रास्ताविकेतून कार्यक्रमाचे उद्दिष्ट नमूद केले, तर प्रमुख अतिथींनी राष्ट्रीय सुरक्षा दिनानिमित्त विद्युत सुरक्षेबाबत विद्यार्थ्यांना माहिती दिली. विद्युत घरगुती कामासाठी वापरतेवेळी कोणती काळजी घेतली पाहिजे, जेणेकरून कुठलीही अनुचित घटना घडणार नाही, याबाबतचे विविध उदाहरणे देऊन विद्युतचा सुरक्षित वापर करण्याबाबत मार्गदर्शन केले. कार्यक्रमाचे सूत्रसंचालन व आभार प्रदर्शन प्रा. सुनील देवानी यांनी केले.

Hello Wardha
Page No. 3 Mar 06, 2021
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National Safety Day was observed at IPER from 4th March 2021

Annexure –V: Lighting Survey (2019 – 20)

List of Assumptions:

- During the survey specific hours for each class room, wash room, office space was assessed and accordingly average daily hours were considered
- The kW ratings of the installed lights is taken from the College data
- The calculations cover the two approaches
  - Approach: Calculation of LED contribution based on the total lighting load energy consumption.

    Note: The Lumen/Watt for 28 W tube light is up to 110; which is almost same as LED is: 110-120[9]
  - The Green Audit Team acknowledges the criteria for introduction of LED lights as LED lights do not have disposal problems. Tube lights face problem of mercury contamination.
  - Conversely the college also faces the problem of disposal of existing tube lights. The sudden disposal of tube lights on large scale and within their service life will lead to huge amount of e-waste which has critical impact on environment. The college management is thus looking for the replacement policy and lighting (tube light, CFL) will be upgraded to eco-friendly LED after failure of existing lighting system.

Lux Levels observed at working place – Above 250

Calculated Contribution of various lighting arrangements: Calculated for 280 working days

Light Sources	Daily Wh Consumption
Tube light	80980
LED	794.5
CFL	2898.5

Light Sources	% Contribution
Tube light	96%
LED	1%
CFL	3%

Light Sources	Number
Tube light	496
LED	57
CFL	172

Light Sources	% Contribution
Tube light	68%
LED	8%
CFL	24%

[9] https://www.google.co.in/amp/s/www.bijlibachao.com/lights/comparing-led-lights-with-fluorescent-lights.html%3fisamp=1

Lighting Survey 2020 – 21

Sr. No	Room Name/no.	Tube light	Watts	Daily average hrs.	W.hr	LED	Watts	Daily average hrs.	W.hr	CFL	Watts	Daily average hrs.	W.hr
1	101	2	40	0.5	40	-	-	-	-	3	15	0.5	22.5
2	102	-	-	-	-	3	15	0.5	22.5	18	15	0.5	135
		-	-	-	-	-	-	-	-	8	20	0.5	80
3	103	1	40	2	80	-	-	-	-	-	-	-	-
4	104	1	40	2	80	-	-	-	-	30	15	0.5	225
5	105	1	40	2	80	-	-	-	-	-	-	-	-
6	106	8	40	4	1280	-	-	-	-	-	-	-	-
7	107	4	40	3	480	-	-	-	-	-	-	-	-
8	108	4	40	3	480	-	-	-	-	-	-	-	-
9	109	4	40	3	480	-	-	-	-	-	-	-	-
10	110	2	40	3	240	-	-	-	-	-	-	-	-
11	111	-	-	-	-	-	-	-	-	-	-	-	-
12	112	5	40	5	1000	-	-	-	-	-	-	-	-
13	113	2	40	2	160	-	-	-	-	-	-	-	-
14	115	2	20	2	80	-	-	-	-	15	20	2	600
		5	40	2	400	-	-	-	-	-	-	-	-
15	116	5	40	4	800	-	-	-	-	-	-	-	-
16	117 / 118	8	40	2	640	-	-	-	-	-	-	-	-
17	119	1	40	4	160	-	-	-	-	-	-	-	-
18	120	10	40	0.5	200	-	-	-	-	-	-	-	-
19	121	-	-	-	-	-	-	-	-	16	20	1	320
		-	-	-	-	-	-	-	-	8	15	1	120
20	Reception	-	-	-	-	-	-	-	-	21	20	1	420

21	201	3	40	6	720	-	-	-	-	-	-	-	-
22	202	5	40	6	1200	-	-	-	-	11	20	2	440
23	203	2	40	5	400	-	-	-	-	-	-	-	-
24	204	1	40	5	200	-	-	-	-	-	-	-	-
25	205	10	40	2	800	-	-	-	-	-	-	-	-
26	206 / 207	7	40	0.5	140	-	-	-	-	-	-	-	-
27	208	1	40	3	120	-	-	-	-	-	-	-	-
28	209	7	40	0.5	140	-	-	-	-	-	-	-	-
29	210 / 211	9	40	0.5	180	-	-	-	-	-	-	-	-
30	212	19	40	4	3040	-	-	-	-	2	10	4	80
31	213	1	40	4	160	-	-	-	-	-	-	-	-
32	214	4	40	4	640	-	-	-	-	-	-	-	-
33	215	2	40	6	480	-	-	-	-	-	-	-	-
34	216	1	40	5	200	-	-	-	-	-	-	-	-
35	217	9	40	1	360	-	-	-	-	-	-	-	-
36	Corridor	18	40	4	2880	-	-	-	-	-	-	-	-
37	301	2	40	6	480	-	-	-	-	-	-	-	-
38	302	4	40	3	480	-	-	-	-	-	-	-	-
39	303	8	40	3	960	-	-	-	-	-	-	-	-
40	304	2	40	5	400	-	-	-	-	-	-	-	-
41	305	2	40	2	160	-	-	-	-	-	-	-	-
42	306	2	40	2	160	-	-	-	-	-	-	-	-
43	307	5	40	2	400	-	-	-	-	-	-	-	-
44	308	7	40	2	560	-	-	-	-	-	-	-	-
45	309	18	40	4	2880	-	-	-	-	2	20	2	80
46	311	8	40	1	320	-	-	-	-	-	-	-	-

47	312	2	40	1	80	-	-	-	-	-	-	-	-
48	313	2	40	2	160	-	-	-	-	-	-	-	-
49	313 - A	6	40	2	480	-	-	-	-	-	-	-	-
50	314	8	40	2	640	-	-	-	-	-	-	-	-
51	315	1	40	2	80	-	-	-	-	-	-	-	-
52	316	1	40	3	120	-	-	-	-	-	-	-	-
53	317	5	40	2	400	-	-	-	-	-	-	-	-
54	318	5	40	2	400	-	-	-	-	-	-	-	-
55	319	2	40	2	160	-	-	-	-	-	-	-	-
56	320	2	40	2	160	-	-	-	-	-	-	-	-
57	321	8	40	6	1920	-	-	-	-	-	-	-	-
58	Corridor	18	40	2	1440	-	-	-	-	-	-	-	-
60	Girls Hostel Room No. 1	5	40	7	1400	-	-	-	-	-	-	-	-
61	Girls Hostel Room No. 2	5	40	7	1400	-	-	-	-	-	-	-	-
62	Girls Hostel Room No. 3	5	40	7	1400	-	-	-	-	-	-	-	-
63	Girls Hostel Room No. 4	5	40	7	1400	-	-	-	-	-	-	-	-
64	Girls Hostel Room No. 5	5	40	7	1400	-	-	-	-	-	-	-	-
65	Girls Hostel Room No. 6	1	40	7	280	-	-	-	-	-	-	-	-
66	Girls Hostel Room No. 7	2	40	7	560	-	-	-	-	-	-	-	-
67	Girls Hostel Room No. 8	2	40	7	560	-	-	-	-	-	-	-	-
68	Girls Hostel Room No. 9	1	40	7	280	-	-	-	-	-	-	-	-
69	Girls Hostel Room No. 10	6	40	7	1680	-	-	-	-	-	-	-	-
70	Girls Hostel Room No. 11	6	40	7	1680	-	-	-	-	-	-	-	-
71	Girls Hostel Room No. 12	6	40	7	1680	-	-	-	-	-	-	-	-
72	Girls Hostel Room No. 13	6	40	7	1680	-	-	-	-	-	-	-	-
73	Girls Hostel Room No. 14	6	40	7	1680	-	-	-	-	-	-	-	-

74	Girls Hostel Room No. 15	6	40	7	1680	-	-	-	-	-	-	-	-	
75	Girls Hostel Room No. 16	6	40	7	1680	-	-	-	-	-	-	-	-	
76	Girls Hostel Room No. 17	8	40	7	2240	-	-	-	-	-	-	-	-	
77	Girls Hostel Room No. 18	8	40	7	2240	-	-	-	-	-	-	-	-	
78	Girls Hostel Room No. 19	8	40	7	2240	-	-	-	-	-	-	-	-	
79	Girls Hostel Room No. 20	8	40	7	2240	-	-	-	-	-	-	-	-	
80	Hall / Corridor	13	40	5	2600	-	-	-	-	-	-	-	-	
81	Mess	5	40	5	1000	-	-	-	-	-	-	-	-	
82	Washroom	2	40	3	240	-	-	-	-	6	12	3	216	
83	Visitors Hall	2	40	5	400	-	-	-	-	-	-	-	-	
84	Boys Hostel Room No. 1	2	40	7	560	-	-	-	-	-	-	-	-	
85	Boys Hostel Room No. 2	10	40	4	1600	-	-	-	-	-	-	-	-	
86	Boys Hostel Room No. 3	10	40	4	1600	-	-	-	-	-	-	-	-	
87	Boys Hostel Room No. 4	10	40	4	1600	-	-	-	-	-	-	-	-	
88	Boys Hostel Room No. 5	10	40	4	1600	-	-	-	-	-	-	-	-	
89	Boys Hostel Room No. 6	2	40	7	560	-	-	-	-	-	-	-	-	
90	Boys Hostel Room No. 7	2	40	7	560	-	-	-	-	-	-	-	-	
91	Boys Hostel Room No. 8	2	40	7	560	-	-	-	-	-	-	-	-	
92	Boys Hostel Room No. 9	2	40	7	560	-	-	-	-	-	-	-	-	
93	Boys Hostel Room No. 10	2	40	7	560	-	-	-	-	-	-	-	-	
94	Boys Hostel Room No. 11	2	40	7	560	-	-	-	-	-	-	-	-	
95	Boys Hostel Room No. 12	2	40	7	560	-	-	-	-	-	-	-	-	
96	Boys Hostel Room No. 13	1	40	7	280	-	-	-	-	-	-	-	-	
97	Boys Hostel Room No. 14	2	40	7	560	-	-	-	-	-	-	-	-	
98	Visitors Hall	1	40	2	80	-	-	-	-	-	-	-	-	
99	Corridor	8	40	7	2240	-	-	-	-	-	-	-	-	

100	Mess	5	40	5	1000	-	-	-	-	-	-	-	-
101	Auditorium	-	-	-	-	42	12	0.5	252	32	10	0.5	160
102		-	-	-	-	4	100	0.5	200	-	-	-	-
103	Entrance	14	40	2	1120	8	20	2	320	-	-	-	-
	Total	**496**	**3860**	**418.5**	**80980**	**57**	**147**	**3.5**	**794.5**	**172**	**212**	**18.5**	**2898.5**

On & off culture practiced in college

Use of LED lights in college

Sensor based lighting installed in college

Annexure –VI: Undertaking by the System Department regarding control of Electronic Equipment's

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

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Dr. R. O. Ganjiwale, I/c Principal

E-mail: iper4160@gmail.com

Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No. ADM/220/054

Date: 15/03/2021

Certificate

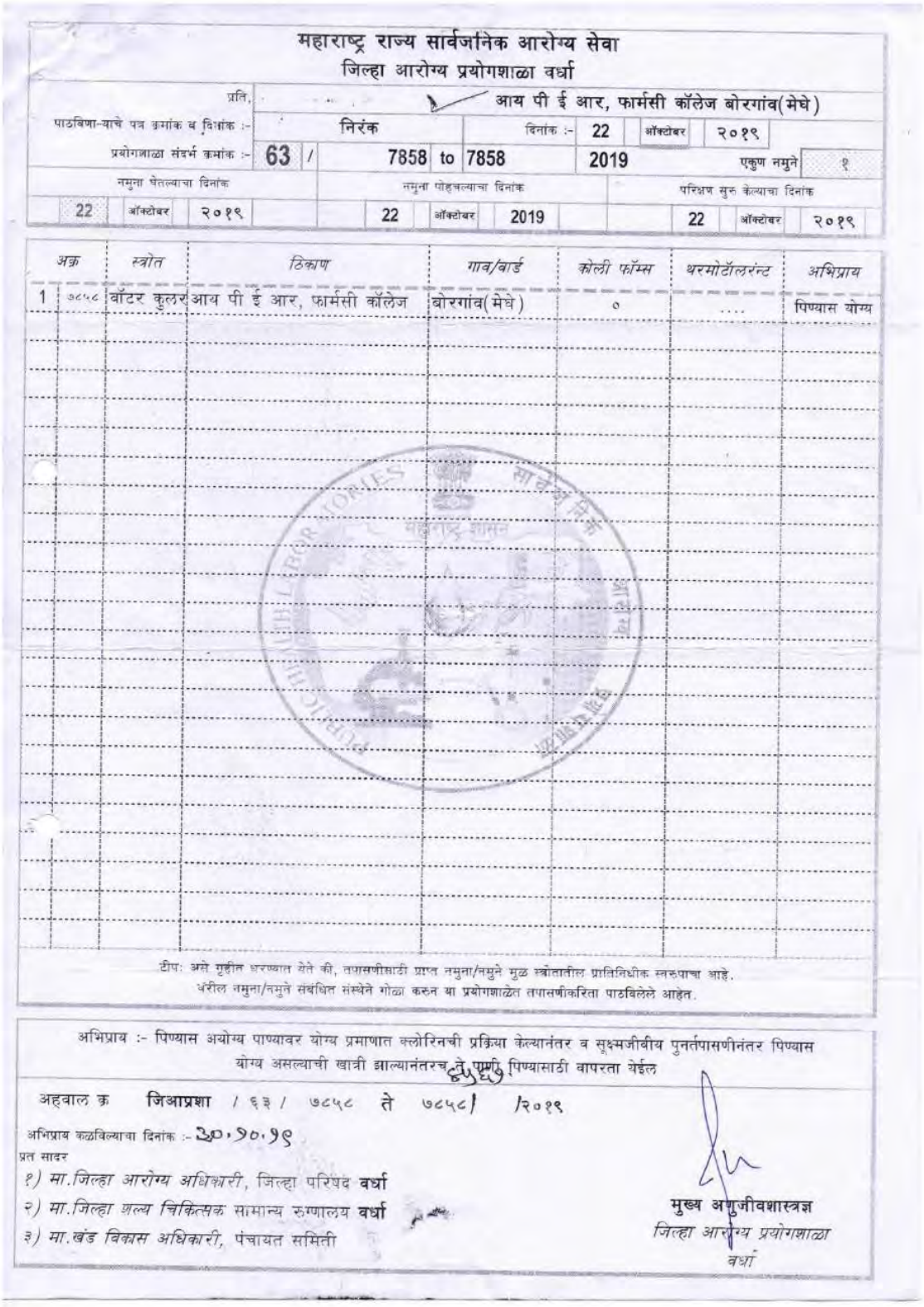
The administrative rights of computer setting are with the administrative department of the college.

As part of the sustainable and eco-friendly setting, the system department has initiated below settings in the compartment of all the users

1. All the computer screen savers are disabled.
2. The computers are turned to sleep mode if they are Ideal.
3. The computer setting can not change as the administrative rights are with the department.
4. With regard to the uses policy of the photocopier and other equipment users "POWER ON" when in use and "POWER OFF" when not in use.
5. The statement is issued in response to the query raised during the green audit.

Dr. R. O. Ganjiwale
Principal
.. PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Annexure –VII: Water Quality Reports



महाराष्ट्र राज्य सार्वजनिक आरोग्य सेवा
जिल्हा आरोग्य प्रयोगशाळा वर्धा

प्रति, आय पी ई आर, फार्मसी कॉलेज बोरगांव(मेघे)

पाठविणा-याचे पत्र क्रमांक व दिनांक :- निरंक दिनांक :- 22 ऑक्टोबर २०१९

प्रयोगशाळा संदर्भ क्रमांक :- 63 / 7858 to 7858 2019 एकुण नमुने १

नमुना घेतल्याचा दिनांक	नमुना पोहचल्याचा दिनांक	परिक्षण सुरु केल्याचा दिनांक
22 ऑक्टोबर २०१९	22 ऑक्टोबर 2019	22 ऑक्टोबर २०१९

अक्र	स्त्रोत	ठिकाण	गाव/वार्ड	कोली फॉर्म्स	थरमोटॉलरंन्ट	अभिप्राय
1	७८५८	वॉटर कुलर	आय पी ई आर, फार्मसी कॉलेज	बोरगांव(मेघे)	०	....	पिण्यास योग्य

टीप: असे गृहीत धरण्यात येते की, तपासणीसाठी प्राप्त नमुना/नमुने मुळ स्त्रोतातील प्रातिनिधीक स्वरूपाचा आहे. वरील नमुना/नमुने संबंधित संस्थेने गोळा करुन या प्रयोगशाळेत तपासणीकरिता पाठविलेले आहेत.

अभिप्राय :- पिण्यास अयोग्य पाण्यावर योग्य प्रमाणात क्लोरिनची प्रक्रिया केल्यानंतर व सूक्ष्मजीवीय पुनर्तपासणीनंतर पिण्यास योग्य असल्याची खात्री झाल्यानंतरच ते पाणी पिण्यासाठी वापरता येईल

अहवाल क्र जिआप्रशा / ६३ / ७८५८ ते ७८५८ / २०१९

अभिप्राय कळविल्याचा दिनांक :- ३०.१०.१९

प्रत सादर
१) मा.जिल्हा आरोग्य अधिकारी, जिल्हा परिषद वर्धा
२) मा.जिल्हा शल्य चिकित्सक सामान्य रुग्णालय वर्धा
३) मा.खंड विकास अधिकारी, पंचायत समिती

मुख्य अणुजीवशास्त्रज्ञ
जिल्हा आरोग्य प्रयोगशाळा
वर्धा

Water Testing Report for the Year 2019 - 20

महाराष्ट्र राज्य सार्वजनिक आरोग्य सेवा
जिल्हा आरोग्य प्रयोगशाळा वर्धा

प्रति, प्रिंसीपल, इन्स्टीट्युट ऑफ फार्मास्युटीकल एडुकेशन ॲन्ड रिसर्च बोरगांव(मेघे)

पाठविणा-याचे पत्र क्रमांक व दिनांक :- निरंक दिनांक :- 4 मार्च २०२१

प्रयोगशाळा संदर्भ क्रमांक :- 6 / 1601 to 1601 2021 एकुण नमुने १

नमुना घेतल्याचा दिनांक	नमुना पोहचल्याचा दिनांक	परिक्षण सुरु केल्याचा दिनांक
4 मार्च २०२१	4 मार्च 2021	4 मार्च २०२१

अक्र	स्त्रोत	ठिकाण	गाव/वार्ड	कोली फॉर्म्स	थरमोटॉलरंन्ट	अभिप्राय
1 १६०१	नळ	संस्थेतील पिण्याचे पाणी	बोरगांव मेघे	०	....	पिण्यास योग्य

PUBLIC HEALTH LABORATORIES सार्वजनिक आरोग्य प्रयोगशाळा महाराष्ट्र शासन

टीप: असे गृहीत धरण्यात येते की, तपासणीसाठी प्राप्त नमुना/नमुने मुळ स्त्रोतातील प्रातिनिधीक स्वरुपाचा आहे. वरील नमुना/नमुने संबंधित संस्थेने गोळा करुन या प्रयोगशाळेत तपासणीकरिता पाठविलेले आहेत.

अभिप्राय :- पिण्यास अयोग्य पाण्यावर योग्य प्रमाणात क्लोरिनची प्रक्रिया केल्यानंतर व सूक्ष्मजीवीय पुनर्तपासणीनंतर पिण्यास योग्य असल्याची खात्री झाल्यानंतरच ते पाणी पिण्यासाठी वापरता येईल

976 - 78

अहवाल क्र जिआप्रशा / ६ / १६०१ ते १६०१ / /२०२१

अभिप्राय कळविल्याचा दिनांक :- 09/03/2021

प्रत सादर

१) मा.जिल्हा आरोग्य अधिकारी, जिल्हा परिषद वर्धा
२) मा.जिल्हा शल्य चिकित्सक सामान्य रुग्णालय वर्धा
३) मा.खंड विकास अधिकारी, पंचायत समिती

मुख्य अणुजीवशास्त्रज्ञ
जिल्हा आरोग्य प्रयोगशाळा
वर्धा

Water Testing Report for the Year 2020 - 21

Annexure– VIII: List of Electronic Equipment's in College

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

Ph. 07152 -240284 Fax 07152-241684

Dr. Nitin R. Dhande, President | Adv. Uday S. Deshmukh, Vice President | Prof. (Dr.) Hemant M. Deshmukh, Treasurer | Shri. Yuvrajsingh V. Choudhary, Secretary

Dr. R. O. Ganjiwale, I/c Principal

E-mail: iper4160@gmail.com
Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No. ADM/220/055 **Date: 15/03/2021**

Details of computers, fax machine, scanners, printers, projectors, xerox machineavailable in College.

Sr. No.	Item	Principal Cabin	Office	Computer Lab	Staff/ HOD Cabin	Library	Tutorial Room	Instrument /Machine room	Exam. Room	Class Room	Total
1	Number of Computers	01	08	24	06	12	09	10	01	Nil	71
2	Number of Fax Machine	01	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	01
3	Number of Scanners	Nil	Nil	Nil	Nil	01 (Scanner cum printer)	Nil	Nil	01	Nil	02
4	Number of Printers	01	04	Nil	Nil	02 (One is scanner cum printer)	Nil	Nil	01	Nil	08
5	Number of Projectors	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	07	07
6	Number of Xerox Machine	Nil	Nil	Nil	Nil	01	Nil	Nil	Nil	Nil	01

Dr. R. O. Ganjiwale
Principal
. PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

List of Electronic Equipment's in college

Annexure –IX: Solar Panel Installations

Note: Installation of 10kW Solar PV System is under process.

Annexure –X: Water Distribution Data

The water is drawn from 01 no. of well & 01 no. of bore well. The water drawn is not measured. Recommendation to monitor the water drawn is raised under chapter 6 of this report.

Annexure –XI: Solar Passive Structure / Drip Irrigation

Sprinkler System installed in college for gardening

Adequate light in classrooms & labs without using electrical lighting

Use of false ceiling to reduce air-conditioned volume and reducing AC load

Use of blinds for windows to reduce heat

AC Condenser in shade

AC Condenser exposed to direct sunlight

Annexure –XII: Water Management

Water Harvesting System installed on College Building

Water harvesting recharge pit

Water filtration unit connected to Water Harvesting Pit

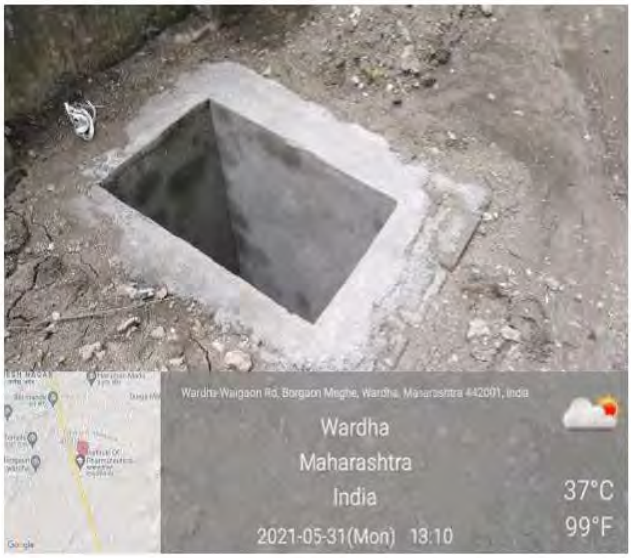
Taps to be replaced by faucets

RO water used for drinking purpose

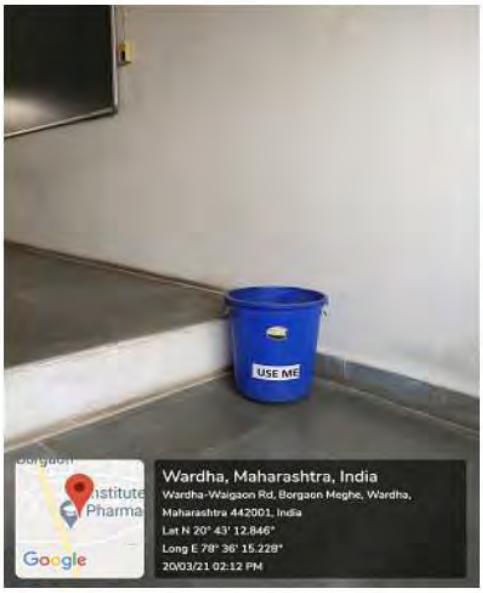
Well & bore well only source of water

Annexure –XIII: Waste Management

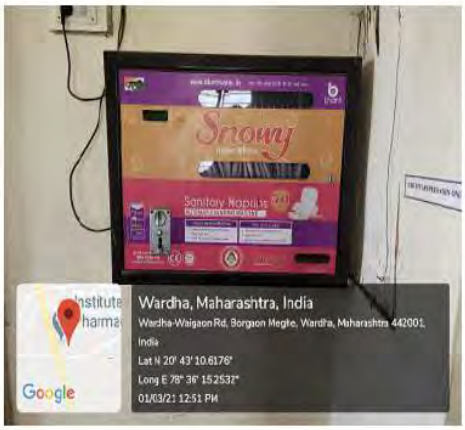
RO Waste water used for gardening



Chemical waste soak pit (Under Construction)



Dustbins in classrooms & labs



Vending machine & Incinerator machine installed in girls common room

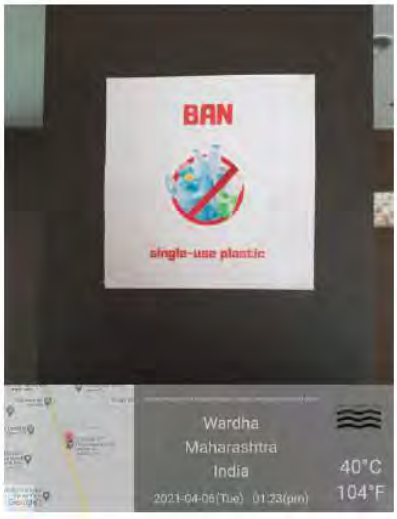
Water from AC condenser collected in bucket

E-Waste collection bin

Pipe line to flow chemical waste

Compost pit under construction

Use of Dustbins to segregate waste



Ban on single use plastic in campus

कार्यालय ग्रामपंचायत बोरगाव (मेघे)

पंचायत समिती, वर्धा, ता. वर्धा, जिल्हा वर्धा

* सरपंच *	* उपसरपंच *	* ग्रामविकास अधिकारी *
श्री. संतोष पु. सेलुकर	श्री. मोहन सु. येरणे	~~एस. के. गुडवार~~ पि. पी. खडसे
Mob: 9372911336	Mob : 8605550297	~~Mob: 9763210200~~

जावक क्रमांक :

दिनांक : २६/०३/२०२१

प्रमाणपत्र

ग्रामपंचायत कार्यालय बोरगांव (मेघे) कडून प्रमाणित करण्यांत येते की; ग्रामपंचायत बोरगांव (मेघे) अंतर्गत मौजा बोरगांव (मेघे) येथील औषध निर्माण शास्त्र शिक्षण व संशोधन संस्था या महाविद्यालयातील साधा कचरा ग्रामपंचायतीच्या कचरा गाडी मार्फत गोळा केला जातो.

करीता सबब प्रमाणपत्र देण्यांत येत आहे.

बोरगांव (मेघे)
दि २६/०३/२०२१

सरपंच
ग्रामपंचायत बोरगाव (मेघे)

* झाडे लावा झाडे जगवा * * झाडे लावा झाडे जगवा * * झाडे लावा झाडे जगवा *

Solid Waste handling letter from Grampanchayat

A. B. INDUSTRIES

Waste Material Re-process Unit

Plot No. A13, Sewagram Road, MIDC, Wardha. Mob. 9372930697

Ref. No. Date

Ref No. 56 **Date: 17/06/2019**

CERTIFICATE

(PAPER AND CELLULAR WASTE DISPOSAL)

This is to certify that the paper and cellular waste received from Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha, during the period from 01/04/2017 to 31/03/2019, was disposed of in environment friendly manner.

Authorized Signature

Cellulose waste handling certificate

Estd : 1991

VIDARBHA YOUTH WELFARE SOCITY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

NAAC accredited Grade 'A'

Dr. R. O. Ganjiwale
I/C. Principal

Ph. 07152 -240284
Fax 07152-241684

E-mail: iper4160@gmail.com
Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No. ADM/220/11

Date: 01/04/2018

Agreement for Disposal of E-Waste

This indenture of agreement is made on 01 April 2018 between Principal, Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha (Hereafter Party No. 1) and Purab Sales, Wardha, sole proprietor through Mr. Prakash Bhagat (Hereafter Party No. 2)

Whereas the Part No. 1, is running Institute of Pharmaceutical Education and Research, (Bachelor of Pharmacy, Master of Pharmacy, Ph.D in Pharmacy) at Borgaon (Meghe), Wardha. The College is recognized by All India Council of Technical Education, and Pharmacy Council of India, New Delhi. It is also permanently affiliated to the Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

And

Whereas the Party No.1, Students of College are imparted with Computer knowledge along with Practical's.

And

Whereas Students of College performs various experiments on electronic machines.

And

Whereas after some period of times the computers, monitors, keyboards, and electronic machines becomes out of order.

And

Whereas the disposal of such E- waste creates problem of disposal as per prevailing environmental laws.

And

Whereas Party No. 2 is authorized computer agency and ready to dispose/reuse/recycle the E- waste provided to them.

This agreement witnesses as under

1] That Party No.1 shall provide all the E-waste generated in the college to Party No.2 free of cost.

2] That Party No.2 agrees to dispose/reuse/recycle the E-waste provided by Party No. 1 as per prevailing environmental law.

3] That this agreement is valid for a period of 01/04/2018 to 31/03/2019.

In witness thereof signed by Party No. 1 and Party No. 2.

Dr. R. O. Ganjiwale
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Mr. Prakash Bhagat
Purab Sales

Estd : 1991

VIDARBHA YOUTH WELFARE SOCITY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

NAAC accredited Grade 'A'

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Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No. ADM/220/21

Date: 01/04/2019

Agreement for Disposal of E-Waste

This indenture of agreement is made on 01 April 2019 between Principal, Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha (Hereafter Party No. 1) and Purab Sales, Wardha, sole proprietor through Mr. Prakash Bhagat (Hereafter Party No. 2)

Whereas the Part No. 1, is running Institute of Pharmaceutical Education and Research, (Bachelor of Pharmacy, Master of Pharmacy, Ph.D in Pharmacy) at Borgaon (Meghe), Wardha. The College is recognized by All India Council of Technical Education, and Pharmacy Council of India, New Delhi. It is also permanently affiliated to the RashtrasantTukadoji Maharaj Nagpur University, Nagpur.

And

Whereas the Party No.1. Students of College are imparted with Computer knowledge along with Practical's.

And

Whereas Students of College performs various experiments on electronic machines.

And

Whereas after some period of times the computers, monitors, keyboards, and electronic machines becomes out of order.

And

Whereas the disposal of such E- waste creates problem of disposal as per prevailing environmental laws.

And

Whereas Party No. 2 is authorized computer agency and ready to dispose/reuse/recycle the E- waste provided to them.

This agreement witnesses as under

1] That Party No.1 shall provide all the E-waste generated in the college to Party No.2 free of cost.

2] That Party No.2 agrees to dispose/reuse/recycle the E-waste provided by Party No. 1 as per prevailing environmental law.

3] That this agreement is valid for a period of 01/04/2019 to 31/03/2020.

In witness thereof signed by Party No. 1 and Party No. 2.

Dr. R. O. Ganjiwale
Principal

PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Mr. Prakash Bhagat
Purab Sales

MOU of E-waste handling from 2019 -20

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

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Dr. R. O. Ganjiwale, I/c Principal

E-mail: iper4160@gmail.com
Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No. ADM/220/54

Date: 01/04/2020

Agreement for Disposal of E-Waste

This indenture of agreement is made on 01 April 2020 between Principal, Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha (Hereafter Party No. 1) and Purab Sales, Wardha, sole proprietor through Mr. Prakash Bhagat (Hereafter Party No. 2)

Whereas the Part No. 1, is running Institute of Pharmaceutical Education and Research, (Bachelor of Pharmacy, Master of Pharmacy, Ph.D in Pharmacy) at Borgaon (Meghe), Wardha. The College is recognized by All India Council of Technical Education, and Pharmacy Council of India, New Delhi. It is also permanently affiliated to the Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

And

Whereas the Party No.1, Students of College are imparted with Computer knowledge along with Practical's.

And

Whereas Students of College performs various experiments on electronic machines.

And

Whereas after some period of times the computers, monitors, keyboards, and electronic machines becomes out of order.

And

Whereas the disposal of such E- waste creates problem of disposal as per prevailing environmental laws.

And

Whereas Party No. 2 is authorized computer agency and ready to dispose/reuse/recycle the E- waste provided to them.

This agreement witnesses as under

1] That Party No.1 shall provide all the E-waste generated in the college to Party No.2 free of cost.

2] That Party No.2 agrees to dispose/reuse/recycle the E-waste provided by Party No. 1 as per prevailing environmental law.

3] That this agreement is valid for a period of 01/04/2020 to 31/03/2021.

In witness thereof signed by Party No. 1 and Party No. 2.

Dr. R. O. Ganjiwale
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon(Meghe), Wardha

Mr. Prakash Bhagat
Purab Sales

MOU of E-waste handling from 2020 -21

महाराष्ट्र MAHARASHTRA ◑ 2020 ◑ XE 910882

31-3-2021

PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Ref. No. ADM/220/181 Date: 01/04/2021

Agreement for Disposal of E-Waste

This indenture of agreement is made on 01 April 2021 between Principal, Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha (Hereafter Party No. 1) and Purab Sales, Wardha, sole proprietor through Mr. Prakash Bhagat (Hereafter Party No. 2)

Whereas the Part No. 1, is running Institute of Pharmaceutical Education and Research, (Bachelor of Pharmacy, Master of Pharmacy, Ph.D in Pharmacy) at Borgaon

(Meghe), Wardha. The College is recognized by All India Council of Technical Education, and Pharmacy Council of India, New Delhi. It is also permanently affiliated to the Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

And

Whereas the Party No.1, Students of College are imparted with Computer knowledge along with Practical's.

And

Whereas Students of College performs various experiments on electronic machines.

And

Whereas after some period of times the computers, monitors, keyboards, and electronic machines becomes out of order.

And

Whereas the disposal of such E- waste creates problem of disposal as per prevailing environmental laws.

And

Whereas Party No. 2 is authorized computer agency and ready to dispose/reuse/recycle the E- waste provided to them.

This agreement witnesses as under

1] That Party No.1 shall provide all the E-waste generated in the college to Party No.2 free of cost.

2] That Party No.2 agrees to dispose/reuse/recycle the E-waste provided by Party No. 1 as per prevailing environmental law.

3] That this agreement is valid for a period of 01/04/2021 to 31/03/2023.

In witness thereof signed by Party No. 1 and Party No. 2.

Dr. R. O. Ganjiwale
Principal

PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Mr. Prakash Bhagat
Purab Sales

MOU of E-waste handling from April 2021 to March 2023

Purab sales

Ref No. 23 Date: 02/04/2019

CERTIFICATE

(E-WASTE DISPOSAL)

This is to certify that the e-waste received from Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha during the period from 01/04/2018 to 31/03/2019 was disposed of in environment friendly manner.

Prakash Bhagat
Purab Sales

E-waste handling certificate for 2018 -19

Purab sales

Ref No. 22 Date: 04/04/2020

CERTIFICATE

(E WASTE DISPOSAL)

This is to certify that the e-waste received from Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha during the period from 01/04/2019 to 31/03/2020 was disposed of in environment friendly manner.

Prakash Bhagat
Purab Sales

E-waste handling certificate for 2019 – 20

Purab sales

Ref No. 17 Date: 03/04/2021

CERTIFICATE

(E-WASTE DISPOSAL)

This is to certify that the e-waste received from Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha during the period from 01/04/2020 to 31/03/2021 was disposed of in environment friendly manner.

Prakash Bhagat
Purab Sales

E-waste handling certificate for 2020 – 21

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH
Borgaon (Meghe), Wardha. 442 001

Excess of solvent used in reaction can be recovered by distillation process to prevent contamination of water.

Sr. No.	Name of Solvent	Boiling point of solvent at which distillation carried out
1	Acetic acid	118
2	Acetone	56.05
3	Acetonitrile	81.65
4	Benzene	80.1
5	1-butanol	117.7
6	2-butanol	99.5
7	2-butanone	79.6
8	*t*-butyl alcohol	82.4
9	Carbon tetrachloride	76.8
10	Chlorobenzene	131.7
11	Chloroform	61.2
12	Cyclohexane	80.7
13	1,2-dichloroethane	83.5
14	Diethylene glycol	246
15	Diethyl ether	34.5
16	Diglyme (diethylene glycol dimethyl ether)	162
17	1,2-dimethoxy-ethane (glyme, DME)	84.5
18	Dimethyl-formamide (DMF)	153
19	Dimethyl sulfoxide (DMSO)	189
20	1,4-dioxane	101.1
21	Ethanol	78.5
22	Ethyl acetate	77
23	Ethylene glycol	195
24	Glycerine	290
25	Heptane	98
26	Hexamethylphosphoramide (HMPA)	232.5
27	Hexamethylphosphorous triamide (HMPT)	150
28	Hexane	69
29	Methanol	64.6
30	Methyl *t*-butyl ether (MTBE)	55.2
31	Methylene chloride	39.8
32	*N*-methyl-2-pyrrolidinone (NMP)	202

33	Nitromethane	101.2
34	Pentane	36.1
35	Petroleum ether (ligroine)	30-60
36	1-propanol	97
37	2-propanol	82.4
38	Pyridine	115.2
39	Tetrahydrofuran (THF)	65
40	Toluene	110.6
41	Triethyl amine	88.9
42	Water	100.00
43	Water, heavy	101.3
44	*o*-xylene	144
45	*m*-xylene	139.1
46	*p*-xylene	138.4

Note:

1. **After neutralization of chemical waste, it is collected in separate container and dumped in Chemical Soak Pit.**
2. **Cleaning/Washing of utensils carried out by detergent powder and waste water collected in separate container**

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. P. B. Ankar	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

BorgaonMeghe), Wardha 442001

CHEMICAL WASTE TREATMENT

Sr. No.	Name of Chemical	Neutralization treatment
1	Sulphuric acid	Two moles of sodium hydroxide (NaOH) is required to neutralize one mole of sulphuric acid (H_2SO_4) resulting in sodium sulphate, as follows: **$2NaOH + H_2SO_4 \rightarrow Na_2(SO)_4 + 2H_20$**
2	Hydrochloric acid	One mole of sodium hydroxide (NaOH) is required to neutralize one mole of hydrochloric acid (HCl) resulting in sodium chloride, as follows: **$NaOH + HCl \rightarrow NaCl + H_20$** Conversely one mole of lime as Ca $(OH)_2$ will neutralize two moles of hydrochloric acid (HCl) resulting in calcium chloride, as follows: **$Ca(OH)_2 + 2HCl \rightarrow CaCl_2 + 2H_20$**
3	Nitric acid	One mole of sodium hydroxide (NaOH) is required to neutralize one mole of HNO_3 resulting in sodium nitrate, as follows: **$NaOH + HNO_3 \rightarrow NaNO_3 + H_20$** Conversely one mole of lime as Ca $(OH)_2$ will neutralize two moles of nitric acid (HNO_3) resulting in calcium nitrate, as follows: **$Ca(OH)_2 + 2HNO_3 \rightarrow Ca(NO_3)_2 + 2H_20$**
4	Sodium hydroxide	One mole of HCl is required to neutralize one mole of NaOH resulting in sodium chloride, as follows: **$HCl + NaOH \rightarrow NaCl + H_20$** Conversely one mole of sulphuric acid (H_2SO_4) will neutralize two moles of sodium hydroxide (NaOH) resulting in sodium sulphate, as follows: **$H_2SO_4 + 2NaOH \rightarrow Na_2(SO)_4 + 2H_20$**
5	Calcium hydroxide	Two moles of hydrochloric acid (HCl) will neutralize one mole of lime as Ca $(OH)_2$ resulting in calcium chloride, as follows: **$2HCl + Ca(OH)_2 \rightarrow CaCl_2 + 2H_20$**
6	Magnesium hydroxide	Magnesium hydroxide is relatively insoluble in water at neutral pH values and higher. Given this, magnesium has little or no effect on water alkalinity above a pH of 7.0

The most commonly controlled parameter in laboratory wastewater is pH which is the measure of free acidity or alkalinity of an aqueous stream.

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. P. B. Ankar	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale

SOP for neutralizing the Used Chemicals before disposal

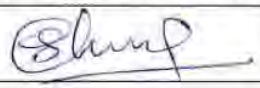
INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha. 442 001

SOP for handling and usage of Hazardous chemicals

1. Handle the hazardous chemicals only by using protective means like hand gloves and safety goggles
2. Use suction bulb or vacuum during pipetting the chemicals
3. Keep inflammable liquids and substances away from naked flame and electric spark.
4. Carefully handles the ether like chemicals and it should not be used near flame.
5. Prepare dilute sulphuric acid solution as per following procedure:

   First cool the aqueous solution in ice bath then pour sulphuric acid slowly in it with constant stirring.
6. Clean the spillage if any as per protocol.

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. C. S. Chaudhari	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale
			

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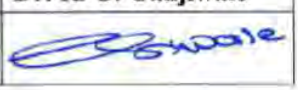
Standard Operating Procedure for Biomedical Waste

Animal waste:

Biomedical waste from animal house including blood, animal tissue, bleeding part and sacrificed animals used in the experimental protocol in Pharmacological investigation are normally incinerated thereafter ash buried in soil.

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. S. D. Dharpure	Dr. B. R. Gandhare	Dr. R. O. Ganjiwale
			

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Standard Operating Procedure for Biomedical Waste

Microbiology and Biotechnological waste:

Biomedical waste from Microbiology and Biotechnology laboratory including various microbial cell cultures are inactivated by Autoclave Sterilization thereafter same is disposed of by incineration.

(Condition in autoclave: Temperature 121 ^{0}C, time 15 minutes and pressure 15 psi)

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mrs. M. M. Deshmukh	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale
			

Annexure –XIV: Awareness / Posters

Swachata Janjagaran Rally & Samuhik Shapath under Swachha Bharat Abhiyan was organized with collaboration of Wardha Nagar Parishad in September – October 2018

Awareness campaign on COVID -19 was organized by IPER from 18th March 2020 till date

Integrated Energy and Green Audit: Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha.

Virtual Yoga Day was celebrated as "Yoga @ Home and Yoga with Family" on 21st June 2020

Herbal Garden in college campus

Diesel Generator in college

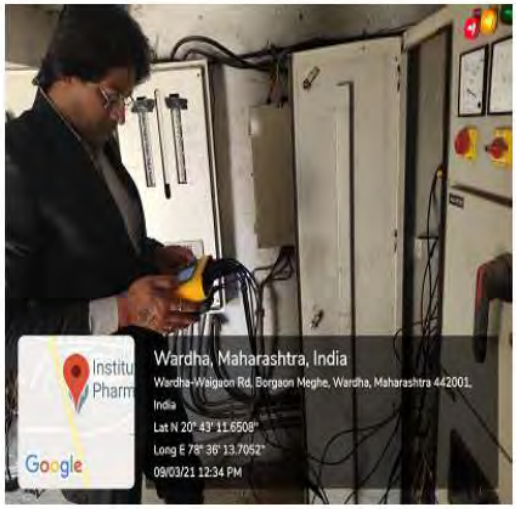
Integrated Energy and Green Audit: Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha.

Chemical storage system

Green Audit Team in discussion with Principal

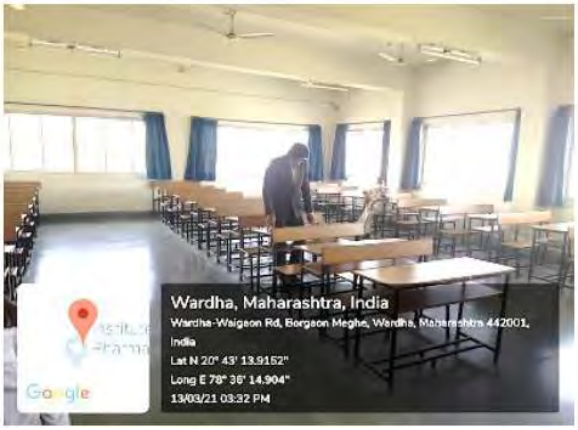
Green Audit Team in discussion with staff members & students

Annexure –XV: Onsite Measurements (Sample Pictures)



Onsite Power Factor and Harmonics Study

Integrated Energy and Green Audit: Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha.



Fire Fighting System installed in college

VERRA

Verified Carbon Standard

Certificate of Verified Carbon Unit (VCU) Retirement

Verra, in its capacity as administrator of the Verra Registry, does hereby certify that on 31 May 2021, 60 Verified Carbon Units (VCUs) were retired on behalf of:

Institute of Pharmaceutical Education and Research Borgaon (Meghe), Wardha, Maharashtra

Project name:

Natural Gas Based Combined Cycle Power Generation, at Kothapeta, East Godavari, Andhra Pradesh, India

VCU serial number:

10055-173964937-173964996-VCS-VCU-508-VER-IN-1-837-01012011-31122011-0

Additional Certifications:

Additional details on this retirement can be found on the Verra Registry.

Powered by APX

GHG Offsetting Certificate

Description of Energy Audit

An energy audit is an inspection, survey and analysis of energy flows, for energy conservation in a building, process and system to reduce the amount of energy input into the system without affecting the output(s). An energy audit is the first step in identifying opportunities to reduce energy expenses and carbon footprints.
The term energy audit is commonly used to describe a broad spectrum of energy studies ranging from a quick walk-through of a facility to identify major problem areas to a comprehensive analysis of the implications of alternative energy efficiency measures sufficient to satisfy the financial criteria of sophisticated investors.

The process of energy audit:-

- The analysis of building and utility data, including study of the installed equipment and analysis of energy bills;
- The survey of the real operating conditions;
- The understanding of the building behavior and of the interactions with weather, occupancy and operating schedules;
- The selection and the evaluation of energy conservation measures;
- The estimation of energy saving potential;
- The identification of customer concerns and needs.

Generally, four levels of analysis can be outlined

Level 0: Benchmarking:

Breakout of electric and fuel consumptions into end-use components (space heating, fan energy, lighting consumption, etc.) Comparison of the building's consumptions to other buildings of typical size, use and geographic location.

Level- I: Walk-through audit: Preliminary analysis made to assess building energy efficiency to identify not only simple and low-cost improvements but also a list of energy conservation measures to orient the future detailed audit. This inspection is based on visual verifications, study of installed equipment and operating data and detailed analysis of recorded energy consumption collected during the benchmarking phase;

Level- II: Detailed/General energy audit: Based on the results of the pre-audit, this type of energy audit consists in energy use survey in order to provide a comprehensive analysis of the studied installation

Level- III: Investment-Grade audit: Detailed Analysis of Capital-Intensive Modifications focusing on potential costly ECOs requiring rigorous engineering study.

Description of Process and Measurements

Instrument Used for the Study:-

1. Power Analyser – ALM 30 Krykard

The 3 phase power analyzer and data logger were used to measure and log the electrical parameters data for the various load centers in the facility. Most of the loads have variation in power requirement and therefore logging helps to observe the variations as well as the average electrical consumption of the load centers.

Using the logger, all major electrical parameters of voltage, current, power, power factor, apparent power, harmonics etc. are recorded at fixed intervals of time.

The variation of parameters like power are plotted and shown with time on X axis and parameter on Y axis. Observations are made on the basis of these measurements.

Some Basic terms:

1. Power – kilowatt (kW) – It is the power consumed by the equipment. This value is varying as per load requirements.
2. Energy – kilowatt hour (kWh) – It is the energy (electrical units) consumed by the equipment. If average power for an electrical load is 2 kW, it means that it consumes 2 kWh units per hour.
3. Apparent power kilo Volt Ampere (kVA) – It is a measure of demand Power / power factor.

Table 1 : FOLLOWING TABLE SHOW VOLTAGE, CURRENT AND FREQUENCY

	VOLTAGE SINGLE PHASE			VOLTAGE LINE TO LINE			CURRENT			Frequency
Time	R	Y	B	RY	YB	BR	R	Y	B	Hz
11:30:30 AM	235	239	235	408	412	407	141.6	119.3	177.7	50.1
11:31:00 AM	232	237	233	404	408	403	178.1	159.8	217.3	50.1
11:31:30 AM	234	239	235	407	412	407	146.8	117.8	178.8	50.1
11:32:00 AM	234	239	235	407	412	407	152.7	121.9	182.6	50.1
11:32:30 AM	233	237	233	405	409	405	182.9	155.9	212.0	50.1
11:33:00 AM	234	238	235	407	411	407	156.1	129.4	187.6	50.1
11:33:30 AM	234	238	235	407	411	407	157.0	129.3	184.9	50.1
11:34:00 AM	233	237	234	405	409	406	173.3	149.9	204.7	50.1
11:34:30 AM	234	237	234	405	409	406	173.5	152.4	204.4	50.1
11:35:00 AM	235	238	234	407	411	407	154.5	132.4	189.6	50.1
11:35:30 AM	234	238	234	406	410	406	163.7	143.3	198.4	50.0
11:36:00 AM	233	236	232	404	407	404	184.7	166.4	222.3	50.0
11:36:30 AM	234	238	234	406	410	406	159.7	137.7	195.3	50.0
11:37:00 AM	234	238	233	406	410	406	162.5	135.5	198.2	50.0
11:37:30 AM	232	236	232	402	406	402	198.7	171.6	234.5	50.0
11:38:00 AM	234	238	233	406	410	406	164.7	133.2	197.3	50.0
11:38:30 AM	234	238	234	406	410	406	165.4	138.3	192.0	49.9
11:39:00 AM	233	237	233	405	408	405	186.2	164.7	211.2	49.9
11:39:30 AM	233	237	234	405	408	405	183.3	163.7	207.6	49.9
11:40:00 AM	233	238	235	406	410	406	168.4	145.2	189.9	49.9
11:40:30 AM	233	237	234	406	410	406	172.9	149.7	194.3	49.9
11:41:00 AM	232	236	233	404	407	404	200.9	180.6	223.6	49.9
11:41:30 AM	234	238	234	406	410	407	164.7	147.4	196.0	49.9
11:42:00 AM	234	238	234	406	410	406	165.1	147.7	200.7	49.9

	VOLTAGE SINGLE PHASE			VOLTAGE LINE TO LINE			CURRENT			Frequency
Time	R	Y	B	RY	YB	BR	R	Y	B	Hz
11:42:30 AM	233	236	233	404	407	404	187.3	173.0	224.3	49.9
11:43:00 AM	234	238	234	407	410	407	162.4	147.5	199.4	49.9
11:43:30 AM	235	239	235	408	412	408	138.1	121.6	175.0	49.9
11:44:00 AM	235	238	235	407	411	408	147.4	130.5	184.4	49.9
11:44:30 AM	237	241	241	413	418	415	102.9	83.8	106.3	49.9
11:45:00 AM	239	242	243	415	420	418	71.4	53.4	59.0	49.9
11:45:30 AM	239	242	242	416	420	418	71.6	52.8	59.1	49.9
11:46:00 AM	239	242	242	416	420	418	71.8	52.7	59.0	49.9
11:46:30 AM	239	242	243	416	420	418	72.3	52.7	59.4	49.9
11:47:00 AM	240	242	242	416	420	418	66.2	52.8	59.6	50.0
11:47:30 AM	240	242	242	416	420	418	64.6	56.7	60.9	50.0
11:48:00 AM	240	242	242	417	420	418	63.7	57.2	61.5	50.0
11:48:30 AM	240	242	242	417	420	418	59.7	57.1	61.6	50.0
11:49:00 AM	240	242	242	417	420	418	59.7	57.2	61.6	50.0
11:49:30 AM	239	241	240	415	418	415	80.7	77.2	106.4	50.0
11:50:00 AM	236	239	235	409	413	408	127.7	121.2	177.8	50.0
11:50:30 AM	238	241	236	412	415	410	102.7	93.5	151.2	50.0
11:51:00 AM	238	241	237	413	416	411	97.4	85.5	144.5	50.0
11:51:30 AM	237	240	236	411	414	410	116.0	102.4	160.2	50.0
11:52:00 AM	236	240	236	410	414	409	123.4	110.4	166.2	50.0
11:52:30 AM	237	241	237	412	415	411	111.3	92.7	147.6	50.0
11:53:00 AM	235	239	235	408	412	408	143.4	120.9	172.5	50.0
11:53:30 AM	234	237	233	406	409	405	167.5	157.4	207.2	50.0
11:54:00 AM	235	238	235	408	411	407	145.1	131.8	181.7	50.0
11:54:30 AM	235	239	235	408	412	408	137.7	124.2	172.9	50.0
11:55:00 AM	235	238	234	407	411	407	146.2	133.8	181.6	50.0

	VOLTAGE SINGLE PHASE			VOLTAGE LINE TO LINE			CURRENT			Frequency
Time	R	Y	B	RY	YB	BR	R	Y	B	Hz
11:55:30 AM	234	237	233	406	409	405	162.1	151.0	200.3	50.0
11:56:00 AM	235	238	235	408	411	407	138.6	124.0	174.0	50.0
11:56:30 AM	235	239	235	408	412	407	139.9	123.7	171.7	50.0
11:57:00 AM	233	237	234	405	409	405	169.8	154.1	203.9	50.0
11:57:30 AM	234	238	235	407	412	407	142.8	123.4	175.0	50.0
11:58:00 AM	235	239	235	407	412	408	139.5	118.6	171.0	50.0
11:58:30 AM	234	238	234	406	410	406	157.1	138.3	189.6	50.0
11:59:00 AM	234	238	234	406	409	406	160.9	141.4	192.2	50.0
11:59:30 AM	235	239	235	409	412	408	137.4	118.0	168.9	50.0
12:00:00 PM	235	239	235	408	412	408	139.4	123.8	173.6	50.0
12:00:30 PM	234	237	233	406	409	405	168.1	158.7	203.9	50.0
12:01:00 PM	236	239	235	409	412	408	134.0	122.9	169.4	50.0
12:01:30 PM	236	239	235	409	412	408	132.8	123.3	170.3	50.1
12:02:00 PM	235	237	234	407	410	406	156.5	150.2	194.9	50.1
12:02:30 PM	235	238	235	408	411	408	153.5	139.9	184.8	50.1
12:03:00 PM	236	239	236	409	412	409	139.4	124.1	170.2	50.1
12:03:30 PM	235	238	235	408	411	408	149.2	134.3	180.7	50.1
12:04:00 PM	234	238	234	407	410	407	164.6	144.1	193.8	50.1
12:04:30 PM	235	239	235	408	412	408	140.1	119.0	169.9	50.1
12:05:00 PM	235	238	235	408	412	408	137.9	123.8	173.9	50.0
12:05:30 PM	234	237	233	405	408	405	166.3	157.4	206.0	50.0
12:06:00 PM	236	239	235	409	412	408	132.1	119.3	169.7	50.0
12:06:30 PM	236	239	235	409	412	408	132.7	121.4	170.7	50.0
12:07:00 PM	239	241	241	415	418	417	71.7	68.8	85.5	50.0
12:07:30 PM	240	242	242	416	420	418	61.2	54.1	56.2	50.0
12:08:00 PM	239	242	243	416	419	418	67.4	54.3	56.1	50.0

	VOLTAGE SINGLE PHASE			VOLTAGE LINE TO LINE			CURRENT			Frequency
Time	R	Y	B	RY	YB	BR	R	Y	B	Hz
12:08:30 PM	239	242	242	416	419	418	69.2	54.3	56.3	50.0
12:09:00 PM	239	242	242	415	419	418	69.8	54.4	56.1	50.0
12:09:30 PM	239	242	242	415	419	418	69.9	51.3	56.0	50.0
12:10:00 PM	240	242	242	416	419	418	63.0	49.8	55.8	50.0
12:10:30 PM	240	242	242	417	419	419	57.6	49.6	55.6	50.0
12:11:00 PM	240	242	243	417	420	419	55.4	49.7	55.8	50.0
12:11:10 PM	241	242	243	417	420	419	55.4	49.8	55.6	50.0

Table 2: Following Table show Voltage and Current Harmonic Distortion

Voltage Distortion			Current Distortion		
R	Y	B	R	Y	B
1.17	1.16	1.09	1.5	2.3	1.9
1.16	1.09	1.05	2.1	2.5	2.2
1.21	1.31	1.13	4.9	2.6	1.9
1.20	1.33	1.14	5.3	2.6	1.9
1.20	1.30	1.13	4.4	2.2	1.6
1.21	1.32	1.14	5.1	2.4	1.8
1.18	1.29	1.12	5.0	2.2	1.8
1.16	1.29	1.11	4.6	2.0	1.6
1.19	1.32	1.12	4.6	2.0	1.6
1.19	1.30	1.13	5.2	2.3	1.6
1.15	1.24	1.13	4.8	2.2	1.6
1.16	1.21	1.11	4.3	1.9	1.4
1.15	1.22	1.10	5.0	2.3	1.5
1.16	1.26	1.10	4.9	2.3	1.5
1.17	1.24	1.10	4.0	1.8	1.3
1.16	1.25	1.13	4.8	2.3	1.5
1.15	1.18	1.12	4.8	2.1	1.6
1.16	1.18	1.12	4.2	1.9	1.5
1.16	1.20	1.11	4.3	1.9	1.5
1.15	1.21	1.12	4.6	2.2	1.6
1.14	1.22	1.13	4.5	2.0	1.6
1.15	1.19	1.13	3.9	1.7	1.4
1.13	1.18	1.11	4.7	2.0	1.5
1.15	1.18	1.09	4.8	1.9	1.5
1.16	1.19	1.10	4.2	1.7	1.4

Voltage Distortion			Current Distortion		
R	Y	B	R	Y	B
1.20	1.25	1.12	4.8	2.0	1.5
1.21	1.26	1.13	5.7	2.4	1.6
1.20	1.24	1.12	5.3	2.2	1.6
1.26	1.35	1.25	7.8	3.9	3.0
1.29	1.40	1.31	11.2	6.2	5.7
1.27	1.39	1.30	11.2	6.2	5.7
1.27	1.38	1.30	11.2	6.1	5.8
1.25	1.37	1.29	11.0	6.2	5.8
1.30	1.39	1.31	12.2	6.1	5.6
1.29	1.36	1.32	12.4	5.8	5.5
1.30	1.36	1.32	12.8	5.7	5.4
1.31	1.38	1.30	13.7	5.8	5.3
1.31	1.39	1.32	13.7	5.9	5.3
1.27	1.34	1.24	9.9	4.1	3.0
1.22	1.27	1.14	6.2	2.4	1.6
1.25	1.31	1.17	7.8	3.1	1.9
1.24	1.31	1.17	8.3	3.4	2.0
1.24	1.30	1.16	7.0	2.9	1.8
1.25	1.29	1.17	6.6	2.6	1.7
1.22	1.30	1.16	7.3	3.2	1.9
1.20	1.24	1.11	5.5	2.4	1.6
1.22	1.19	1.12	4.7	2.0	1.4
1.22	1.23	1.15	5.4	2.4	1.6
1.20	1.21	1.12	5.7	2.6	1.6
1.22	1.19	1.12	5.4	2.4	1.6
1.21	1.18	1.10	4.9	2.2	1.4

Voltage Distortion			Current Distortion		
R	Y	B	R	Y	B
1.20	1.20	1.12	5.7	2.8	1.6
1.20	1.21	1.14	5.6	2.6	1.6
1.23	1.23	1.13	4.7	2.1	1.5
1.26	1.30	1.17	5.6	2.5	1.6
1.24	1.29	1.16	5.7	2.5	1.7
1.24	1.25	1.15	5.0	2.2	1.6
1.25	1.26	1.16	4.9	2.1	1.5
1.25	1.26	1.15	5.7	2.5	1.7
1.24	1.26	1.16	5.7	2.4	1.7
1.24	1.22	1.16	4.7	2.0	1.5
1.25	1.24	1.16	5.9	2.6	1.7
1.26	1.25	1.17	6.0	2.5	1.7
1.27	1.24	1.15	5.1	2.1	1.5
1.22	1.26	1.16	5.2	2.3	1.6
1.21	1.26	1.16	5.7	2.6	1.7
1.21	1.25	1.15	5.4	2.4	1.6
1.22	1.28	1.15	4.9	2.1	1.5
1.22	1.28	1.14	5.7	2.4	1.7
1.24	1.27	1.14	5.8	2.3	1.7
1.26	1.25	1.14	4.8	1.9	1.5
1.24	1.26	1.15	6.1	2.4	1.7
1.25	1.25	1.14	6.0	2.4	1.7
1.36	1.37	1.31	11.8	5.1	3.8
1.36	1.41	1.37	13.6	6.5	6.1
1.32	1.41	1.38	12.2	6.4	6.2
1.29	1.38	1.36	11.7	6.1	6.2

Voltage Distortion			Current Distortion		
R	Y	B	R	Y	B
1.30	1.42	1.37	11.6	6.4	6.2
1.30	1.44	1.38	11.6	6.7	6.3
1.36	1.48	1.42	13.1	6.8	6.5
1.40	1.49	1.41	14.5	6.8	6.5
1.40	1.47	1.40	15.1	6.7	6.4
1.38	1.47	1.40	15.0	6.8	6.5

Table 3 : Following table shows Power Factor

KW in R phase	KW in Y phase	KW in B phase	POWER FACTOR IN R	POWER FACTOR IN Y	POWER FACTOR IN B
31.3	26.9	39.2	0.942	0.947	0.940
39.0	35.7	47.2	0.941	0.945	0.934
32.7	26.8	39.5	0.949	0.952	0.941
34.1	27.7	40.4	0.954	0.950	0.942
40.3	34.7	46.1	0.947	0.939	0.933
34.7	29.1	41.3	0.950	0.942	0.939
35.1	29.1	40.9	0.952	0.943	0.942
38.4	33.2	44.8	0.948	0.934	0.935
38.3	33.6	44.5	0.944	0.929	0.932
34.5	29.6	41.8	0.953	0.939	0.940
36.3	31.8	43.3	0.949	0.933	0.935
40.7	36.6	48.1	0.946	0.930	0.930
35.7	30.7	42.8	0.953	0.938	0.937
36.2	30.2	43.3	0.954	0.937	0.936
43.7	37.9	50.5	0.950	0.935	0.931
36.7	29.7	43.2	0.953	0.938	0.937
36.9	31.1	42.2	0.953	0.946	0.939
41.1	36.6	46.0	0.947	0.938	0.932
40.3	36.3	45.1	0.945	0.936	0.930
37.6	32.7	41.8	0.955	0.948	0.939
38.5	33.6	42.6	0.953	0.945	0.936
44.2	40.1	48.5	0.949	0.941	0.931
36.7	33.2	43.2	0.953	0.948	0.940
36.8	33.2	44.2	0.953	0.947	0.941
41.4	38.4	48.8	0.948	0.939	0.935
35.6	32.4	43.4	0.936	0.924	0.930
31.1	27.7	39.0	0.958	0.952	0.947

KW in R phase	KW in Y phase	KW in B phase	POWER FACTOR IN R	POWER FACTOR IN Y	POWER FACTOR IN B
33.0	29.4	40.8	0.951	0.945	0.943
21.9	17.5	20.7	0.896	0.865	0.811
16.9	12.9	14.1	0.991	-0.997	0.987
16.9	12.7	14.2	0.991	-0.997	0.987
17.0	12.7	14.1	0.991	-0.996	0.987
17.1	12.7	14.2	0.991	-0.996	0.987
15.7	12.8	14.3	0.991	-0.996	0.988
15.3	13.7	14.6	0.991	-0.996	0.987
15.1	13.8	14.7	0.990	-0.998	0.987
14.2	13.8	14.7	0.988	-0.997	0.986
14.2	13.8	14.7	0.989	-0.997	0.986
17.8	17.2	22.0	0.923	0.923	0.863
28.9	27.9	39.9	0.959	0.962	0.954
23.3	21.6	34.3	0.956	0.959	0.960
22.5	20.1	33.1	0.971	0.977	0.969
26.5	23.5	36.2	0.963	0.956	0.959
27.9	25.1	37.3	0.957	0.948	0.953
25.3	21.5	33.7	0.960	0.962	0.964
32.4	27.5	38.5	0.962	0.952	0.949
37.4	35.2	45.4	0.955	0.943	0.941
32.7	29.6	40.2	0.956	0.943	0.944
31.2	28.3	38.6	0.964	0.954	0.949
32.9	30.2	40.2	0.958	0.947	0.944
36.1	33.7	44.0	0.953	0.941	0.941
31.4	28.2	38.9	0.963	0.954	0.952
31.5	28.2	38.3	0.960	0.954	0.949
37.8	34.6	44.8	0.954	0.948	0.940
32.0	28.0	38.9	0.957	0.950	0.946

KW in R phase	KW in Y phase	KW in B phase	POWER FACTOR IN R	POWER FACTOR IN Y	POWER FACTOR IN B
31.4	27.0	38.2	0.960	0.956	0.950
35.0	31.0	41.8	0.952	0.944	0.942
35.8	31.5	42.2	0.951	0.939	0.939
31.1	26.9	37.7	0.962	0.955	0.951
31.5	28.1	38.6	0.960	0.950	0.948
37.5	35.6	44.8	0.955	0.946	0.940
30.3	28.0	37.9	0.961	0.954	0.950
30.0	28.1	38.1	0.959	0.955	0.951
34.9	33.7	43.0	0.951	0.945	0.942
34.3	31.4	40.8	0.950	0.941	0.941
31.5	28.3	38.1	0.959	0.955	0.951
33.5	30.4	40.2	0.955	0.949	0.945
36.7	32.3	42.7	0.953	0.941	0.940
31.7	27.2	38.0	0.963	0.956	0.951
31.1	28.1	38.7	0.957	0.952	0.948
37.0	35.3	45.2	0.952	0.947	0.942
29.8	27.2	38.0	0.958	0.957	0.952
30.0	27.7	38.2	0.958	0.956	0.952
15.9	15.5	18.1	0.927	0.936	0.878
14.5	13.0	13.5	0.987	-0.996	0.990
16.0	13.1	13.5	0.991	-0.996	0.992
16.4	13.1	13.5	0.992	-0.996	0.993
16.5	13.1	13.5	0.992	-0.996	0.992
16.6	12.3	13.5	0.992	-0.993	0.993
15.0	11.9	13.4	0.990	-0.991	0.993
13.7	11.9	13.4	0.988	-0.990	0.993
13.2	11.9	13.4	0.988	-0.990	0.993
13.2	12.0	13.4	0.988	-0.990	0.993

Figure 1 : FOLLOWING FIGURE SHOW ENERGY STUDY

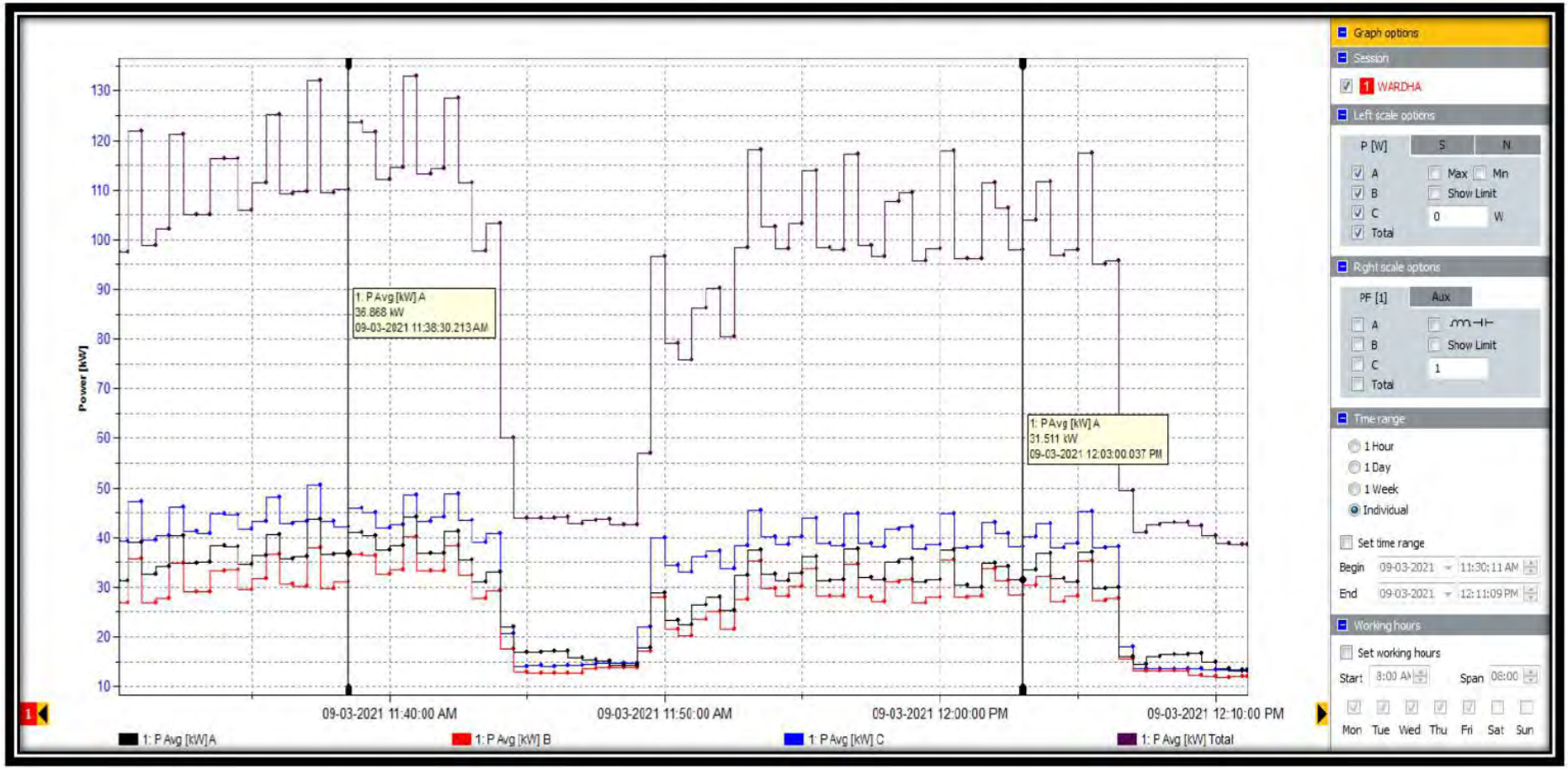


Figure 2: FOLLOWING FIGURE SHOW VOLTAGE HARMONIC

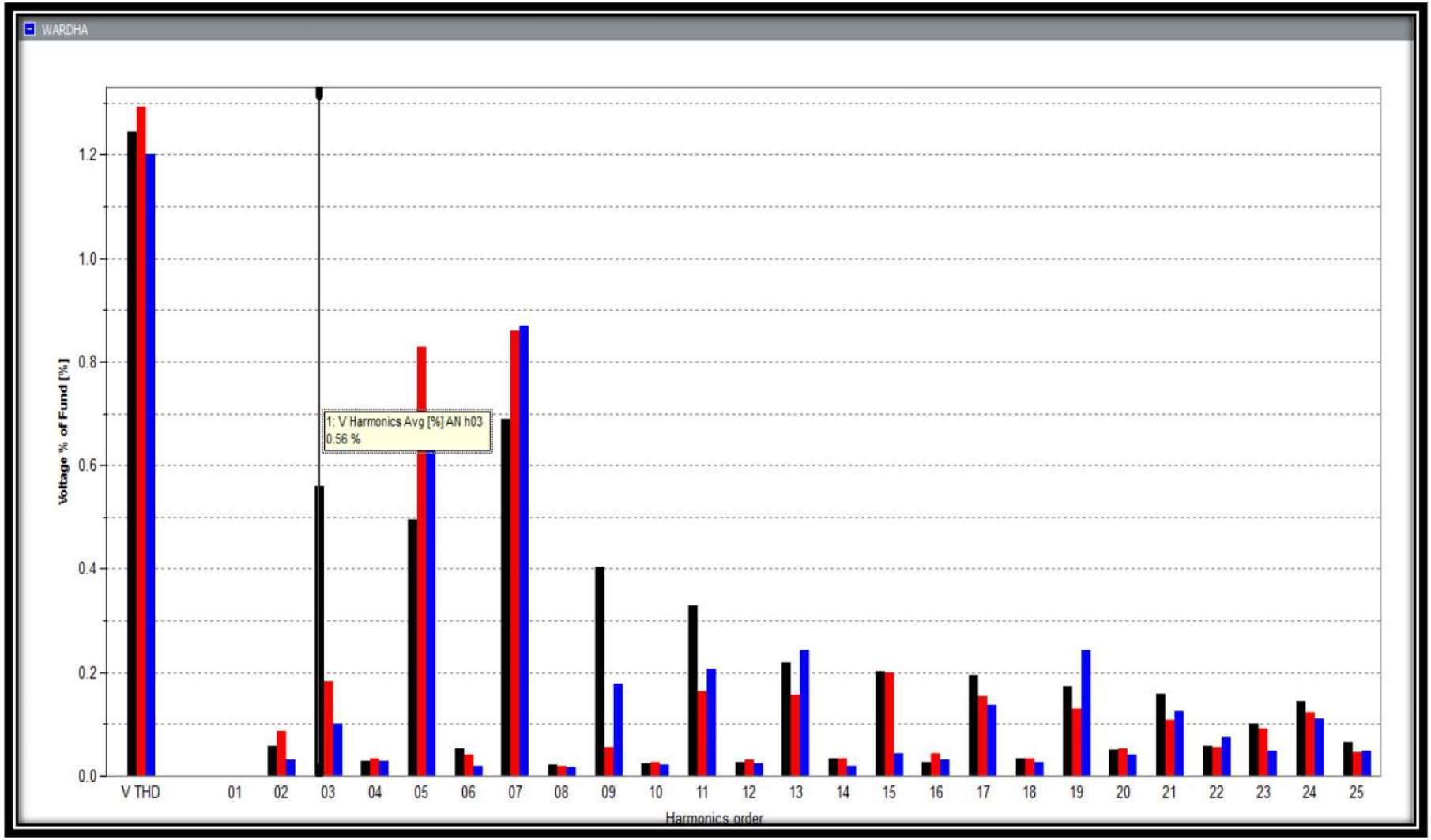
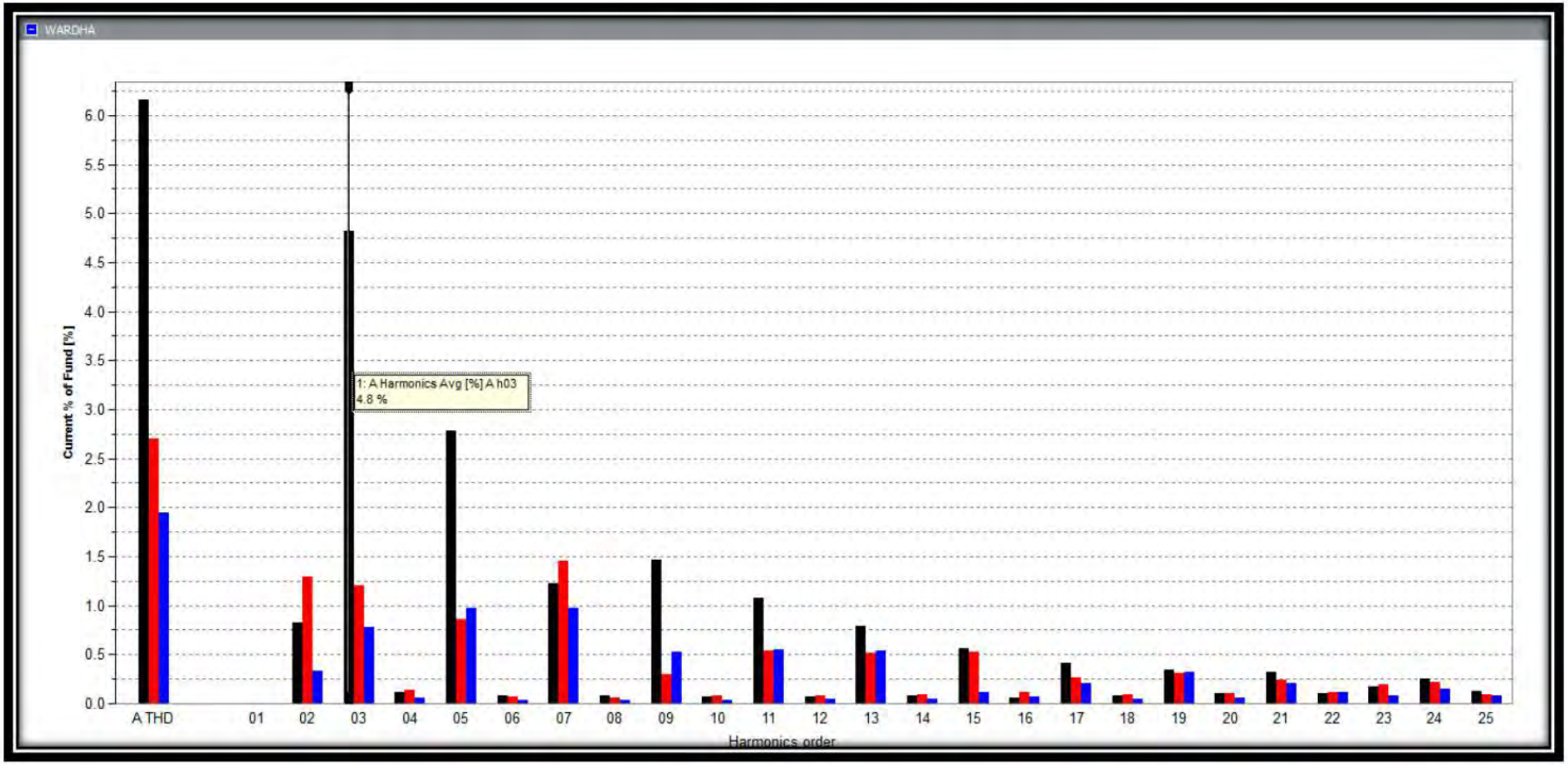


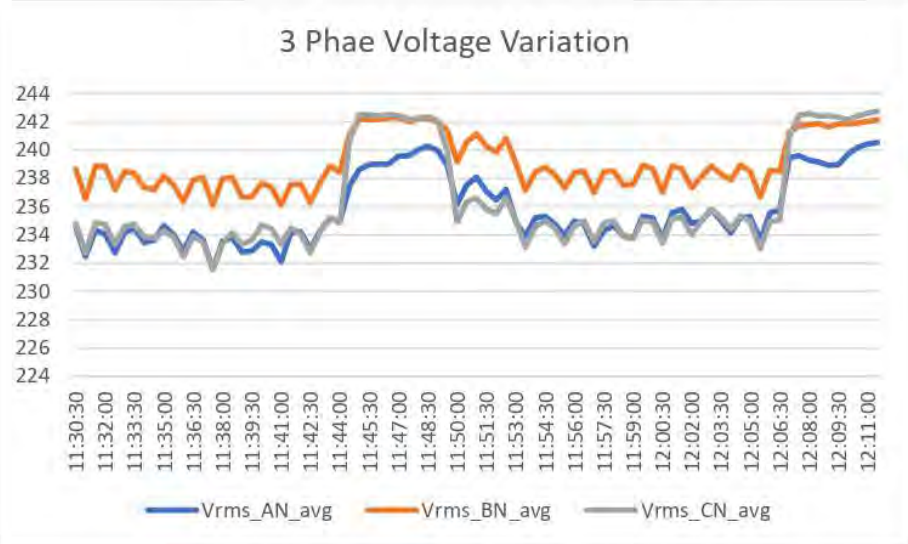
Figure 3: FOLLOWING FIGURE SHOW CURRENT HARMONIC



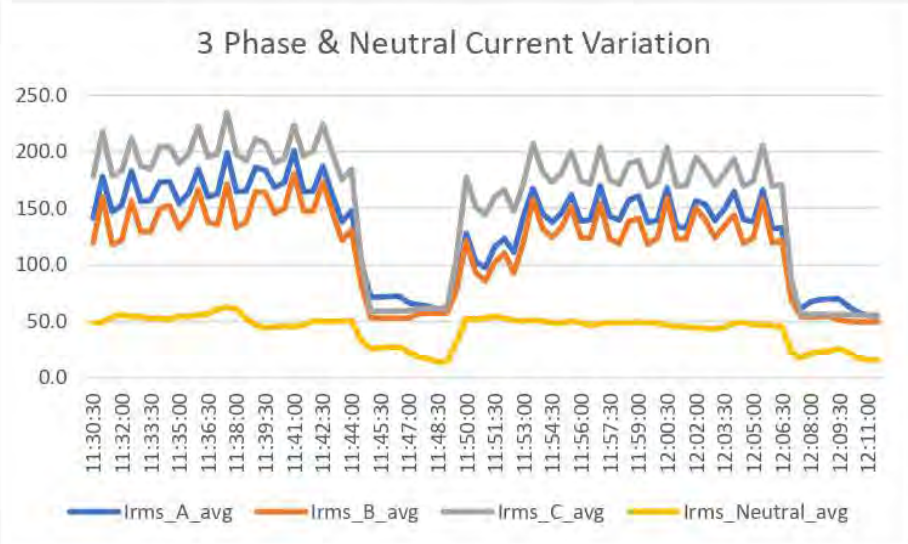
Electrical Measurements Observations

All electrical parameters for main feeder were logged using electrical data logger.
The logging was conducted on 09th March 2021 and all the electrical parameters were recorded at 30 seconds intervals. The cycle was logged during day time at normal college working day.
Below are variations observed during from the measurement and Main feeder.

Graph 1. Voltage Variation at Main Feeder

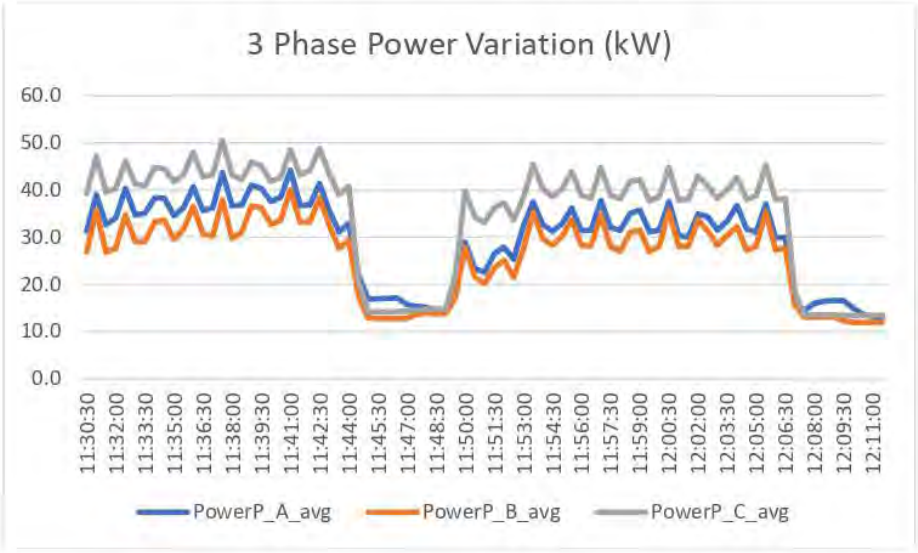


Graph 2. Current Variation at Main feeder

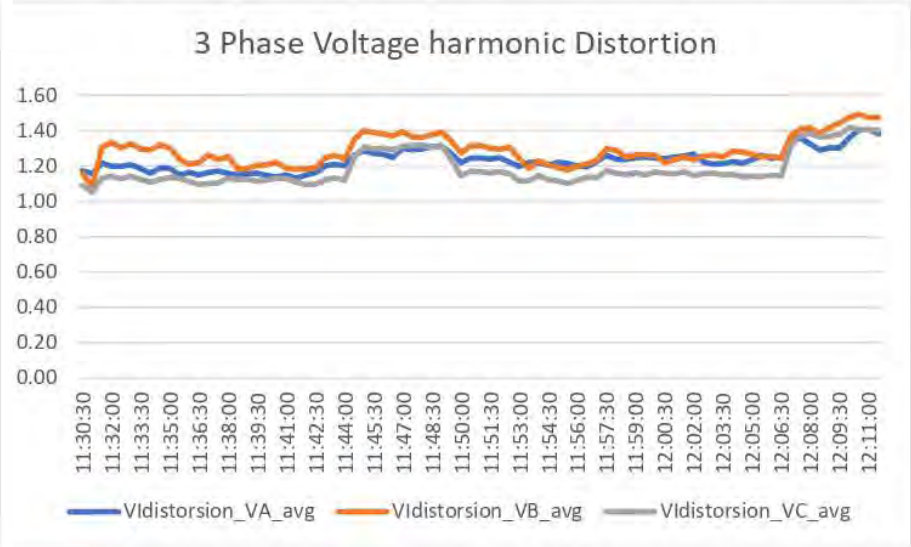


Graph 3. Power Factor Variation at Main Feeder

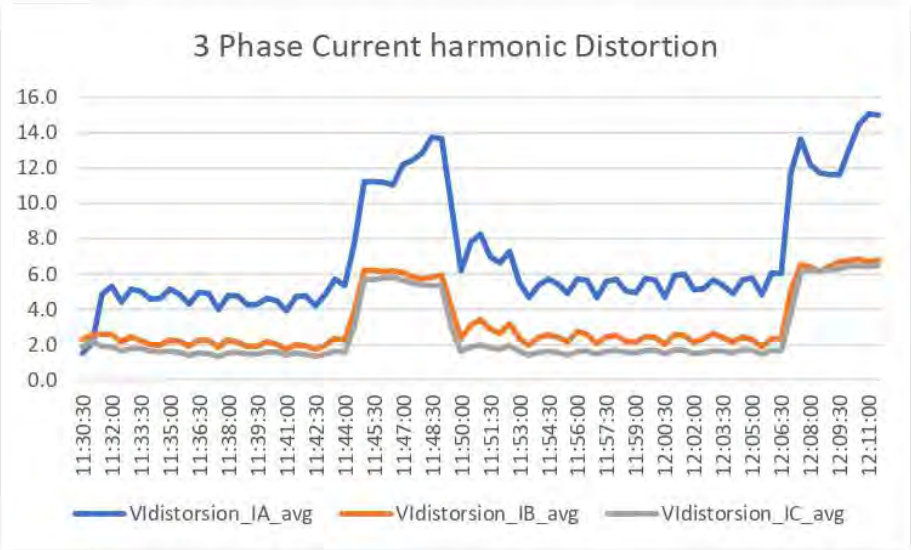
Graph 4. Power Variation at Main Feeder



Graph 5. Voltage Harmonic Distortion at Main Feeder



Graph 6. Current Harmonic Distortion at Main Feeder



The following table gives the results of Voltage and Current data logging for main Feeder.

	Voltage			Current				Power Factor	Active Power		
	Volts			Amperes					kW		
	R	Y	B	R	Y	B	N		R	Y	B
Minimum	232	236	232	55.35	49.58	55.57	14.18	0.84	13.15	11.88	13.37
Average	236	239	236	131.69	115.47	156.26	42.96	0.93	29.60	26.15	34.68
Maximum	241	242	243	200.89	180.56	234.51	62.25	0.98	44.23	40.10	50.53

Observations for Main Feeder Logging

- Power requirement of the complete facility varies between 38 kW to 132 kW during day time maximum power requirement went to about 132 kW.
- The Voltage Variation is between prescribed tolerance limits. The average measured voltage is 239 Volts. The voltage is balanced through the all phases.
- Slight balancing in current distribution required. The unbalance in 3 phases is although less than 10% which is on higher end. The current in Y ***phase is lower than remaining two phases***.

Solution: Distribute of load remaining two phases and balance loads across all 3 phases.
The unbalance in network was recorded due to improper distribution of load. It is recommend that the single phase loads on each phase to be distributed properly so that the current in each phase will be balanced. Unbalanced network can cause three-phase motors and other three-phase loads to experience poor performance or premature failure because of the following: Mechanical stresses in motors due to lower than normal torque output. Higher than normal current in motors and three-phase rectifiers.

- The facility has satisfactory power factor levels having an average power factor maintained at 0.93. Installation of Automatic Power Factor Corrector, will maintain the power factor at unity. There is variation in power factor due to switching loads.

Encon 1. Energy Billing Saving Opportunity by Improving Power Factor.

- The present power factor maintained on average is **0.93**.Minimum PF recorded was 0.84. There is penalty imposed by MSEDCL for not maintaining power factor above 0.90. There is also incentive provide by MSEDCL for maintaining power factor to unity i.e 1. Previously MSEDCL used to charge consumer based on kWh whereas on they'll be charging based on KVAh i.e. (Active Power (kWh) + Reactive Power (kVARh)). The reactive power occupies the capacity of electricity network and reduces the useful capacity of the system for generation and distribution. The source of the most reactive currents is the poor power factor loads (equipment) connected at the consumer premises. As these loads are not compensated by appropriate capacitor installations by consumers, utilities are burdened for installation of capacitors. It is thus imperative that every section of consumers has to shoulder their responsibility to maintain the

system PF within permissible limits only.

- Apart from this, the prime objective of the kVAh billing is to encourage the consumers to maintain near unity Power factor to achieve loss reduction, improve system stability, power quality and improve voltage profile. At the national level, emphasis is being given on energy conservation, energy efficiency and Demand Side Management (DSM) and green energy solutions to optimize the energy usage. By kVAh billing, the consumers will be encouraged to adopt energy efficiency programs and will be benefited by reduced electricity bills.

Solution

- Capacitor required for maintaining power factor near unity- 66 kVAr. Install 70 kVAr Automatic power factor corrector into 5 steps for maintaining power factor near unity.
- Approximate cost of capacitor with installation = Rs. 25000.00

Harmonic Analysis

What is harmonics?

- In an ideal power system, the voltage supplied to customer equipment, and the resulting load current are perfect sine waves. In practice, however, conditions are never ideal, so these waveforms are often quite distorted. This deviation from perfect sinusoids is usually expressed in terms of harmonic distortion of the voltage and current waveforms.
- Power system harmonic distortion is not a new phenomenon - efforts to limit it to acceptable proportions have been a concern of power engineers from the early days of utility systems. At that time, the distortion was typically caused by the magnetic saturation of transformers or by certain industrial loads, such as arc furnaces or arc welders. The major concerns were the effects of harmonics on synchronous and induction machines, telephone interference, and power capacitor failures. In the past, harmonic problems could often be tolerated because equipment was of conservative design and grounded wye-delta transformer connections were used judiciously.
- Distortions of the fundamental sinusoid generally occur in multiples of the fundamental frequency. Thus on a 50 Hz power system, a harmonic wave is a sinusoid having a frequency expressed by the following formula, where n is an integer:

$$f_{harmonics} = n * 50Hz.$$

What are Sources of Harmonics?

- Harmonics are caused by nonlinear loads attached to the power system. Nonlinear loads draw non-sinusoidal current. Resistors, inductors, and capacitors are linear devices. When a resistive load is applied to an AC power system, it draws sinusoidal current. When an inductive or capacitive load is applied, it too draws sinusoidal current although it is phase shifted compared to the resistive load. There are many types of nonlinear loads which cause harmonics. The largest sources of harmonics are converters. Converters range from a huge 1000 MW inverter station for an HVDC line to a 75 W rectifier found in a television. Other nonlinear sources of harmonics include arcing devices such as arc furnaces, transformer magnetizing impedance, fluorescent and high intensity discharge lights. The harmonic current caused by the nonlinear sources can cause harmonic distortion in the system voltage which may cause problems for other devices.

Effects of Harmonics?

The effects of harmonics are divided into four general categories:

- effects on the power system itself
- effects on consumer load
- effects on communication circuits
- effects on revenue billing

- On the power system, harmonic currents are the main culprit, causing equipment overheating and thermal loss-of-life. This may be a concern for motors or transformers. The impact is worse when network resonances amplify harmonic currents. Harmonics may also interfere with relaying and metering to some degree.
- Harmonics can also cause thyristor firing errors in converter and SVC installations, metering inaccuracies, and false tripping of protective devices. The performance of

consumer equipment, such as motor drives and computer power supplies, can be adversely affected by harmonics. In addition, harmonic currents flowing on power lines can induce noise on nearby communication lines.

- Harmonic voltage distortion may cause equipment insulation stress, particularly in capacitors. When harmonics cause the voltage impressed on the capacitor bank to be distorted, the peak voltage may be high enough to cause a partial discharge, or corona, within the capacitor dielectric. This may eventually result in a short circuit at the edges of the foil and failure of the capacitor bank.
- High harmonic currents cause fuse blowing in capacitor banks. This results in a loss of reactive power supply to the system which may cause other problems.
- Harmonic voltage distortion can effect revenue billing by introducing error into kilowatt hour metering systems that rely upon accurate discernment of the voltage zero. And, of course harmonic current sums with fundamental current demanded by facility loads to directly increase net billable kilowatt demand and kilowatt hour consumption charges.

System Problem	Common Causes	Possible Effects	Solutions
Harmonics (non sinusoidal voltages and /or current wave forms)	Office – Electronics, UPSs, variable frequency drives, high intensity discharge lighting and electronic and core coil ballasts.	Over- heating of neutral conductors, motors .transformers, switch gear. Voltage drop, low power factors, reduced capacity.	Take care with equipment selection and isolate sensitive electronics from noisy circuits.

What standards are applicable for Harmonic Measurement? What is the acceptable limit of harmonics?

- American standards regarding harmonics have been laid out by the IEEE in the 519 Standard: IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems. There is a combined effect of all nonlinear loads on utility systems that have a limited capability to absorb harmonic current. Further, utilities are charged with the responsibility to provide a high quality supply in terms of voltage level and waveform. IEEE 519 recognizes not only the absolute level of harmonics produced by an individual source but also their size relative to the supply network.

The permissible harmonic limit for different current (I_{sc}/I_L) as per IEEE standard is given in below table

IEEE 519 Standard - Maximum Harmonics Current /distortion in Percentage of I_L						
Maximum Harmonics Current Distortion in Percent of I_L						
Isc/I_L	**<11**	**11<=h<17**	**17<=h<23**	**23<=h<35**	**35<=h**	**Total Demand Distortion**
<20	4	2	1.5	0.6	0.3	5
20<50	7	3.5	2.5	1	0.5	8
50<100	10	4.5	4	1.5	0.7	12
100<1000	12	5.5	5	2	1	15
>1000	15	7	6	2.5	1.4	20

Where,
Isc = Maximum short circuit current at point of common coupling and
I_L = Maximum demand load current (fundamental frequency component) at PCC
TDD = Total Demand Distortion

	Voltage Harmonic Distortion			Current Harmonic Distortion		
	%			%		
	R	Y	B	R	Y	B
Minimum	1.13	1.09	1.05	1.52	1.73	1.33
Average	1.23	1.29	1.18	6.97	3.25	2.62
Maximum	1.40	1.49	1.42	15.06	6.83	6.48

Observation Table: Harmonics Measured

The Voltage Harmonics are within permissible limit. However the current harmonics are slight higher side than the permissible limits. It is recommend to use harmonic filters to reduce the current harmonics within permissible limit and to avoid any further future penalty.

Solution:

- Installation 35 KVAr Active Harmonic Filter.
- Approximate cost of capacitor with installation = Rs. 25000.00

The penalty for harmonics is still under proposal stage. However the suggested harmonics penalty is 5% additional energy charges (Wheeling charges plus Energy charges) for consumers who do not maintain the harmonics levels specified in IEEE STD 519-2014.

1. Estimated Output & Returns

Detailed estimation of output of solar PV system is done considering location of installation, proposed direction of solar panels, data of solar irradiance at the location, system losses, and other related data.

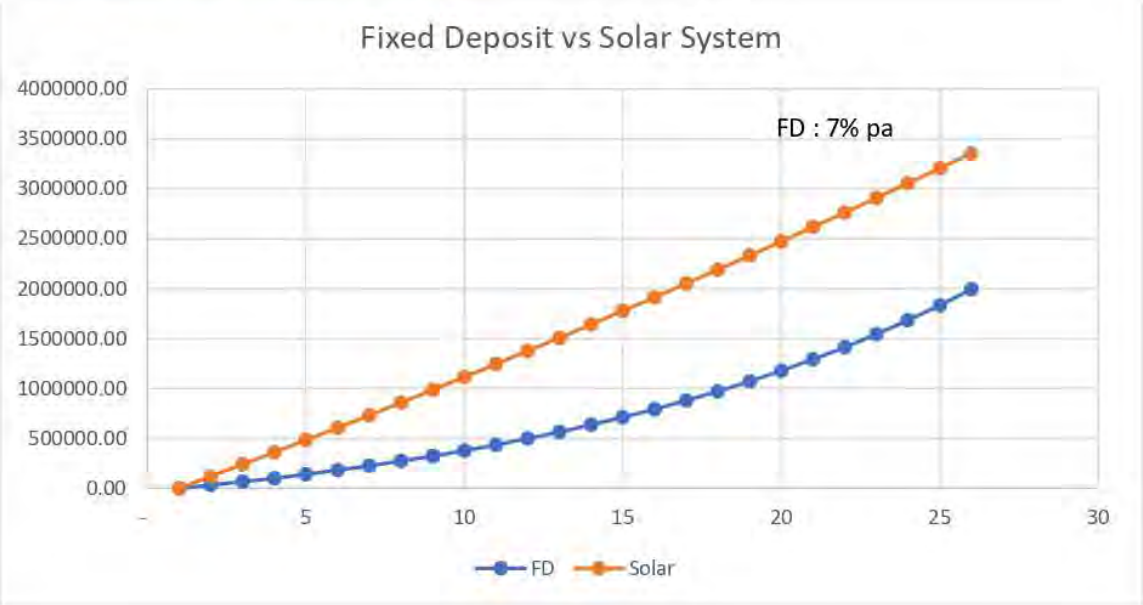
1.1 Basis of estimation

- Solar PV Capacity: 10kWP
- Location: Institute of Pharmaceutical Education & Research, Wardha, Maharashtra
- The solar panels are expected to be free of shadow.
- Generation is based on radiation of 1000W/m2 and grid availability.
- Assumed clear sunny 330 days/year.
- Space required is 800 sq.ft. facing south direction with clear rooftop available.

1.2 Estimated output

- Daily generation from solar: 45 kWh/day
- Monthly generation: 1350 kWh/month
- Total Annual output: 14850 kWh/annum
- Specific Production: 1485kWh/kWp/annum

1.3 Comparison with Bank Fixed Deposit:



Environmental Consciousness

Concern:

The environment issue has become a world –wide concern in the past decade being the focus of dimension in variety of forums both at national and international levels. Because environmental problems are rooted in economics and social policies, they occur at all levels from local to global, and success requires action by many players over long periods of time. The government is responsible for dealing with these problems and working towards solutions. Accordingly, the government is trying to address this over the years by creating various policies, programs enacting environmental legislation and through interaction institutions and treaties laws and regulations and expenditures.

Environment is mutual responsibility of everybody for society. In order to mitigate the risks associated with medical waste, it is important that management should always try to identify and evaluate the nature of the risks involved and then try to devise ways and means of managing those risks. Currently, there have not been any attempts to identify the risks posed by medical waste, a fact which contributes to it being not given the attention it deserves.

College Responsibilities and Performance

Environment conscious can be seen over all the above activities that the college carries out. Environment balance is maintained with Plants, Water and Waste management. These factors are well balanced in the facility.

Action Plan:

1. Energy Saving Awareness-

Many programs have already been conducted in the college for energy saving awareness. This should be continued and as part of social concern. The college should take initiative and conduct such events amongst different schools and colleges, societies and at various other places. Installation of sign boards to switch off the utilities when not in use like this will increase the awareness about energy conservation.

2. Carbon Emission reduction:

- Entry should be restricted for unauthorized, unnecessary vehicles in the campus, which will help to maintain the carbon neutrality of campus.
- Burning in open should also be avoided.
- Plantation: Planting and then maintaining trees help in reducing pollution, reduces erosion of soil, surrounding improves with green ambience, temperature of the area is maintained to lower values and helps in reduction in carbon percentage.

3. Water Sustainability:

- Water sustainability is fulfilling the present needs of the water without affecting the future supplies and availability. Water is very basic and utmost important need in society. Hence water security can be achieved with water sustainability.

- Not only water but water quality is also an issue of growing importance. Due to land and water pollution done by us the quality of water is getting deteriorated. The surface water is polluted with the sewage and other polluted water sources. Hence, there is requirement of the water treatment processes to make ground water healthier and safe.
- With sewage treatment plant the water can be treated and increased in biological and chemical oxygen which can be used as outdoor water usage as vehicle cleaning, gardening, flushing in the toilets. This will also reduce the load on the raw water intake.

4. Waste Management:

- **Biological Waste:**
  Waste management is gradually becoming a serious concern entire worldwide due to limited sorting at source and improper storage, collection, transportation, treatment and final disposal. Handling the waste correctly at first time will reduce the waste disposal cost and energy to segregate the waste. When segregated, each waste has its cost value by recycling. There are recycling plants of much kind of wastes. It adds to the value of the waste and also provides the employment

- **E-waste:**
  This is an emerging issue raised due to the excessive use of the electronic goods and their short life span. The electronic goods are creating considerable waste problems as their disposal is difficult to achieve. The hazardous contents in the e-waste make it critical to dispose immediately and safely.

Annexure –XVII: Snapshot of Annual Rainfall Data, Grid Emission Factor

Table: Rainfall data of Wardha District (2002-2011) in mm

Taluka	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Wardha	864.6	951.1	885.4	1121	940.31	152.9	892.7	617.31	393.4	927.9	**974.7**
Seloo	1279.5	968	1105	1395	1084.31	643.1	986.1	758.31	329.5	976	**1152.5**
Deoli	941.7	967	739.6	1165			682.3	581	1242.6	1013.8	**916.6**
Hinganghat	988.2	1048.2	956.9	1246.9			1011	769.3	1513.6	941.4	**1059.4**
Samudrapur	1074	1112	882.8	1281.2			733.9	772.91	440.2	1108.5	**1050.7**
Arvi	793.9	863.7	789.5	1216.7	1146	1132	977.6	605	1147.1	1109.9	**978.1**
Ashti	760.6	706.8	699	1020	843.7	1203.3	578.8	569.4	873.6	820.4	**807.6**
Karanja	876	910.5	879.5	1051.3	958.7	1061.6	705.2	702.2	1253	924	**932.2**
Average	**947.3**	**940.9**	**867.2**	**1187.1**	**994.6**	**1238.6**	**821.0**	**671.9**	**1274.1**	**977.7**	

Web link: http://cgwb.gov.in/District_Profile/Maharashtra/Wardha.pdf

CEA Database Version-13

Emission Factors (tCO2/MWh) (incl. Imports)	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Weighted Average Emission Rate (2)	0.78	0.83	0.82	0.82	0.82	0.82
Simple Operating Margin (1) (2)	0.97	0.99	1.00	0.99	0.97	0.96
Build Margin (not adjusted for imports)	0.92	0.97	0.95	0.93	0.91	0.87
Combined Margin (1) (2)	0.95	0.98	0.98	0.96	0.94	0.92

Notes:

Coordinates:

Swapnil Thanekar
Sustainability |Energy |Water
(Certified Energy Auditor – EA4416)

Plot Number 09, Shivaji Nagar,
Opposite LAD college Ground,
North Ambazari Road,
Pin- 440010, Nagpur

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SUSTAINABILITY SOLUTIONS

Certificate

OF SUCCESSFUL COMPLETION OF GREEN, ENERGY AND ENVIRONMENT AUDIT

awarded to

Institute of Pharmaceutical Education and Research,
Borgaon (Meghe), Wardha, Maharashtra, India
for period April 2021 to March 2022

Assessment topics are stated below

1. Organization Level Efforts
2. Creation of Awareness
3. Lighting
4. Cooling and Ventilation
5. Operation of Electronic Equipment's
6. Water Management
7. Water Quality
8. Renewable Energy
9. Transportation
10. Purchasing Practices
11. Energy and Carbon Footprint
12. Waste Management
13. Environment
14. Plantation Details

Sustainability Solutions,
Nagpur

Mr. Swapnil Thanekar
M.Tech (Heat & Power Engineering)
Certified Energy Auditor
Expert Global Reporting Initiative

Date
2022-04-14

INTEGRATED GREEN AND ENERGY AUDIT

FOR THE PERIOD APRIL 2021 TO MARCH 2022

IN LINE WITH NAAC REQUIREMENTS

Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha

14/04/2022
Version 01

By:
Energy and Green Audit Team,
Sustainability Solutions

From Chairman's Desk

The Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha is managed by the Vidarbha Youth Welfare Society, Amravati. The V. Y. W. Society was established in the year 1965. With the objective to uplift the rural students in academic excellence particularly in the field of Science and Technology.

Our experience taught us that educational institutions have the accountability to sustain the Nation's growth. Our responsibility is not just limited to education; we inculcate principles and values. Human society is in the middle of Environmental, Social, and Economic challenges. The major ones are climate change, the greenhouse effect, polluted air, water, soil, etc. The key question is, "How do we do it?" We apply the principles of Inclusivity, Materiality, and Responsiveness.

Our principles are our constant source of inspiration. As management, we completely understand that sustainable development through higher education will play a pivotal role in building our nation. After graduation or post- graduation, the students become leaders of tomorrow and get dispersed from the world of education into their specific carrier. They take with them the Sustainable practices and approaches as a kit to solve problems. We are developing our student's so that they are prepared to face global challenges and convert them into opportunities. We strive to put forward living examples for our students, society, peers, and other reasonable stakeholders by adopting environmentally friendly steps. We endeavor to hand over the future generation with a cleaner and safer, socially stable, and economically prosperous world.

The audit's purpose was an independent review of the practices followed in our campus w.r.t. the Sustainable Policies. We will take the learnings from this independent review as a "value addition" to promote better environmental performance and continually improve the College Campus and Community. We will adhere to PDCA's proven principles (Plan, Do Check, and Act) to identify, prioritize, allocate resources, initiate action, monitor results, and implement corrective actions to attain Sustainability, encompassing Environmental, Social topics.

I am Thankful to the entire Green Audit Team of IPER (Mr. Swapnil Thanekar, Mrs. Bhakti Thanekar and Mr. Ashish Soni) for taking sincere efforts and hard work for this green audit. We are ascertained that the report will help society, staff, students, and all concerned in the College Campus and will motivate for sustainable and green practices throughout.

Dr. N. R. Dhande
President, V.Y.W.S. Amravati

From Principal's Desk

Colleges have broad impacts on the world around them, both negative and positive. The activities pursued by colleges can create a variety of adverse environmental impacts. But college are also in a unique position as educational institutional to be leaders in pursuing environmentally sustainable solutions. Green Audit is linked to Sustainable development process. Through green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the progress of Green Audit process.

The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, and effects of carbon neutrality, planting of trees, hazardous waste management and E- waste management. Finally, green audit is a requirement of NAAC assessment to the Colleges and Universities. It is necessary to conduct green audit in college campus because students have to be aware of the green audit, its advantages to save the planet and thereby get motivated to become good citizens of the country. Green audit and sustainable development process help to reduce wastage and associated cost as well as increase the product quality. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more relevant.

Green audit can be useful tool for a college to determine how and where they are using most of energy, water or other sources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of the impact of green methods on campus. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. All across the world, colleges and universities are looking to a sustainable future by working to become carbon neutral. Universities are taking responsibility for their environmental impact and are working to neutralize those effects. To become carbon neutral, universities are working to reduce their emissions of greenhouse gases, reduce their use of energy, use more renewable energy, and emphasize the importance of sustainable energy sources.

I am thankful to the entire Green Audit team of IPER (Mr. Swapnil Thanekar, Mrs. Bhakti Thanekar, and Mr. Ashish Soni) and team of college NSS unit for taking sincere efforts and hard work for this green audit. We are ascertained that the report will help society, staff, students, and all concerned in the College Campus and will motivate for sustainable and green practices throughout.

The Sustainable impact of our institution are mapped considering the United Nations SDG's as below:

	Our Institutions is actively engaged in: ✓ Awareness Camps ✓ Blood Donation Programs

	✓ Refer our SSR Report
	✓ We are in process of installation of Solar Pv Plant in our campus.
	✓ We are giving saplings to our guests in place of bouquet ✓ We have banned use of single use of plastic in our campus ✓ We serve the RO water in place of single use plastic bottle ✓ We have planted lot of trees inside and our side the campus ✓ Organic composting ✓ Energy efficiency projects (Sensor Based Lighting) (Refer Annexure V)
	We are promoting energy savings, reduction in water consumption, augmenting water harvesting, we are in process of installing renewable solar energy plant of 10 kW, introduction of sensor-based lighting controls for night lights, energy-efficient lighting (CFL), and maximum use of daylight, and educating the society, plantation of trees outside the college campus, waste reduction, responsible waste disposal, and many more applicable programs.
	We have implemented the projects of ✓ Plantation of trees

We are thankful to the Green Audit Team (Mr. Swapnil Thanekar, Ms. Bhakti Thanekar and Mr. Ashish Soni, Mr. Rushikesh Kohre) who played key role in this achievement. We endeavor to set an example for our Peers so that they can also adopt sustainable practices.

Dr. R. O. Ganjiwale
Principal IPER, Wardha

Acknowledgement

Green Audit Assessment Team thanks the management of Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha for assigning this important work of Green Audit. We appreciate the cooperation of our Team for completion of study. Our special thanks to:

Chairman – Dr. Nitin R. Dhande
Principal – Dr. Rajendra O. Ganjiwale
IQAC Coordinator – Dr. D. J. Singhavi
Professor – Dr. Shagufta A. Khan
Asst. Professor – Mr. Girish D. Dahikar
Asst. Professor – Dr. Nilesh A. Karande
Asst. Professor – Mr. Sunil P. Dewani
Asst. Professor – Mr. Ashish B. Budhrani
Associate Professor – Dr. Manisha P. Puranik
Librarian – Mrs. Anita A. Karlekar
Assistant Librarian – Mrs. Mrunal Y. Ghogare
Computer Operator – Mr. Anant W. Bhaik
Laboratory Technician – Mr. Prashant B. Ankar
Laboratory Technician – Mr. Vijay M. Dahiwalkar
Store In charge – Mr. Chandrashekhar S. Chaudhary

All the members of College Development Committee, Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha. Team of students as stated under Annexure-I

For giving us necessary inputs to carry out this very vital exercise of Green Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

Profile of Audit Team Members and Independent Reviewers

Mr. Swapnil Thanekar Certified Energy Auditor, M. Tech (Heat & Power Engineering), Expert Global Reporting Initiative, GHG Expert
Ms. Bhakti Thanekar Certified Energy Auditor, B. Tech (Chemical Engineering), Principal Consultant - Energy and Safety
Mr. Ashish Soni Diploma Graduate with 16 years' experience in Electrical Systems
Mr. Ajinkya Anjikar M. Tech, Chemical Engineering, IIT Hyderabad (Observer, Reviewer)
Mr. Sushant Deshkar Electrical Engineer, Assessment Team Member

DISCLAIMER

Green Audit Team has prepared this report for Institute Of Pharmaceutical Education And Research, Borgaon (Meghe), Wardha based on input data submitted by the representatives of College and after having complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the calculations are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any director consequential loss arising from any use of the information, statements or forecasts in the report.

Technical Review by:
Bhakti Thanekar
Bureau of Energy Efficiency
Registration Number –
EA-14451

Prepared by:
Swapnil Thanekar
Bureau of Energy Efficiency
Registration Number –
EA-4416

Ashish V. Soni
Onsite Assessment
Team Leader.

Scope of Work

Topics to be covered as part of the assessment are:

✓ Solar Passive Architecture

- How the buildings are constructed to utilize the solar energy efficiently. This includes use of day light as lighting source and avoidance of GHG intensive technology example AC as source of cooling due to solar heat gains.

✓ Implementation of measures to reduce wastage of energy

- This includes effective and objective evidences to create awareness towards wastage of electric energy. Hoardings, placards, messages, posters etc. planted at key locations in college, hostels and cafeterias. PCRA (Petroleum Conservation Research Association, Govt. of India) and BEE (Bureau of Energy Efficiency) posters are exhibited.
- It can also be extended to include papers presented by the students on avoidance of electricity at college or day to day life.
- Appointment of joint committees of teachers and students to save electricity
- Controlling of Power Factor by installation of APFC and getting rebate (up to 5% or MSEDCL norms) from MSEDCL for maintaining unity Power factor

✓ Energy Efficient Procurement

- This includes evaluation of energy efficient procurement practices. This does not exactly mean that you need to buy the most efficient, but you need to buy the most efficient which is financially viable. Example AC with efficiency star ratings, Transformer etc.
- Replacement of lighting sources to CFL or LED
- Replacement of Copper Ballast with Electronic Ballast
- Centralized controls of lighting, auditorium etc. to avoid any misuse of electricity
- Procurement of LED monitors to phase-out CRT Monitors
- Shift to paperless regime wherever not required, example attendance muster replaced by biometrics, DG logbook replaced by computerized logbook, daily reports converted from paper to paperless, HoD meetings converted to paperless formats, and all such examples.
- Installation of Solar panels, Power Purchase Agreements with Solar Power Plant owners to buy environmentally friendly energy Source etc.
- Documentary evidences as feasible to calculate the above impacts and finally into the value of avoidance of tCO_2 emitted to atmosphere.

✓ Rain Water Harvesting

- This includes Calculation of Catchment Area (Terrace and Ground) and evaluating rough amount of water that is recharged into the water recharge pits if applicable.

✓ Hazardous Waste Management and E-Waste Management

- There are various wastes that are generated within the organization. The report will give the list of the procedures for waste handling.

✓ Duration of the Green Audit

- The Green audit field observations data collection was carried from 10th April 2022 to 12th April 2022 for the period April 2021 to March 2022. The submitted data was monitored by the college throughout the year and assessed by Assessment Team during the visit.

Scorecard

NAAC Criteria Key Indicator - 7.1 Institutional Values and Social Responsibilities		
Environmental Consciousness and Sustainability		**Audit Team Assessment**
7.1.2 The Institution has facilities for alternate sources of energy and energy conservation measures:		
1. Solar energy	✓	Installation of 10 kW Solar PV System is under process.
2. Biogas plant		-
3. Wheeling to the Grid		
4. Sensor-based energy conservation	✓	Annexure –V: Lighting Survey 2020 – 21
5. Use of LED bulbs/ power efficient equipment	✓	Annexure –XI: Solar Passive Structure
Options: A. 4 or All of the above B. Any 3 of the above ✓ C. Any 2 of the above D. Any 1 of the above E. None of the above		
7.1.3 Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words):		
1. Solid waste management	✓	Refer chapter 12 and Annexure –XIII: Waste Management
2. Liquid waste management	✓	
3. Biomedical waste management		
4. E- waste management	✓	
5. Waste recycling system		
6. Hazardous chemicals and radioactive waste management	*NA*	
7.1.4 Water conservation facilities available in the Institution:		
1. Rain water harvesting	✓	Refer chapter 06 and Annexure –XII: Water Management
2. Bore well / Open well recharge	✓	
3. Construction of tanks and bunds	✓	
4. Waste water recycling		
5. Maintenance of water bodies and distribution system in the campus		

Green Campus Initiatives include: **7.1.5.1. The institutional initiatives for greening the campus are as follows:**		
1. Restricted entry of automobiles	✓	Annexure –XIII: Waste Management
2. Use of Bicycles/ Battery powered vehicles		
3. Pedestrian Friendly pathways	✓	Annexure –XIII: Waste Management
4. Ban on use of Plastic	✓	
5. Landscaping with trees and plants	✓	Annexure –XIIV: Awareness / Posters
Options: A. Any 4 or All of the above B. Any 3 of the above ✓ C. Any 2 of the above D. Any 1 of the above E. None of the above		
Quality audits on environment and energy are regularly undertaken by the institution 7.1.6.1. The institutional environment and energy initiatives are confirmed through the following		
1. Green audit	✓	Covered as part of this report. Please refer the contents of this report
2. Energy audit	✓	
3. Environment audit	✓	Covered as part of this report under Chapter -11 and Annexure –XVII
4. Clean and green campus recognitions/awards		Covered as part of this report under Chapter -13 and Annexure –XVI
5. Beyond the campus environmental promotional activities	✓	Please refer Annexure – XIV: List of Awareness Program Undertaken by College
Options: A. Any 4 or all of the above ✓ B. Any 3 of the above C. Any 2 of the above D. Any 1 of the above E. None of the above		

Clean Campus[1]

Sr. No.	Aspect	Reference
1.	Cleanliness in and around the campus and waste minimization	➢ Chapter No. 1 & Annexure No. IV ➢ Chapter No. 1 & Annexure No. XIV
2.	Water conservation and management including ➢ Waste water management and reuse ➢ Rain water harvesting, etc	➢ Chapter No. 12 & Annexure No. XII ➢ Chapter No. 6 & Annexure No. XII
3.	Environment-friendly activities adopted and practiced by the campus	➢ Chapter No. 1 & Annexure No. IV ➢ Chapter No. 1 & Annexure No. XIV
4.	Greenery within the campus to provide pollution free air and carbon-sink	➢ Chapter No. 13 & Annexure No. XIV

Smart Campus[2]

Sr. No.	Aspect	Reference
1.	Impact of deployment of digital technology in order for the students, faculty and management in the campus to reduce consumption of natural resources (such as paper, gas, energy etc).	➢ Digital library ➢ Digital attendance ➢ Digital Meetings ➢ Digital notes ➢ Digital papers ➢ Online conferences and classes ➢ Efficient electronic equipment's like LED screens, LCD projectors, Printers, Xerox machine, Fax machine ➢ Procurement of energy efficient equipment ➢ Wi-Fi technology ➢ Solar unit
2.	Alignment of the latest digital trends like IoT, Big Data and Cloud Networking to achieve various aspects of sustainability in the campus, specifically to contribute to United Nations SDGs	Our college uses Google forms, Google classroom, Cisco WebEx (https://iperelearn.tech/), Zoom app for online classes. This helps us to share data/ links to all students within fraction of second and result will be prepared in less time duration which saves our time, man

[1] http://www.aicte-india.org/csc2019
[2] http://www.aicte-india.org/csc2019

		power and paper work. In this Pandemic situation, we are conducting online classes through Google meet, Cisco WebEx (https://iperelearn.tech/), Zoom app. Through Google drive, Cisco WebEx (https://iperelearn.tech/) we can give access to limited students of particular class only. We provide the notes of different theory subject and practicals to the students on Google classroom, Cisco WebEx (https://iperelearn.tech/) and WhatsApp's group These technologies help us to shares the data in short duration of time to all students and also help in saving papers. ➢ Installation of smart photo sensor to regulate the night lighting ➢ Digital notes ➢ LAN is used for Admission process, data entry, accounting and all administration process
3.	Create an ecosystem to 'smartly' connect and share the information with each other at campus, institute and national level. Any international level connect will provide a distinct advantage. The smart connects, though the cloud networking, so established should address concerns of environmental challenges including contribution to United Nations Sustainable Development Goals.	To share the data among all the Teachers and students, we are using Google, Cisco WebEx (https://iperelearn.tech/). Google Drive is a file storage and synchronization service developed by Google for sharing of information to all users or to specific users. Google drive and WhatsApp helps to share Notes/ Notices/ University important notices by single click to specific group of students/ to all students/ to the teachers. We are sharing notes to the students in the form of PDF or in DOC format which ever possible in their Google class, Cisco WebEx meeting. College had organized webinars, online parents meet, online alumni meet, during COVID lock down. We had connected peoples (Guest, Speakers and participants) from all over the India in one platform. We had taken online feedback from parents, students regarding curriculum completion and from alumni regarding progress of the institution. This platform is helpful not only to connect the peoples but also it is useful in sharing the needful information and, also saves paper and with less use of man power. We had collected all data in soft format. Our faculty members had online attended National conferences during lock down period.

Contents

List of Annexure

Abbreviations

AHU	Air Handling Unit
CFL	Compact Fluorescent Lamp
COP	Coefficient Of Performance
DG	Diesel Generator
ECRM	Energy Consumption Reduction Method
HVAC	Heating, Ventilation, And Air Conditioning
ISO	International Standardization Organization
ITHD	Current Voltage Total Harmonic Distortion
km	Kilometer
kV	Kilo Volt
kW	Kilo Watts
Lab	Laboratory
LED	Light-Emitting Diode
MNRE	Ministry of New and Renewable Energy
MSEDCL	Maharashtra State Electricity Distribution Co. Ltd.
MEDA	Maharashtra Energy Development Agency (MEDA)
TR	Tons of Refrigeration
VTHD	Voltage Total Harmonic Distortion
MSRTC	Maharashtra State Road Transport Corporation

Reference list of Websites

Sr. No.	Websites
1	IEEE 519 - http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=2227
2	http://mnre.gov.in/solar-energy/ch2.pdf
3	BEE - http://www.beeindia.in/
4	ECBC - http://beeindia.in/content.php?page=schemes/schemes.php?id=3
5	http://www.energymanagertraining.com/new_index.php
6	http://www.usailighting.com/stuff/contentmgr/files/1/92ffeb328de0f4878257999e7d46d6e4/misc/lighting_comparison_chart.pdf
7	https://www.bijlibachao.com/lights/use-energy-efficient-lights.html
8	http://www.imd.gov.in/section/climate/climateimp.pdf
9	http://www.bijlibachao.com/air-conditioners/air-conditioner-selection-understand-tonnage-eer-cop-and-star-rating.html
10	http://www.thehindubusinessline.com/opinion/time-to-focus-on-more-crop-per-drop/article9778971.ece
11	http://cgwb.gov.in/District_Profile/Maharashtra/Wardha.pdf
12	http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Roof%20Top%20Rain water%20Harvesting_Presentation_2006.pdf
13	http://www.imd.gov.in/section/climate/climateimp.pdf
14	http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf
15	http://cdm.unfccc.int/
16	http://database.v-c-s.org/
17	https://www.iperwardha.com/
18	https://www.mahadiscom.in/
19	https://www.mahaurja.com/meda/
20	https://offset.climateneutralnow.org/vchistory/details?orderId=15798

Introduction of the College

The IPER, Wardha is managed by the Vidarbha Youth Welfare Society, Amravati. The V. Y. W. Society was established in the year 1965, with the objective to uplift the rural students in academic excellence particularly in the field of Science and Technology. The society runs 70 Institutions from pre – primary to post – graduate level covering various faculties like Arts, Commerce, Science, Social Sciences, Engineering, Dental and Pharmaceutical Sciences.

The Institute of Pharmaceutical Education and Research (IPER), a pioneering Pharmacy Institution in Vidarbha region of Maharashtra, was established in 1991. The Institute provides Education leading to Degree, Post Graduate and Ph. D program in Pharmaceutical Sciences. Around 400 students from all corners of India are studying in the Institute. A beautiful and attractive campus of IPER is stretched in an area of 5 acres. Well-equipped laboratories, rich library, qualified and experienced staff and high academic standards have made IPER as one of the Premier Pharmaceutical Institutions in Maharashtra and India.

The Institute is approved and accredited:

- All India Council for Technical Education, New Delhi (AICTE).
- Pharmacy Council of India, New Delhi (PCI).
- National Board of Accreditation, New Delhi (NBA).
- Government of Maharashtra, Mumbai (GOM).
- Permanently affiliated to R. T. M. Nagpur University, Nagpur (RTMNU).
- Accredited by National Assessment and Accreditation Council, Bangalore (NAAC) with Grade "A".

Objective of Green Audit

The Green Audit Team focused on Material[3] Issues pertaining to college which have the highest influence on the Green Attributes of the College. To evaluate steps taken by college management towards green campus below material issues are discussed chapter wise:

1. Organization Level Efforts
2. Creation of Awareness
3. Lighting
4. Cooling and Ventilation
5. Operation of Electronic Equipment's
6. Water Management
7. Water Quality
8. Renewable Energy
9. Transportation
10. Purchasing Practices
11. Energy and Carbon Footprint
12. Waste Management
13. Environment
14. Plantation Details

Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader.

[3]Definition: as per Global Reporting Initiative: **GRI 101:** FOUNDATION2016
An organization is faced with a wide range of topics on which it can report. Relevant topics, which potentially merit inclusion in the report, are those that can reasonably be considered important for reflecting the organization's economic, environmental, and social impacts, or influencing the decisions of stakeholders. In this context, 'impact' refers to the effect an organization has on the economy, the environment, and/or society (positive or negative). A topic can be relevant – and so potentially material – based on only one of these dimensions.

1. Organizational Level Efforts

Is the college having campus green team?	Yes, the Green Campus Committee is already in place. This committee is highly active and meets twice in a year.
If yes, who are the stakeholders?	Yes, it included stakeholders. The stakeholders include ➢ Management ➢ Teaching Faculty ➢ Students ➢ Lab Technician ➢ Computer Operator The Green Campus Committee is shared with the Audit Team. Refer Annexure III.
Does it meet regularly?	The Team meets once in a semester. This was confirmed during site visit interviews and the review of the minutes of meeting.
Can the Green Campus Team suggest new environmental initiatives to College Management?	Suggestions on improvement of environmental performance are always welcomed by College Management. Rain water harvestings, tree plantation at various locations around the college, installation of solar plant, etc. was also discussed as part of brain storming sessions within the meetings. These discussions were converted into live projects by the college management. The annexure to this report captures the live projects of the college.
Has the college established an environmental mission/vision for its campus?	The Management of College is persistent and resolved to make the campus eco-friendlier in due course of time. Various efforts are already initiated towards implementation sustainable initiatives, application of efficient technologies to save energy, plantation etc. There is no separate environmental mission / vision.
Is the college encouraging sustainable behaviour via: o education campaigns? o Posters, placards, messages o incentives? o contests? o awards?	College conducts various activities to create awareness amongst the students and society on environment safety and protection. College has established 'Green Campus Committee' which along with NSS has conducted various Environmentally Friendly Activities / Trainings for college: ➢ Virtual Yoga Day was celebrated on 21st June 2021. ➢ Tree Plantation Drive was organized at IPER College on 28th July 2021. ➢ Poster Competition was organized on account of "Swachata Pakhwada" from 1st August 2021 to 15th August 2021. ➢ "Nirmal Ganesh Visarjan" drive was organized at

	IPER College on 20th September 2021. ➢ Webinar on "Food Planet Health" was organized on 11th October 2021 in which 96 students participated. ➢ Blood Donation Camp was organized at IPER College on 1st January 2022 in which 38 students donated blood. Please refer Annexure IV for details. **Community Based Initiative's by college:** ➢ Majhi Vasundhara Abhiyan was organized in the vicinity of the college on 2nd September 2021. ➢ Cleanliness Drive and Awareness Rally on "Ban on Plastic" was organized on 14th March 2022. Please refer Annexure XIV for details.
Is the college staff modelling sustainable behaviour for students, peers, and community?	During interviews it was confirmed that there are 55 staff members in the college, out of which: **Teaching & Non-Teaching:** ➢ 85% staff of the college commute by their own 2-wheeler. ➢ 15% staff of the college travel by their own 4-wheeler.
Do students model sustainable behaviour for staff, peers, and community?	Total 383 students are enrolled for 2021-22 session Approximately: ➢ 55% students of the college commute by their college own 2-wheeler & sharing basis. ➢ 32% students reside in hostel within the college campus. ➢ 10% students of the college commute by walking. ➢ 3% students of the college commute by public transport (State Transport). Students participate in activities conducted by college on environment and sustainable development. In addition, please refer above assessments.
Is the college sharing learning internally via • Posters, placards, messages? • assemblies? • classroom presentations? • training/professional development? • posters/bulletin boards? • newsletter? • website?	Data is shared via posters, placards and messages. The assessment team is appraised that the awareness poster includes topics related to minimization of energy usage by avoiding wastage, improvements on energy efficiency, minimization of water wastages, proper disposal of wastes. Please refer Annexure XIII for details.

Does the college offer energy conservation lessons?	Yes, College organizes lectures and motivates students for Energy and Environment conservation.
Is the college sharing its learning externally via • Paper presentations? • newsletter? • website?	The students are encouraged to present projects on topic related to environmental aspects. College is extensively engaged in the research work. The college makes the Green Audit Report public so that learning's of college are shared.
Further Scope of Improvement: ➢ **At organization level, the college needs to establish long term improvement objectives to further reduce energy consumption, water consumption and reflect the same in form of dedicated Environment Policy.**	
Conclusion: ➢ **Active involvement of Organization is observed.** ➢ **Adequate awareness amongst the students and other stakeholders (faculty, other staffs, service providers, etc.) is observed and reflected from their behavior.**	

2. Creation of Awareness

Are the objectives of green audit clearly understood by the institute	Yes To spread awareness amongst the students and the surrounding community about the environmental impact due to operations associated with their teaching institution. ➢ To sensitize them how to address the situation at the local and personal level by conducting programs, camps and other means as feasible ➢ To reduce the negative environmental footprint on the environment ➢ To explore possibilities to use renewable energy sources to avoid GHG emissions and also reduce power cost ➢ To introduce renewable energy and to continuously improve its share in total energy mix ➢ To continue the use of efficient LED based lighting ➢ To introduce the automatic controls on the lighting systems ➢ To mitigate the carbon emission ➢ To increase the green cover ➢ To vigorously and responsibly position the institute for active contribution in Clean India Mission undertaken by the Governments. ➢ To identify ways and means to sustainably contribute and reduce gaps and become environment friendly ➢ To support community to combat various environmental and social issues as feasible.

Are there posters/guidance displayed to remind students and staff of good practices?	Yes
Are the students aware of energy sources?	The major source of energy is electricity (grid electricity) followed by usage of diesel in the DG as back in case of failure of grid electricity. Students are aware of these sources of energy which are utilized by the college.
Is college tracking its electrical energy usage?	There is a single meter, which measures the electricity imported by the college. The readings of electricity consumption are included as part of this report under chapter 11.
Is college offering energy conservation lessons and programs?	➢ College has created awareness among the faculty and students to reduce energy wastage. ➢ The college has appropriately disabled the screen savers and programmed the computers for sleep mode operations. ➢ The usage policy of photocopiers, fax machines and other equipment users is "POWER ON" when in use and "POWER OFF" when not in use. There is no idle power consumption. Please refer Annexure V and VI for details.
Do students and staff know where their water comes from?	The source of water is well & bore well. Well & bore well water is utilized for drinking (after purification), in the wash rooms and for cleaning purpose.
Is college encouraging responsible water use via: • posters, placards? • incentives? • contests? • awards?	Yes, by posters, placards, contests and winner of contest are awarded.
How is trash managed outside the campus?	The waste is given to the Municipal Corporation for disposal.
Further Scope of Improvement ➢ **College may calculate the water footprint to compare its performance with national and international consumption standards and communicate with its stakeholders.**	
Conclusion ➢ **Visible communication on environmental issues.** ➢ **Effective use of notice boards and signs.** ➢ **Water footprint may be calculated in future.** ➢ **College is installing 10kW Solar PV system.**	

3. Lighting

How college is utilizing daylight?	The college building is situated in such a manner that it is getting the full advantage of good airflow enabling good ventilation and sun light. It is a building having large windows

	and open space in all directions. During the day time, it is possible to carry out activities without air conditioners and air fans during operational days.
Is college utilizing any incandescent lights? Can they be replaced with compact fluorescents (energy saving bulbs)?	The college timings are from 9:30 AM to 5:30 PM. Thus, requirement of daytime lighting (powered by electricity) is limited. Energy efficient lighting system is followed. the contemporary best practices will recommendations on lighting by Bureau of Energy Efficiency, Book-3, Chapter 8, table 8.1 **Table 8.1 Luminous Performance Characteristics of Commonly Used Li** **Type of Lamp** / **Lumens / Watt: Range** / **Lumens / Watt: Avg.** / **Colour Rendering Index** / **Typical Application** Incandescent / 8-18 / 14 / Excellent (100) / Homes, restaurants, general lighting, emergency lighting Fluorescent lamps / 46-60 / 50 / Good w.r.t. coating (67-77) / Offices, shops, hospitals, homes Compact fluorescent lamps (CFL) / 40-70 / 60 / Very good (85) / Hotels, shops, homes, offices High pressure mercury (HPMV) / 44-57 / 50 / Fair (45) / General lighting in factories, garages, car parking, flood lighting LED lamps / 30-50 / 40 / Good (70) / Reading lights, desk lamps, night lights, spotlights, security lights, signage lighting, etc Thus, LED's are considered for installation as night lights, security street lights by the college. The term reading light[4] normally refers to lamps or lights which focus light dedicated for readings, thus LEDs were not considered for class room lightings initially. Fluorescent lamps were utilized for class rooms (as the same are stated to be suitable for office illumination level requirements). LED lights started replacing the conventional tube light as a replacement measure after failure. LED lighting survey was also undertaken by the Audit Team. Please refer below assessments in details. During the onsite visit the Audit Team visited each department and physically counted the installed lights by their types (Fluorescent tube lamp, CFL and LED). It is confirmed that there is no incandescent light installed for lighting purpose. As per the published article: http://www.usailighting.com/stuff/contentmgr/files/1/92ffeb328de0f4878257999e7d46d6e4/misc/lighting_comparison_chart.pdf LED light has lumen/ watt in the range of 80-100 whereas CFL has lumen/ watt in the range of 70-90
Has the college evaluated existing lighting for opportunities to reduce lighting in over-lit areas?	The lighting arrangements are well balanced with arrangements to switch ON and OFF lights independently. There are therefore practically no over lit areas.
Are the light switched duly labelled to make more obvious which switches relate to which appliances?	Switch arrangements are lucid. The fan switches are adjacent to fan speed regulators. Light switches are arranged in order of lighting. The buttons are marked.
Are the lights switched off to make use of daylight? (e.g. lights parallel to windows or in corridors)	There is minimum or practically negligible use of lights during day time as the building structure has possibility of daylight usage. The lux level in the classrooms was measured and found above 250. On the outcast days some places register lower lux level. The locations were pinned and college

[4] https://www.collinsdictionary.com/dictionary/english/reading-light

	management confirmed to take subsequent corrective actions.
Is the college utilizing natural lighting when possible?	Yes, natural lighting is first preference.
For the spaces like store rooms, toilets, kitchen areas, copying rooms, corridors etc is there scope for automatic lighting controls?	The college avails the sensor-based lighting arrangements to control the night illumination. The lighting sensors automatically switch on and switch off lights depending on the lux levels. **Recommendation:** **The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements.**
Can main lighting ever be switched off and dedicated lighting be used?	As such there are no dedicated lamps which can replace overhead lighting. However, redundant lighting can be switched off when it is not required.
Are the light fittings clean?	The staff is responsible for day to day cleaning was interviewed during onsite visit. Cleanliness is well maintained. In-house light fittings are cleaned regularly some light fittings need cleaning. However, the installed fittings were not cleaned as Covid-19 Pandemic caused shortage of staff.
Do windows and skylights need cleaning to allow in more natural light?	The window and skylight were not clean as Covid-19 Pandemic caused shortage of staff.
Has the college installed lighting occupancy sensors?	No, lights are negligibly operated during day time. The lights are operated manually. The night lights are however operated based on the sensors which operate lights based on the illumination levels.
Is there mechanism in place to immediately report inoperable occupancy light sensors?	Yes, in case of failure of the existing sensor, the night lights will not operate.
What is the % contribution of the LED lighting?	We have evaluated the % LED installation at Passage and ground and all other floor. The value is determined and presented under Annexure V.
Further Scope of Improvement ➢ **The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements.**	
Conclusion ➢ **The students and employees were interviewed and no complains was identified within respect to the sufficiency of lighting measures.** ➢ **Sufficient lux levels above 250 are common in class rooms and work-stations based on the survey of audit team.** ➢ **Negligible lighting load is observed during day time as college makes good use of daylight.**	

4. Cooling and Ventilation

How are the Air Conditioning Controls? For the local controls,	The AC usage is very high as the temperature in Wardha district is (Max temperature is above 42°C[5]) hottest day in

[5] http://www.imd.gov.in/section/climate/climateimp.pdf

how it is ensured that AC is working only ON when necessary. What is temperature setting of the AC?	Wardha was registered with temperature of 47.3[6]°C). The AC temperature is set at 28°C. Awareness is created and measures are implemented in line with the recommendations of Ministry of Power (https://www.cseindia.org/a-step-in-the-right-direction-says-cse-of-power-ministry-s-move-to-fix-starting-temperature-of-room-air-conditioners-at-24oc-and-not-lower-to-save-energy-8814)
What is the mechanism of reducing heat in-grace? Are the closing blinds or fitting reflective film to windows installed to reduce solar gain?	The building is designed to make best use of day light and avoid the heat in-grace. Blinds are available in office to control unnecessary heat in-grace.
Are all external doors and windows closed when air conditioning is on?	There are 5 number of AC's in college. Based on interviews, it is confirmed that the practice of closing doors and windows is maintainedwhen air conditioning is in operation.
Is there a scenario where air conditioning is wasted in unused spaces, such as cupboards, corridors?	There are no such instances observed. Arrangements are duly implemented to avoid losses.
Are Efficient and energy labelled AC's utilized for cooling purposes?	There are 5 number of AC's in the college out which 3 are 2 star they run for 5-6 hours during summer and rainy season, and 2 are 3 star they run for 8 hours during all college days. **Recommendation:** **The 2 start AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above).** **Below guidelines can be considered by college in future while selecting between the AC and evaporative cooling.** **Evaporative Cooling System (for computer lab)** The Assessment team has undertaken document review and analysis of the data for the assessment of the air conditioning system. Based on the same it was found that there exists scope for the use of evaporative based cooling which is energy effective compared to the reversed Bryon cycle i.e. Vapour Compression Cycle. The basic reason for the same installed system has COP of 1.5 kW/TR of refrigeration compared to evaporative cycle which draws 0.3-0.5 kW based on the size of installation.
Further Scope of Improvement ➢ **The 2 start AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above).** ➢ **Evaporative cooling can be availed for computer lab.**	

[6]https://timesofindia.indiatimes.com/city/nagpur/at-47-3-c-wardha-hottest-in-country-on-thursday/articleshow/5928566.cms

5. Operation of Electronic Equipment

Are computers, printers, photocopiers and other equipment switched off at the end of the day?	Yes
Is there any mechanism by which the screens and other equipment be controlled during the day?	The college has availed the services of the Green Audit from session 2017-18 onwards. The college has appropriately disabled the screen savers and programmed the computers for sleep mode operations. Please refer to Annexure VI.
Are the screen savers disabled?	Yes, please refer above assessment.
Are computers programmed to 'power down' mode?	Computers are programmed for the sleep operation.
Is the user entrusted with the rights to modify standby settings? (E.g. TVs, LCD projectors, printers etc.)	No, the college has the administrative rights. Such changes cannot be initiated by users.
What is status of the photocopiers, fax machines and other equipment? Are they programmed on 'Energy Saver' mode during the day?	The equipment like photocopiers, fax machines are shutdown when not in use, computers are turned to sleep mode whenever not in use.
Are the power management settings enabled on all the computers/ monitors/ all-in-one machines?	All machines are governed by the college. All are equipped by power management settings as already described above.
Conclusion: ➢ **The Electrical Equipment's are well operated. Redundant operations are avoided.**	

6. Water Management

Are any water leaks identified?	The urinals are flushed periodically and manually. The urinals need to be equipped with push button taps. Please refer below recommendation.
Are taps left running? Are there any dripping taps? Do taps need maintenance?	No such instance was observed.
Are push button taps utilized?	Some toilet washrooms are not equipped with the push buttons. Please refer below recommendation.
Is water escaping from overflows either inside or outside buildings?	No such instance was identified during onsite audit. There is a dedicated pipeline to direct water / chemicals to soak pit (from labs).
Has the college installed low-flow faucets, automatic faucets, and/or faucet aerators?	**Recommendation:** **The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and/or faucet aerators as the replacement for the existing conventional taps.**

Has the college installed low-flow shower heads at Hostel?	NA
Has the college harvested rainwater?	Yes, the rain water is harvested over the college building.
Is the college collecting the condensation from A/C units for onsite watering needs?	Yes. The condensed water is collected and used for gardening.
Has the college optimized its irrigation system for gardening to o operate at night or early morning hours to minimize evaporation? o water the minimum time and frequency necessary for the applicable vegetation?	Yes, the college has installed sprinkler system for gardening. As per the latest publication from "The Hindu" drip irrigation is one of the most important measures to achieve "more crop per drop". Share of Agriculture consumption is approximately 83 per cent of India's water resources, thus approximately 17 per cent water resources are available for domestic and industrial use (http://www.thehindubusinessline.com/opinion/time-to-focus-on-more-crop-per-drop/article9778971.ece).
What is amount of rain water harvested?	Total area of roof top of college building is 1599.40 m^2. The rainfall for Wardha Region (Gramin) is approximately 974.7 mm. Total rain water harvesting is 1403 m^3 at the run off coefficient of 0.9. The college has also laid the cement blocks. This enables the rain water falling on the cement blocks to flow & get harvested. The area under the cement block is 1665 m^2. The run off coefficient is considered as 0.3 based on the Manual on Artificial Recharge of Ground Water, issued by Government of India, Ministry of Water Resources, Central Ground Water Board, and September 2007. The water rain water harvested from the cement blocks is 486 m^3. Total quantity of water harvested = 1403 + 486= 1889 m^3 Please refer Annexure XVIII for details. **Potential of Rain Water Harvesting:** Total area of roof top of auditorium is 873 m^2 and hostel is 817.51 m^2. (873 + 817.51 = 1690.51). The rainfall for Wardha Region (Gramin) is approximately 974.7 mm. Total rain water that can be harvested is 1482 m^3 at the run off coefficient of 0.9. Please refer Annexure XVIII for details. **Recommendation:** **The college management needs to install rain water harvesting system on the auditorium as well as hostel.**
Are there any community based projects implemented by the college?	Yes. Activities by NSS have been undertaken by the college. Refer Chapter 1 and Annexure XIV for details.
Further Scope of Improvement: ➢ **The college management needs to install rain water harvesting system on the auditorium as well as hostel.** **Long Term Measure:**	

- **The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and / or faucet aerators as the replacement for the existing conventional taps.**
- **College needs to install the metering arrangement to measure the water drawn from well and bore wells.**
- **College can undertake determination of water footprint and calibrate its specific water consumption with the established National and International Norms.**

Conclusion:

- **The college is having 01 no. of well and 02 no. of bore wells which are the only source of water.**
- **Practically efficient measures (drip irrigation / sprinklers) are implemented for gardening.**

7. Water Quality

Is the college campus maintained clean to minimize litter polluting water table?	The college premise is kept clean. Thus, the chances of litter polluting water table are negligible. The Assessment Team has also observed that the effluent from the chemical lab is directly sent to soak pit without treatment. **Recommendation:** **College needs to perform study of all the effluent chemicals (volume, weight, impact) used and accordingly develop mitigation measures under its sustainable strategy.**
Is the college monitoring drinking water quality regularly? If yes, what is the frequency?	Yes. Third party water testing is done by the college. Water Quality Test Reports are included as part of Annexure VII to this Report.

Further Scope of Improvement:

- **College needs to perform study of all the effluent chemicals (volume, weight, impact) used and accordingly develop mitigation measures under its sustainable strategy.**

Conclusion:

- **The students, staff members and guests have access to clean, safe and potable water with the RO system.**

8. Renewable Energy

Is the college having solar, wind, or other forms of renewable energy?	Yes. Installation of 10kW solar plant is under process.
Is the college purchasing renewable power from third party or renewable	No.

energy certificates for its electricity use?	
Is the college offering renewable energy lessons / programs?	This already assessed under chapter 01 of this report.

9. Transportation

Is college encouraging transportation measures like bicycle, Bulk transport, walking?	**Students:** Total 383 students are enrolled for 2021-22 session Approximately : ➢ 55% students of the college commute by their college own 2-wheeler & sharing basis. ➢ 32% students reside in hostel within in the college campus. ➢ 10% students of the college commute by walking. ➢ 3% students of the college commute by public transport (State Transport). Please refer above assessments for additional details. Students participate in activities conducted by college on environment and sustainable development. In addition, please refer above assessments. **Faculties:** During interviews it was confirmed that there are 55 staff members in the college, out of which Approximately: ➢ 85% staff of the college commute by their own 2-wheeler. ➢ 15% staff of the college travel by their own 4-wheeler. Please refer above assessments for additional details.
Is the college providing eco-friendly or less GHG intensive transportation matching services? (Example carpools, college buses etc)	Refer above response.
What are the good practices pertaining to Transport?	**Recommendation:** **College Management should encourage use of bi-cycle and mass transport systems amongst students and faculties.**
Further Scope of Improvement: ➢ **College Management should encourage use of bi-cycle and mass transport systems amongst students and faculties.**	
Conclusion: ➢ **The college management, its employees and the students observe satisfactory practices of transportation/ commutation.**	

10. Purchasing Practices

Describe the purchasing that confirms the better environmental performance?	Printers with duplex printing facility is installed at the computer lab and Library. There is culture of the two-sided printing. Paper is not wasted.
How does the college limit the purchase of single-serve bottles and containers?	The college has RO system; guests are served with water from RO system. Single serve bottles are not utilized unless requested by the guest.
Is the college having water fountains/stations to promote easy filling of reusable water bottles?	Yes, the water dispensers are connected to output of RO system. Clean and potable water is available to staff, student and guests.

Further Scope of Improvement:

The college should further emphasize on the purchase of:

- **No- to low-odor (VOC) markers**
- **No- to low-VOC paints? (Via Facilities)**
- **Paper / paper products with maximum recycled content**
- **Refillable pens / pencils**
- **Compostable bags for compost collection**

Conclusion:

- **Focus of the recommendation pertaining to the environmental preference of evaporative cooling over AC needs to be considered.**
- **Both sided paper is utilized by college to avoid use of fresh papers**

11. Energy and Carbon Footprint

Has the college undertaken energy audit?	Yes, the energy audit was undertaken and electrical measurements were undertaken at the college. Please refer the Annexure –XV of this report. Energy audit is an effective tool in identifying and perusing a comprehensive energy Management program. Energy Audit highlights the areas of energy savings, thereby reducing the energy costs. The following are the major consumers of electricity in the facility: ➢ Computers ➢ Lighting ➢ Air-Conditioning ➢ Fans ➢ Pumps ➢ Other Lab Equipment
What are the steps undertaken during the energy audit?	The Assessment Team undertook the analysis of the college premise: ➢ To study electricity bills ➢ Study of lighting system and its measurement. ➢ Air conditioner ➢ Identification of energy saving opportunity and energy conservation.

What methodology was adopted?	The energy assessment involved desk review and onsite measurements. Review of energy bill received from MSEDCL was undertaken. Review of lighting, HVAC, fuel usage, pumping systems etc. was undertaken. Energy conservation and saving opportunities are identified and included below.
What are the suggested energy conservation measures?	**Below energy conservation measures are suggested** ➢ The one switch for college concept should be implemented in the college. This will avoid unwanted operation and wastage of electricity. ➢ There are 40 W tube lights with copper chokes. As per replacement policy the LED tube-light should be installed. The T8 LED tube has wattage of 20 W, thus the energy saved is 40-20 = 20 watt/fitting. As per study there are 456 tubes of 40 W in college, library and hostel. After the replacement based on failure the energy savings will be approximately 15322 kWh. With average electricity cost of INR 9 /kWh, the annual savings will be approximately INR 137894 per year. ➢ Air conditioner shall be operated between temperature range of 24-28^{0}C to maintain lower cooling load on compressor to save energy. ➢ The existing 2 star labelled AC's and reached end of their service life. The AC's should be replaced by the 5-star AC's. ➢ All Class Rooms and labs must sensitize students regarding optimum use of electrical appliances in the room like, lights, fans, and computers. ➢ The comfort air conditioning temperature to be set between 24˚C to 28˚C. ➢ Lights in toilet area may be kept OFF during day time. Additional sensors can be installed in washrooms to automatically regulate the light and exhaust fans.
Has the college calculated its carbon footprint?	For the first time college is calculating the carbon footprint. The data applicable to Scope-2 emission (electricity purchase from grid) is available. The emissions pertaining to Scope-01 are limited to HSD use in DG, College Bus and LPG usage in Labs.
How is college promoting zero emission transportation options?	Not applicable. There is no internal transportation within the college.
Are all the applicable emission sources calculated?	The emission source pertaining to grid-based electricity source is calculated. Scope-01 emission source data pertaining to DG, HSD consumption in DG, LPG consumption in labs is calculated, Scope 2 emission on account of electricity imported from grid is considered.

	0.75 ton	1 ton	1.5 ton	2 ton
1 Star AC (mostly non inverter)	627	845	1246	1648
2 Star AC (mostly non inverter)	590	800	1184	1626
3 Star AC (mix of inverter and non inverter)	532	747	1104	1148
4 Star (mostly inverter)	464	645	945	1293
5 Star (mostly inverter)	450	554	840	1113

Annual Electricity Consumption (Units or kWh for 1600 hrs) based on data from BEE

Scope-01 Emissions:

Year	HSD Consumption in DG	Petrol Consumption	LPG Consumption in Labs
Session	lit	lit	kg
2021-22	69.1	40.53	85.2

Equivalent Scope-01 Emissions are as below[7]:

Year	HSD Consumption in DG	Petrol Consumption	LPG Consumption in Labs	Total GHG Emission (Scope-1)
Session	tCO_2	tCO_2	tCO_2	tCO_2
2021-22	0.25	0.13	0.31	0.70

Scope -2 Emissions are tabulated as follows[8]:

Year	Annual Electricity Consumption	Total GHG Emission (Scope-2)
Session	kWh	tCO_2
2021-22	78456	78.46

Total CO_2 emissions = Scope-01 + Scope-02

Year	Total GHG Emission (Scope-1)	Total GHG Emission (Scope-2)	Total GHG Emission (Scope-1+2)
Session	tCO_2	tCO_2	tCO_2
2021-22	0.70	78.46	80[9]

12. Waste Management

How the college reduces its paper waste via: • encouraging digital reading, note-taking, and activities? • setting printers and computers to default to duplex (double-sided) printing? • reducing margins and white space on documents that must be printed? • printing multiple pages per sheet?	➢ The college has adopted the duplex printers, which enables the complete usage of the paper areas. ➢ College has taken initiates towards plastic free campus. The students are encouraged to use waste bins which are placed in the college.

[7]With 10 % uncertainty
[8]With 10 % uncertainty
[9] Rounded Value

• minimizing paper correspondence with families? • opting out of unwanted mail?	➢ The internal correspondences and various functionalities are taken care by the electronic means like emails, sms etc. ➢ The recycling / disposal system adopted by the college is as below.
Is the college undertaking recycling collection for additional recyclable materials—like plastic bags, CFL (spiral) light bulbs, batteries, drink pouches, candy wrappers, and electronics?	**Different types are generated within campus which include.** ➢ **E-Waste:** The E-waste generally includes the tube-lights, CFL, LED, computer waste, etc. are stored into the scrap bin and is given to the agency for proper disposal. MOU of E-waste handling is executed. ➢ **Plant Waste:** The plant waste is composted in-house. Vermi culture compost is obtained from waste leaves. ➢ **Sewage Waste:** The liquid waste from lavatories and other sources are disposed through sewer line. ➢ **Chemical Waste:** The chemical waste is neutralized in the labs and flown or dumped into the soak pit. ➢ **Cellulose and Paper Waste:** According to the Management Policy, Cellulose and paper waste is stored in a particular place and when appropriate amount of waste is accumulated a Tender is released and quotations are requested. The waste is handed over to the agency which quotes highest price. ➢ **Biomedical Waste:** The biomedical waste is incinerated in the machine and the ash is buried in the ground. Please refer Annexure XIII for details. **Recommendation:** **Proper process for biomedical waste disposal system should be initiated on urgent basis.**
Further Scope of Improvement: ➢ **Proper process for biomedical waste disposal system should be initiated on urgent basis.**	
Conclusion: ➢ **E-waste and Cellulose waste are handled in a proper manner through dedicated agencies.**	

13. Environment

Air Quality

The plantation around the college helps to improve ambient air quality. The class room and labs are well ventilated and spacious. This minimizes suffocation to students by improving air changes and hence the air quality.

The assessment team has availed the monitoring result which are publicly available and independently monitored and hence reliable and reproducible source. Air Quality was found satisfactory however it is variable and changes with season and anthropogenic activities.

Sound Measurements

The Audit Team undertook readings of sound at various locations in the college like Classroom, Lab, Office and Campus most of the readings were found within the limits, but the college being situated on the main road readings at campus were on higher side.

Please refer Annexure XVI for further details

14. Plantation by College

The College campus has several trees i.e. a college garden and a Botanical garden with various rare and medicinal important species.

Every year, plantation programme is carried out in the campus as well as outside the campus. Students are also involved in plantation programme in surrounding locality. In the current session, the Institution planted several trees in the vicinity.

There are 2048 fully grown trees as wells as shrubs in the campus.

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

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Dr. R. O. Ganjiwale, I/c Principal

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Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref. No.- GEN/153/81 Date- 18/4/2022

DETAILS OF PLANTS/TREES AVAILABLE IN CAMPUS OF INSTITUTE

Sr. No.	Name of plants/trees	Numbers
1	Mango trees	05
2	Ashoka trees	13
3	Big trees	11
4	Cycas trees	12
5	Palm trees	20
6	Saru trees	34
7	Vidya plants	28
8	Coconut tree	01
9	Gulab plants	150
10	General trees	306
11	Medicinal plants of different varieties including different habit. (Herbal Garden)	1468
	Total	**2048**

Dr. R.O. Ganjiwale
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe) Wardha

List of trees in the campus

Annexure

Annexure – I: List of Interviewed College Staff / Students

Estd : 1991

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Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref.No.-GEN/153/79 Date- 18/4/2022

List of staff members present for Green Audit (2021-22)

Sr. No.	Name of staff Members	Designation	Signature
1	Dr. R. O. Ganjiwale	Principal	
2	Dr. S. A. Khan	Professor	
3	Dr. D. J. Singhavi	IQAC Co-ordinator	
4	Mr. G. D. Dahikar	Assistant Professor	
5	Dr. N. A. Karande	Assistant Professor	
6	Mr. A. B. Budhrani	Assistant Professor	
7	Mrs. A. A. Karlekar	Librarian	
8	Mrs. M. Y. Ghogare	Asst. Librarian	
9	Mr. P. B. Ankar	Technician	
10	Shri. V. M. Dahiwalkar	Technician	
11	Shri. N. A. Sontakke	Technician	
12	Shri. C. S. Choudhary	Store keeper	
13	Mr. R. S. Matkar	Supporting staff	
14	Mr. Kishor Macchiwar	Mess contractor	

Dr. R. O. Ganjiwale
Principal

PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe) Wardha

List of Staff members present during Green Audit

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

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Dr. R. O. Ganjiwale, I/c Principal

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Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref.No.-GEN/153/80 Date- 18/4/2022

List of students present for Green Audit (2021-22)

Sr. No.	Name of Student	Class	Signature
1	Mr. Sagar Kodwani	B. Pharm. I year	
2	Mr. Saarthak Lambat	B. Pharm. I year	
3	Mr. Rushikesh Sawarkar	B. Pharm. I year	
4	Ms. Saloni Misalkar	B. Pharm. II year	
5	Ms. Vrushali Sushir	B. Pharm. II year	
6	Ms. Shruti Nimbalkar	B. Pharm. II year	
7	Ms. A. S. Pandey	B. Pharm. III year	
8	Mr. P. R. Rawal	B. Pharm. III year	
9	Mr. P. Y. Jachak	B. Pharm. III year	

Dr. R. O. Ganjiwale

Principal

PRINCIPAL

Institute of Pharmaceutical Education & Research

Borgaon (Meghe) Wardha

List of Students present during audit

Annexure – II: Reference Documents / Surveys

Sr. No	Reference Documents / Surveys pertaining to
1.	Functionality of RO water plant
2.	Roof top area by College
3.	Setup for rain Water Harvesting
4.	Information regarding Garden Waste Management
5.	Information regarding Liquid Waste Management
6.	Measures for maintaining Cleanliness in Campus.
7.	Measures for Garbage Collection and disposal
8.	Plantation Measures
9.	Electricity Bills for duration of April 2021 to March 2022
10.	Nature Conservation Club Composition
11.	Declaration on Operational Controls of System Department with Respect to IT Management & Other Electronic Equipment's.
12.	Roll of Staff, Students & Management to Save Electricity In Campus.
13.	Lighting Survey undertaken by the Green Audit Team
14.	AC Survey undertaken by the Green Audit Team
15.	Water Harvesting Survey undertaken by the Green Audit Team
16.	Waste Water Management Survey undertaken by the Green Audit Team

Annexure –III: Green Campus Committee

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH
Borgaon (Meghe), Wardha. 442 001

Ref. No. ADM/937/ 08 **Date: 10/07/2021**

Green Campus Committee (2021-22)

Sr. No.	Name	Designation
1	Dr. R. O. Ganjiwale	Chairman
2	Dr. D. J. Singhavi	IQAC co-ordinator
3	Dr. N. A. Karande	Member
4	Mr. A. B. Budhrani	Member
5	Mr. P. B. Ankar	Member
6	Mr. C. S. Choudhary	Member
7	Mr. V. M. Dahiwalkar	Member
8	Mr. R. S. Matkar	Member
9	Ms. A. S. Pandey	Student representative
10	Mr. P. R. Rawal	Student representative
11	Mr. P. Y. Jachak	Student representative
12	Mr. Kishor Macchiwar	Canteen contractor
13	Mr. G. D. Dahikar	Member secretory

Dr. R. O. Ganjiwale
Chairman
Green campus committee

PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe) Wardha

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha. 442 001

GREEN CAMPUS COMMITTEE

VISION

1. To be more efficient in our energy consumption (including electricity and other energy forms), taking concrete steps to minimise waste;

2. To create a positive effect on the local environment and community through efficient use of natural resources and efficient management of wastes.

MISSION

1. Our mission is to improve environmental sustainability at Institute of Pharmaceutical Education and Research by achieving measurable energy and water savings;

2. Educating the campus community about sustainability;

3. To educate the students about medicinal values of the plants.

Dr. R. O. Ganjiwale
Chairman
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Annexure – IV: List of Awareness Program Undertaken by College

Virtual Yoga Day was celebrated on 21st June 2021

Tree Plantation Drive at IPER College on 28th July 2021

Online Poster Competition was organized on account of Swachata Pakhwada from 1st to 15th August 2021

"Nirmal Ganesh Visarjan" drive was organized at IPER College on 20th September 2021

Webinar on "Food Planet Health" was organized on 11th October 2021

Blood Donation Camp was organized at IPER College on 1st January 2022

Annexure –V: Lighting Survey (2021 – 22)

List of Assumptions:

- During the survey specific hours for each class room, wash room, office space was assessed and accordingly average daily hours were considered
- The kW ratings of the installed lights is taken from the College data
- The calculations cover the two approaches
  - Approach: Calculation of LED contribution based on the total lighting load energy consumption.

    Note: The Lumen/Watt for 28 W tube light is up to 110; which is almost same as LED is: 110-120[10]
  - The Green Audit Team acknowledges the criteria for introduction of LED lights as LED lights do not have disposal problems. Tube lights face problem of mercury contamination.
  - Conversely the college also faces the problem of disposal of existing tube lights. The sudden disposal of tube lights on large scale and within their service life will lead to huge amount of e-waste which has critical impact on environment. The college management is thus looking for the replacement policy and lighting (tube light, CFL) will be upgraded to eco-friendly LED after failure of existing lighting system.

Lux Levels observed at working place – Above 250

Calculated Contribution of various lighting arrangements: Calculated for 280 working days

Light Sources	Daily Wh Consumption
Tube light	75540
LED	3355
CFL	2899

Light Sources	% Contribution
Tube light	92%
LED	5%
CFL	3%

Light Sources	Number
Tube light	456
LED	97
CFL	172

Light Sources	% Contribution
Tube light	63%
LED	13%
CFL	24%

[10] https://www.google.co.in/amp/s/www.bijlibachao.com/lights/comparing-led-lights-with-fluorescent-lights.html%3fisamp=1

Lighting Survey 2021 – 22

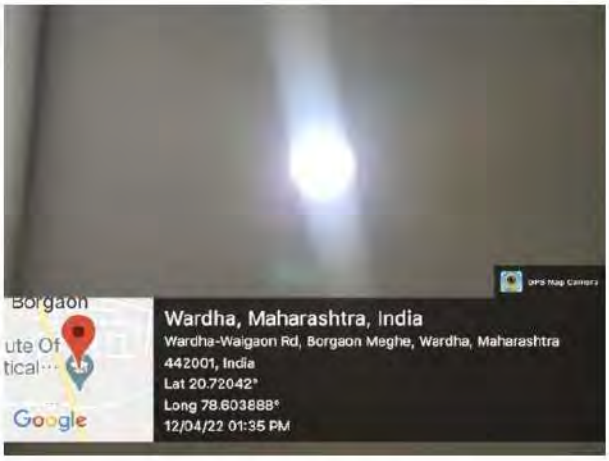
Sr. No	Room Name/no.	Tube light	Watts	Daily average hrs	W.hr	LED	Watts	Daily average hrs	W.hr	CFL	Watts	Daily average hrs	W.hr
1	101	2	40	0.5	40	-	-	-	-	3	15	0.5	22.5
2	102	-	-	-	-	3	15	0.5	22.5	18	15	0.5	135
		-	-	-	-	-	-	-	-	8	20	0.5	80
3	103	1	40	2	80	-	-	-	-	-	-	-	-
4	104	1	40	2	80	-	-	-	-	30	15	0.5	225
5	105	1	40	2	80	-	-	-	-	-	-	-	-
6	106	8	40	4	1280	-	-	-	-	-	-	-	-
7	107	4	40	3	480	-	-	-	-	-	-	-	-
8	108	4	40	3	480	-	-	-	-	-	-	-	-
9	109	4	40	3	480	-	-	-	-	-	-	-	-
10	110	2	40	3	240	-	-	-	-	-	-	-	-
11	111	-	-	-	-	-	-	-	-	-	-	-	-
12	112	5	40	5	1000	-	-	-	-	-	-	-	-
13	113	2	40	2	160	-	-	-	-	-	-	-	-
14	115	2	20	2	80	-	-	-	-	15	20	2	600
		5	40	2	400	-	-	-	-	-	-	-	-
15	116	5	40	4	800	-	-	-	-	-	-	-	-
16	117 / 118	8	40	2	640	-	-	-	-	-	-	-	-
17	119	1	40	4	160	-	-	-	-	-	-	-	-
18	120	10	40	0.5	200	-	-	-	-	-	-	-	-
19	121	-	-	-	-	-	-	-	-	16	20	1	320
		-	-	-	-	-	-	-	-	8	15	1	120
20	Reception	-	-	-	-	-	-	-	-	21	20	1	420
21	201	3	40	6	720	-	-	-	-	-	-	-	-
22	202	5	40	6	1200	-	-	-	-	11	20	2	440

23	203	2	40	5	400	-	-	-	-	-	-	-	-
24	204	1	40	5	200	-	-	-	-	-	-	-	-
25	205	10	40	2	800	-	-	-	-	-	-	-	-
26	206 / 207	7	40	0.5	140	-	-	-	-	-	-	-	-
27	208	1	40	3	120	-	-	-	-	-	-	-	-
28	209	7	40	0.5	140	-	-	-	-	-	-	-	-
29	210 / 211	9	40	0.5	180	-	-	-	-	-	-	-	-
30	212	19	40	4	3040	-	-	-	-	2	10	4	80
31	213	1	40	4	160	-	-	-	-	-	-	-	-
32	214	4	40	4	640	-	-	-	-	-	-	-	-
33	215	2	40	6	480	-	-	-	-	-	-	-	-
34	216	1	40	5	200	-	-	-	-	-	-	-	-
35	217	9	40	1	360	-	-	-	-	-	-	-	-
36	Corridor	-	-	-	-	18	20	2	720	-	-	-	-
37	301	2	40	6	480	-	-	-	-	-	-	-	-
38	302	4	40	3	480	-	-	-	-	-	-	-	-
39	303	8	40	3	960	-	-	-	-	-	-	-	-
40	304	2	40	5	400	-	-	-	-	-	-	-	-
41	305	2	40	2	160	-	-	-	-	-	-	-	-
42	306	2	40	2	160	-	-	-	-	-	-	-	-
43	307	5	40	2	400	-	-	-	-	-	-	-	-
44	308	7	40	2	560	-	-	-	-				
45	309	18	40	4	2880	-	-	-	-	2	20	2	80
46	311	8	40	1	320	-	-	-	-	-	-	-	-
47	312	2	40	1	80	-	-	-	-	-	-	-	-
48	313	2	40	2	160	-	-	-	-	-	-	-	-
49	313 - A	6	40	2	480	-	-	-	-	-	-	-	-
50	314	8	40	2	640	-	-	-	-	-	-	-	-
51	315	1	40	2	80	-	-	-	-	-	-	-	-

52	316	1	40	3	120	-	-	-	-	-	-	-	-
53	317	5	40	2	400	-	-	-	-	-	-	-	-
54	318	5	40	2	400	-	-	-	-	-	-	-	-
55	319	2	40	2	160	-	-	-	-	-	-	-	-
56	320	2	40	2	160	-	-	-	-	-	-	-	-
57	321	8	40	6	1920	-	-	-	-	-	-	-	-
58	Corridor	-	-	-	-	18	20	2	720	-	-	-	-
60	Girls Hostel Room No. 1	5	40	7	1400	-	-	-	-	-	-	-	-
61	Girls Hostel Room No. 2	5	40	7	1400	-	-	-	-	-	-	-	-
62	Girls Hostel Room No. 3	5	40	7	1400	-	-	-	-	-	-	-	-
63	Girls Hostel Room No. 4	5	40	7	1400	-	-	-	-	-	-	-	-
64	Girls Hostel Room No. 5	5	40	7	1400	-	-	-	-	-	-	-	-
65	Girls Hostel Room No. 6	1	40	7	280	-	-	-	-	-	-	-	-
66	Girls Hostel Room No. 7	2	40	7	560	-	-	-	-	-	-	-	-
67	Girls Hostel Room No. 8	2	40	7	560	-	-	-	-	-	-	-	-
68	Girls Hostel Room No. 9	1	40	7	280	-	-	-	-	-	-	-	-
69	Girls Hostel Room No. 10	6	40	7	1680	-	-	-	-	-	-	-	-
70	Girls Hostel Room No. 11	6	40	7	1680	-	-	-	-	-	-	-	-
71	Girls Hostel Room No. 12	6	40	7	1680	-	-	-	-	-	-	-	-
72	Girls Hostel Room No. 13	6	40	7	1680	-	-	-	-	-	-	-	-
73	Girls Hostel Room No. 14	6	40	7	1680	-	-	-	-	-	-	-	-
74	Girls Hostel Room No. 15	6	40	7	1680	-	-	-	-	-	-	-	-
75	Girls Hostel Room No. 16	6	40	7	1680	-	-	-	-	-	-	-	-
76	Girls Hostel Room No. 17	8	40	7	2240	-	-	-	-	-	-	-	-
77	Girls Hostel Room No. 18	8	40	7	2240	-	-	-	-	-	-	-	-
78	Girls Hostel Room No. 19	8	40	7	2240	-	-	-	-	-	-	-	-
79	Girls Hostel Room No. 20	8	40	7	2240	-	-	-	-	-	-	-	-
80	Hall / Corridor	13	40	5	2600	-	-	-	-	-	-	-	-
81	Mess	5	40	5	1000	-	-	-	-	-	-	-	-

82	Washroom	2	40	3	240	-	-	-	-	6	12	3	216
83	Visitors Hall	2	40	5	400	-	-	-	-	-	-	-	-
84	Boys Hostel Room No. 1	2	40	7	560	-	-	-	-	-	-	-	-
85	Boys Hostel Room No. 2	10	40	4	1600	-	-	-	-	-	-	-	-
86	Boys Hostel Room No. 3	10	40	4	1600	-	-	-	-	-	-	-	-
87	Boys Hostel Room No. 4	10	40	4	1600	-	-	-	-	-	-	-	-
88	Boys Hostel Room No. 5	10	40	4	1600	-	-	-	-	-	-	-	-
89	Boys Hostel Room No. 6	2	40	7	560	-	-	-	-	-	-	-	-
90	Boys Hostel Room No. 7	2	40	7	560	-	-	-	-	-	-	-	-
91	Boys Hostel Room No. 8	2	40	7	560	-	-	-	-	-	-	-	-
92	Boys Hostel Room No. 9	2	40	7	560	-	-	-	-	-	-	-	-
93	Boys Hostel Room No. 10	2	40	7	560	-	-	-	-	-	-	-	-
94	Boys Hostel Room No. 11	2	40	7	560	-	-	-	-	-	-	-	-
95	Boys Hostel Room No. 12	2	40	7	560	-	-	-	-	-	-	-	-
96	Boys Hostel Room No. 13	1	40	7	280	-	-	-	-	-	-	-	-
97	Boys Hostel Room No. 14	2	40	7	560	-	-	-	-	-	-	-	-
98	Visitors Hall	1	40	2	80	-	-	-	-	-	-	-	-
99	Corridor	4	40	7	1120	4	40	7	1120	-	-	-	-
100	Mess	5	40	5	1000	-	-	-	-	-	-	-	-
101	Auditorium	-	-	-	-	42	12	0.5	252	32	10	0.5	160
102		-	-	-	-	4	100	0.5	200	-	-	-	-
103	Entrance	14	40	2	1120	8	20	2	320	-	-	-	-
	Total	**456**			**75540**	**97**			**3354.5**	**172**			**2899**

On & off culture practiced in college



Use of LED lights in college

Sensor based lighting installed in college

Annexure –VI: Undertaking by the System Department regarding control of Electronic Equipment's

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha, Maharashtra State, India - 442 001

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Dr. R. O. Ganjiwale, I/c Principal

E-mail: iper4160@gmail.com
Web Side: www.iperwardha.com

Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

GEN/153/82 Date- 19/04/2022

CERTIFICATE

The administrative rights of computer setting are with the administrative department of the college.

As part of the sustainable and eco-friendly setting, the system department has initiated below settings in the compartments of all the users.

1. All the computer screen savers are disabled.
2. The computers are turned to sleep mode if they are ideal.
3. The computer settings cannot change as the administrative rights are with the department.
4. With regard to the uses policy of the photocopier and other equipment's uses **"POWER ON"** when in use and **"POWER OFF"** when not in use.

Dr. R. O. Ganjiwale
Principal
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Annexure –VII: Water Quality Reports

महाराष्ट्र राज्य सार्वजनिक आरोग्य सेवा
जिल्हा आरोग्य प्रयोगशाळा वर्धा

प्रति, इन्स्टिट्युट ऑफ फार्मासिटीकल एज्युकेशन ॲन्ड रीसर्च बोरगांव (मे), वर्धा

पाठविणा-याचे पत्र क्रमांक व दिनांक :- १५३ दिनांक :- 17 नोव्हेंबर २०२१

प्रयोगशाळा संदर्भ क्रमांक :- 29 / 8169 to 8169 2021 एकुण नमुने १

नमुना घेतल्याचा दिनांक	नमुना पोहचल्याचा दिनांक	परिक्षण सुरु केल्याचा दिनांक
17 नोव्हेंबर २०२१	17 नोव्हेंबर 2021	17 नोव्हेंबर २०२१

अक्र	स्वीत	ठिकाण	गाव/वार्ड	कोली फॉर्म	थरमोटॉलरंन्ट	अभिप्राय
1 ८१६९	नळ	इन्स्टिट्युट ऑफ फार्मासिटीकल एज्युकेशन ॲन्ड रीसर्च	बोरगांव (मे)	०	....	पिण्यास योग्य

टीप: असे गृहीत धरण्यात येते की, तपासणीसाठी प्राप्त नमुना/नमुने मुळ स्वोतातील प्रातिनिधीक स्वरुपाचा आहे. वरील नमुना/नमुने संबंधित संस्थेने गोळा करुन या प्रयोगशाळेत तपासणीकरिता पाठविलेले आहेत.

अभिप्राय :- पिण्यास अयोग्य पाण्यावर योग्य प्रमाणात क्लोरिनची प्रक्रिया केल्यानंतर व सुक्ष्मजीवीय पुनर्तपासणीनंतर पिण्यास योग्य असल्याची खात्री झाल्यानंतरच ते पाणी पिण्यासाठी वापरता येईल

अहवाल क्र जिआप्रशा / २९ / ८१६९ ते ८१६९ / २०२१

अभिप्राय कळविल्याचा दिनांक :- 23/11/2021

प्रत सादर
१) मा.जिल्हा आरोग्य अधिकारी, जिल्हा परिषद वर्धा
२) मा.जिल्हा शल्य चिकित्सक, सामान्य रुग्णालय वर्धा
३) मा.खंड विकास अधिकारी, पंचायत समिती

for मुख्य अणुजीवशास्त्रज्ञ
जिल्हा आरोग्य प्रयोगशाळा
वर्धा

Water Testing Report for the Year 2021 - 22

Annexure– VIII: List of Electronic Equipment's in College

Estd : 1991

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Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Ref.No.-GEN/153/78 Date-18/4/2022

Details of computers, LCD, scanner, printers purchased during session 2021-2022

Sr. No.	Name of Item	Quantity
1	Computers	10
2	LCD	03
3	Scanner	02
4	Printers	02

Dr. R. O. Ganjiwale

Principal

PRINCIPAL

Institute of Pharmaceutical Education & Research

Borgaon (Meghe) Wardha

Annexure –IX: Solar Panel Installations

Note: Installation of 10kW Solar PV System is under process.

Annexure –X: Water Distribution Data

The water is drawn from 01 no. of well & 01 no. of bore well. The water drawn is not measured. Recommendation to monitor the water drawn is raised under chapter 6 of this report.

Annexure –XI: Solar Passive Structure / Drip Irrigation

Sprinkler System installed in college for gardening

Adequate light in classrooms & labs without using electrical lighting

Use of false ceiling to reduce air-conditioned volume and reducing AC load

Use of blinds for windows to reduce heat

AC Condenser in shade

AC Condenser exposed to direct sunlight

Annexure –XII: Water Management

Water Harvesting System installed on College Building

Water harvesting recharge pit

Taps to be replaced by faucets

Valves to be replaced by push buttons

RO water used for drinking purpose

Well & bore well only source of water

Annexure –XIII: Waste Management

RO Waste water used for gardening

Chemical waste soak pit

Dustbins in classrooms, labs and office

Vending machine & Incinerator machine installed in girls' common room

Water from AC er collected in bucket

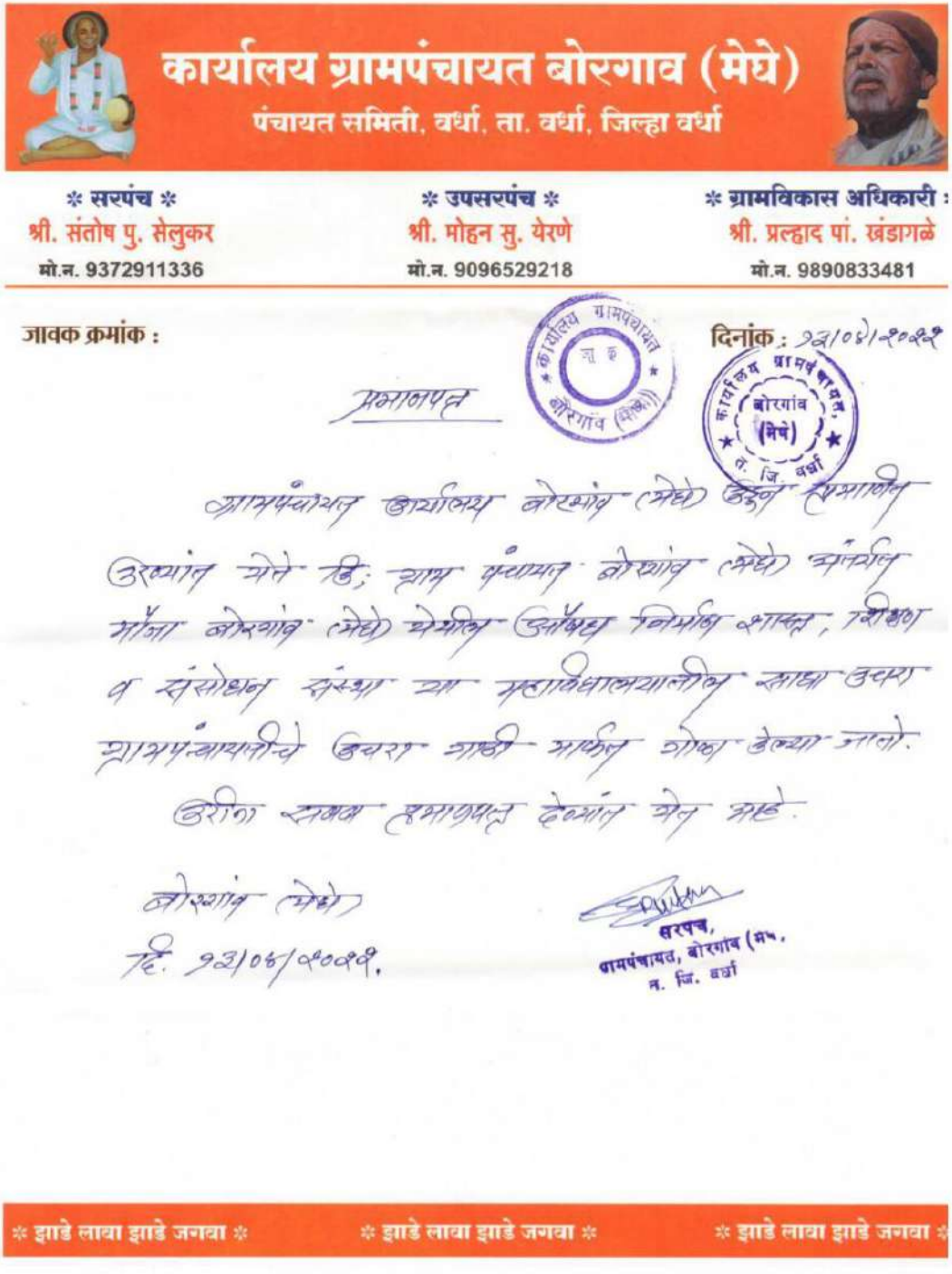
E-Waste collection bin

Compost Pit

Use of Dustbins to segregate waste

Ban on single use plastic in campus

Cement Blocks area for water harvesting



कार्यालय ग्रामपंचायत बोरगाव (मेघे)

पंचायत समिती, वर्धा, ता. वर्धा, जिल्हा वर्धा

* सरपंच *	* उपसरपंच *	* ग्रामविकास अधिकारी *
श्री. संतोष पु. सेलुकर	श्री. मोहन सु. येरणे	श्री. प्रल्हाद पां. खंडागळे
मो.न. 9372911336	मो.न. 9096529218	मो.न. 9890833481

जावक क्रमांक :

दिनांक : २३/०६/२०२१

ग्रामपंचायत कार्यालय बोरगांव (मेघे)

प्रमाणपत्र

ग्रामपंचायत कार्यालय बोरगांव (मेघे) हद्दीत प्रमाणित करण्यात येते कि; ग्राम पंचायत बोरगांव (मेघे) अंतर्गत मौजा बोरगांव (मेघे) येथील औषध निर्माण शास्त्र, संशोधन व संशोधन संस्था या प्रशासकीयालयातील सांडा कचरा ग्रामपंचायतीचे कचरा गाडी मार्फत गोळा केल्या जातो. तरी सदर प्रमाणपत्र देण्यात येत आहे.

बोरगांव (मेघे)

दि. २३/०६/२०२१.

सरपंच,
ग्रामपंचायत, बोरगांव (मे.),
ता. जि. वर्धा

* झाडे लावा झाडे जगवा * * झाडे लावा झाडे जगवा * * झाडे लावा झाडे जगवा *

Solid Waste handling letter from Grampanchayat

महाराष्ट्र MAHARASHTRA ◑ 2020 ◑ XE 910882

पुढांक लिपिक/उप-लेखापाल
कोषागार कार्यालय, वर्धा.

Ref. No. ADM/220/181 Date: 01/04/2021

Agreement for Disposal of E-Waste

This indenture of agreement is made on 01 April 2021 between Principal, Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha (Hereafter Party No. 1) and Purab Sales, Wardha, sole proprietor through Mr. Prakash Bhagat (Hereafter Party No. 2)

Whereas the Part No. 1, is running Institute of Pharmaceutical Education and Research, (Bachelor of Pharmacy, Master of Pharmacy, Ph.D in Pharmacy) at Borgaon

(Meghe), Wardha. The College is recognized by All India Council of Technical Education, and Pharmacy Council of India, New Delhi. It is also permanently affiliated to the Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

And

Whereas the Party No.1, Students of College are imparted with Computer knowledge along with Practical's.

And

Whereas Students of College performs various experiments on electronic machines.

And

Whereas after some period of times the computers, monitors, keyboards, and electronic machines becomes out of order.

And

Whereas the disposal of such E- waste creates problem of disposal as per prevailing environmental laws.

And

Whereas Party No. 2 is authorized computer agency and ready to dispose/reuse/recycle the E- waste provided to them.

This agreement witnesses as under

1] That Party No.1 shall provide all the E-waste generated in the college to Party No.2 free of cost.

2] That Party No.2 agrees to dispose/reuse/recycle the E-waste provided by Party No. 1 as per prevailing environmental law.

3] That this agreement is valid for a period of 01/04/2021 to 31/03/2023.

In witness thereof signed by Party No. 1 and Party No. 2.

Dr. R. O. Ganjiwale
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Mr. Prakash Bhagat
Purab Sales

MOU of E-waste handling from April 2021 to March 2023

Purab sales
Shop No2,Pooja Bakery Kelkarwadi
Arvi Road , Wardha – 442001 (M.S.)
Mob 8446443244

Ref. No. 09 Date: 12/04/2022

CERTIFICATE

(E-waste certificate)

This is to certify that the e-waste received from Institute of Pharmaceutical Education and Research, Borgaon (Meghe), Wardha during the period from 01/04/2021 to 31/03/2022 was disposed of environment friendly manner.

Mr. Prakash Bhagat
Purab Sales

E-waste handling certificate for 2021 – 22

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH
Borgaon (Meghe), Wardha. 442 001

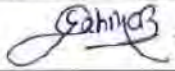
Excess of solvent used in reaction can be recovered by distillation process to prevent contamination of water.

Sr. No.	Name of Solvent	Boiling point of solvent at which distillation carried out
1	Acetic acid	118
2	Acetone	56.05
3	Acetonitrile	81.65
4	Benzene	80.1
5	1-butanol	117.7
6	2-butanol	99.5
7	2-butanone	79.6
8	*t*-butyl alcohol	82.4
9	Carbon tetrachloride	76.8
10	Chlorobenzene	131.7
11	Chloroform	61.2
12	Cyclohexane	80.7
13	1,2-dichloroethane	83.5
14	Diethylene glycol	246
15	Diethyl ether	34.5
16	Diglyme (diethylene glycol dimethyl ether)	162
17	1,2-dimethoxy-ethane (glyme, DME)	84.5
18	Dimethyl-formamide (DMF)	153
19	Dimethyl sulfoxide (DMSO)	189
20	1,4-dioxane	101.1
21	Ethanol	78.5
22	Ethyl acetate	77
23	Ethylene glycol	195
24	Glycerine	290
25	Heptane	98
26	Hexamethylphosphoramide (HMPA)	232.5
27	Hexamethylphosphorous triamide (HMPT)	150
28	Hexane	69
29	Methanol	64.6
30	Methyl *t*-butyl ether (MTBE)	55.2
31	Methylene chloride	39.8
32	*N*-methyl-2-pyrrolidinone (NMP)	202

33	Nitromethane	101.2
34	Pentane	36.1
35	Petroleum ether (ligroine)	30-60
36	1-propanol	97
37	2-propanol	82.4
38	Pyridine	115.2
39	Tetrahydrofuran (THF)	65
40	Toluene	110.6
41	Triethyl amine	88.9
42	Water	100.00
43	Water, heavy	101.3
44	*o*-xylene	144
45	*m*-xylene	139.1
46	*p*-xylene	138.4

Note:

1. **After neutralization of chemical waste, it is collected in separate container and dumped in Chemical Soak Pit.**
2. **Cleaning/Washing of utensils carried out by detergent powder and waste water collected in separate container**

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. P. B. Ankar	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale
			

SOP for handling Used Chemicals and water of Washed Utensils

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

BorgaonMeghe), Wardha 442001

CHEMICAL WASTE TREATMENT

Sr. No.	Name of Chemical	Neutralization treatment
1	Sulphuric acid	Two moles of sodium hydroxide (NaOH) is required to neutralize one mole of sulphuric acid (H_2SO_4) resulting in sodium sulphate, as follows: **$2NaOH + H_2SO_4 \rightarrow Na_2(SO)_4 + 2H_20$**
2	Hydrochloric acid	One mole of sodium hydroxide (NaOH) is required to neutralize one mole of hydrochloric acid (HCl) resulting in sodium chloride, as follows: **$NaOH + HCl \rightarrow NaCl + H_20$** Conversely one mole of lime as $Ca(OH)_2$ will neutralize two moles of hydrochloric acid (HCl) resulting in calcium chloride, as follows: **$Ca(OH)_2 + 2HCl \rightarrow CaCl_2 + 2H_20$**
3	Nitric acid	One mole of sodium hydroxide (NaOH) is required to neutralize one mole of HNO_3 resulting in sodium nitrate, as follows: **$NaOH + HNO_3 \rightarrow NaNO_3 + H_20$** Conversely one mole of lime as $Ca(OH)_2$ will neutralize two moles of nitric acid (HNO_3) resulting in calcium nitrate, as follows: **$Ca(OH)_2 + 2HNO_3 \rightarrow Ca(NO_3)_2 + 2H_20$**
4	Sodium hydroxide	One mole of HCl is required to neutralize one mole of NaOH resulting in sodium chloride, as follows: **$HCl + NaOH \rightarrow NaCl + H_20$** Conversely one mole of sulphuric acid (H_2SO_4) will neutralize two moles of sodium hydroxide (NaOH) resulting in sodium sulphate, as follows: **$H_2SO_4 + 2NaOH \rightarrow Na_2(SO)_4 + 2H_20$**
5	Calcium hydroxide	Two moles of hydrochloric acid (HCl) will neutralize one mole of lime as $Ca(OH)_2$ resulting in calcium chloride, as follows: **$2HCl + Ca(OH)_2 \rightarrow CaCl_2 + 2H_20$**
6	Magnesium hydroxide	Magnesium hydroxide is relatively insoluble in water at neutral pH values and higher. Given this, magnesium has little or no effect on water alkalinity above a pH of 7.0

The most commonly controlled parameter in laboratory wastewater is pH which is the measure of free acidity or alkalinity of an aqueous stream.

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. P. B. Ankar	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale

SOP for neutralizing the Used Chemicals before disposal

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha. 442 001

SOP for handling and usage of Hazardous chemicals

1. Handle the hazardous chemicals only by using protective means like hand gloves and safety goggles
2. Use suction bulb or vacuum during pipetting the chemicals
3. Keep inflammable liquids and substances away from naked flame and electric spark.
4. Carefully handles the ether like chemicals and it should not be used near flame.
5. Prepare dilute sulphuric acid solution as per following procedure:

   First cool the aqueous solution in ice bath then pour sulphuric acid slowly in it with constant stirring.
6. Clean the spillage if any as per protocol.

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. C. S. Chaudhari	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale
			

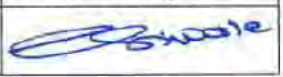
INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Borgaon (Meghe), Wardha. 442 001

Standard Operating Procedure for Biomedical Waste

Animal waste:

Biomedical waste from animal house including blood, animal tissue, bleeding part and sacrificed animals used in the experimental protocol in Pharmacological investigation are normally incinerated thereafter ash buried in soil.

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mr. S. D. Dharpure	Dr. B. R. Gandhare	Dr. R. O. Ganjiwale
			

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Borgaon (Meghe), Wardha. 442 001

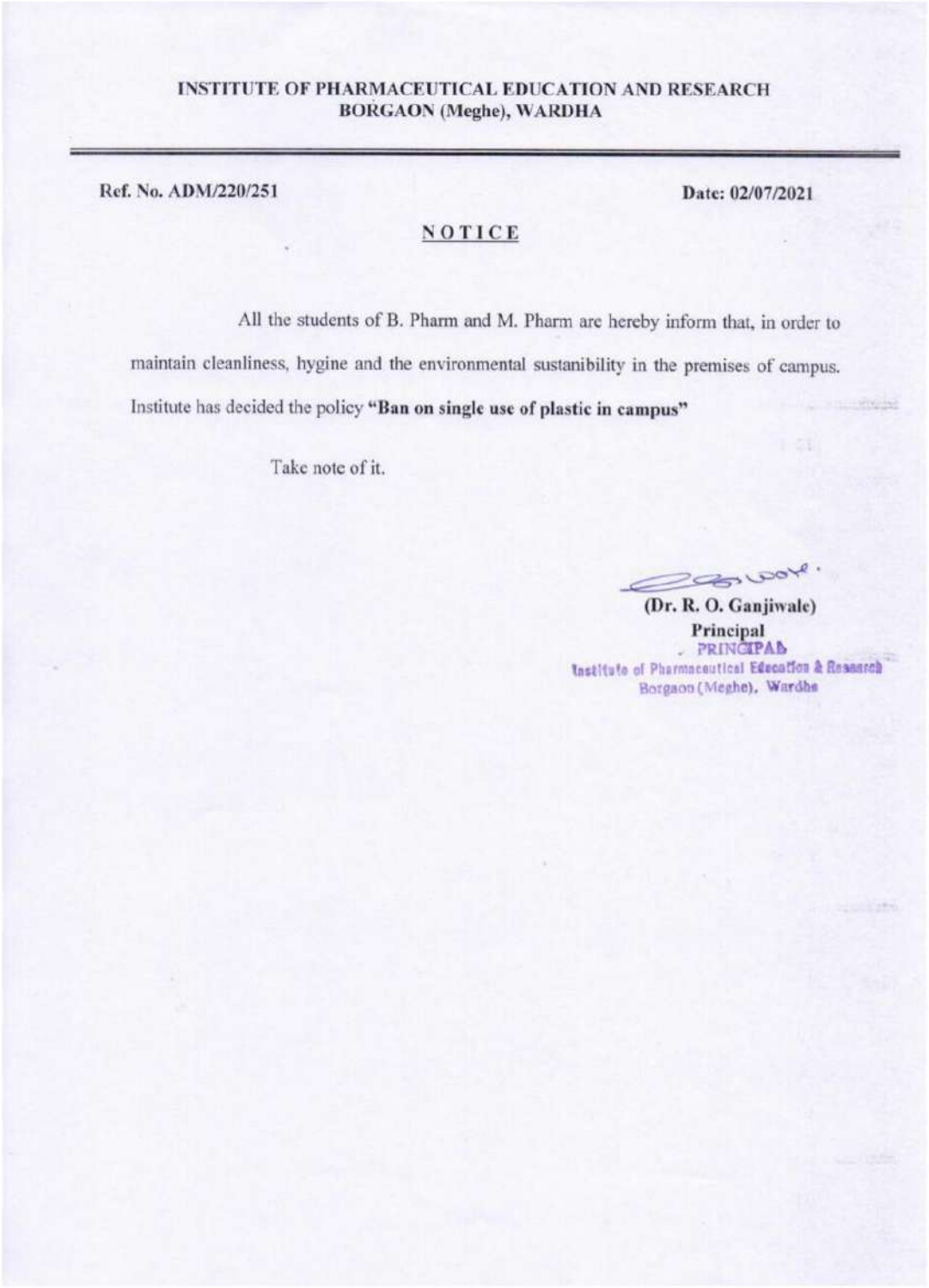
Standard Operating Procedure for Biomedical Waste

Microbiology and Biotechnological waste:

Biomedical waste from Microbiology and Biotechnology laboratory including various microbial cell cultures are inactivated by Autoclave Sterilization thereafter same is disposed of by incineration.

(Condition in autoclave: Temperature 121 ^{0}C, time 15 minutes and pressure 15 psi)

Prepared on	Prepared by	Checked by	Approved by
01/07/2020	Mrs. M. M. Deshmukh	Mr. G. D. Dahikar	Dr. R. O. Ganjiwale



INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH
BORGAON (Meghe), WARDHA

Ref. No. ADM/220/251 Date: 02/07/2021

NOTICE

All the students of B. Pharm and M. Pharm are hereby inform that, in order to maintain cleanliness, hygine and the environmental sustanibility in the premises of campus. Institute has decided the policy **"Ban on single use of plastic in campus"**

Take note of it.

(Dr. R. O. Ganjiwale)
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

Ban on Single Use Plastic Notice

Annexure –XIV: Awareness / Posters

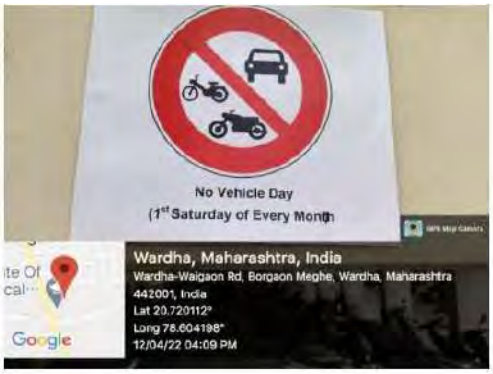
Majhi Vasundhara Abhiyan was organized in the vicinity of the college on 2nd September 2021

Cleanliness Drive and Awareness Rally on "Ban on Plastic" was organized on 14th March 2022

Herbal Garden in college campus

Diesel Generator in college

Chemical storage system



No Vehicle Day

Unnat Bharat Abhiyan

Landscaping of trees in college campus

Pedestrian Friendly Pathways

Green Audit Team in discussion with Principal

Green Audit Team interviewing the staff members & students

INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH
BORGAON (Meghe), WARDHA

Ref. No. ADM/220/254 Date: 05/07/2021

NOTICE

All students of B.Pharm and M.Pharm are hereby inform that, in order to control the environmental pollution in the premises of campus. Institute has decided to observe 1st Saturday of every month as a **"No Vehicle Day"**

Take note of it.

Note: - Faculty, students can come to the college by public transport or Bicycle or electric vehicle.

(Dr. R. O. Ganjiwale)
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

No Vehicle Day Notice

INSTITUTE OF PHARMACEUTICAL EDUCATION & RESEARCH
BORGAON (MEGHE), WARDHA

GENERAL INSTRUCTIONS

- All students will restrict themselves from using plastic bottles and plastic material.
- All Student/Teaching Staff/ Non-Teaching staff shall use metal bottles for drinking purpose.
- Any Student/Teaching Staff/ Non-Teaching staff finds any waste material in corridor, classrooms or laboratory shall collect and put in the dustbin.
- All Student/Teaching Staff/ Non-Teaching staff shall switch off lights/Fans and other electricity utilities if not in use.
- Computers which in use for more than five minutes, must be switched off.
- All Student/Teaching Staff/ Non-Teaching staff must volunteer themselves for cleanliness and watering of lawns/trees/garden within the campus.
- All Student/Teaching Staff/ Non-Teaching staff are encouraged for use of single vehicle with a pillion ride.
- All Student/Teaching Staff/ Non-Teaching staff are encouraged to use public transport for traveling purpose wherever suitable.
- All Student/Teaching Staff/ Non-Teaching staff shall save and conserve water in gardening.
- All Student/Teaching Staff/ Non-Teaching staff shall close the drinking water taps to save and conserve water.
- All Student/Teaching Staff/ Non-Teaching staff shall close the water taps in toilets to save and conserve water.
- All Student/Teaching Staff/ Non-Teaching staff shall close the water taps in laboratory to save and conserve water.

INSTITUTE OF PHARMACEUTICAL EDUCATION & RESEARCH
BORGAON (MEGHE), WARDHA

STANDARD OPERATING PRACTICES

MAINTAINING CLEANLINESS IN COLLEGE PREMISES

INSTITUTE OF PHARMACEUTICAL EDUCATION & RESEARCH
BORGAON (MEGHE), WARDHA

STANDARD OPERATING PRACTICES

SAVING ELECTRICITY IN CLASSROOMS

- Whomsoever enters the classroom will check that if sufficient light is there or not.
- Only minimum number of lights required shall be put on.
- Fans shall be switched on only if required.
- Whomsoever leaves last shall switch off all the lights and fans before leaving the class.

INSTITUTE OF PHARMACEUTICAL EDUCATION & RESEARCH
BORGAON (MEGHE), WARDHA

- All students restrict themselves from using plastic bottles and plastic material.
- All Student/Teaching Staff/Non-Teaching staff shall use metal bottles for drinking purpose.
- Any Student/Teaching Staff/Non-Teaching staff finds any waste material in corridor, classrooms or laboratory shall collect and put in the dustbin.
- All Student/Teaching Staff/Non-Teaching staff shall switch off lights/Fans and other electricity utilities if not in use.
- Computers if not in use for more than five minutes, must be switched off.
- All Student/Teaching Staff/Non-Teaching staff must volunteer themselves for cleanliness and watering of lawns/trees/garden within the campus.
- All Student/Teaching Staff/Non-Teaching staff are encouraged for use of single vehicle with a pillion rider.

Dr. R. O. Ganjiwale
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

INSTITUTE OF PHARMACEUTICAL EDUCATION & RESEARCH
BORGAON (MEGHE), WARDHA

- All students/ Teaching staff/Non-Teaching staff are encouraged to use public transport for travelling purpose wherever suitable.
- All Student/Teaching Staff/Non-Teaching staff shall save and conserve water in gardening area.
- All Student/Teaching Staff/Non-Teaching staff shall close the drinking water taps to save and conserve water.
- All Student/Teaching Staff/Non-Teaching staff shall close the water taps in toilets to save and conserve water.
- All Student/Teaching Staff/Non-Teaching staff shall close the water taps in laboratory to save and conserve water.

Dr. R. O. Ganjiwale
Principal
PRINCIPAL
Institute of Pharmaceutical Education & Research
Borgaon (Meghe), Wardha

General SoP's followed by college

Annexure –XV: Onsite Measurements (Sample Pictures)

Onsite Measurements taken by Green Audit Team

Lux Meter Readings

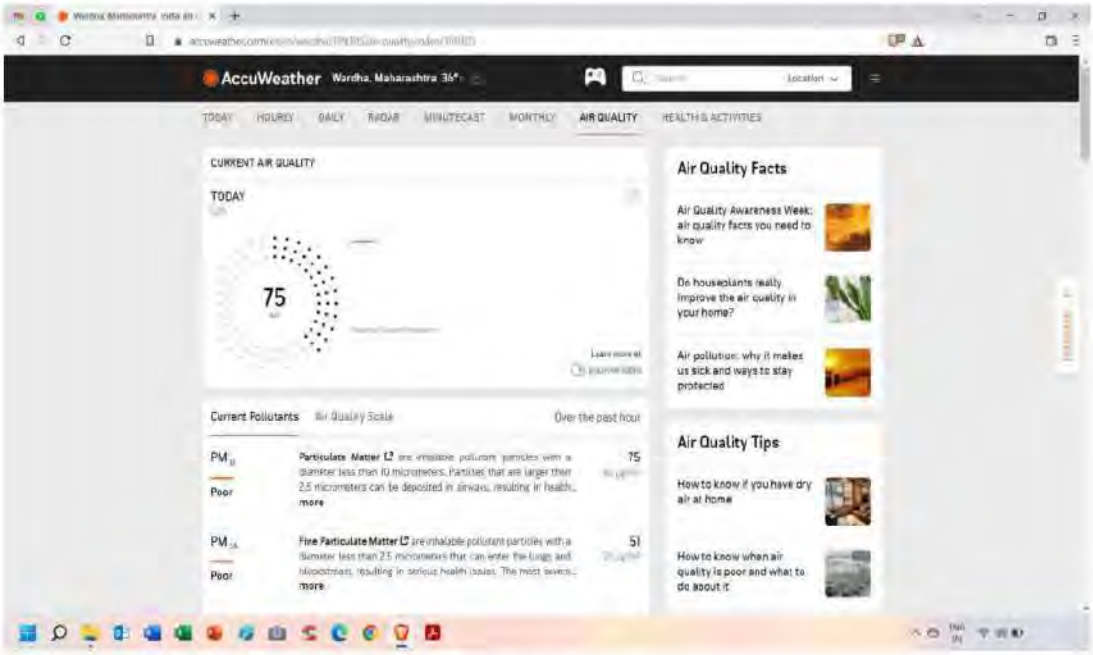
Fire Fighting System installed in college

Annexure –XVI: Sound and Air Quality Readings

WHO/ CPCB Guidelines for Noise[11]

Specific Environment	Time Base (hours)	Standard limits as per WHO guidelines	
		LAeq [dB]	LAmax, Fast [dB]
School class rooms and pre-schools, indoors	During class	35	-
School, playground outdoor	During play	55	-
Ceremonies, festivals and entertainment events	4	100	110
Public addresses, indoors and outdoors	1	85	110

The noise levels were registered at various locations. Sample evidence in form of readings is captured in next page. The college is located on the main road so the noise levels were on slightly higher side.



Air Quality Index[12]

The Air Quality is independently monitored and sourced from publicly available, reliable and reproducible source. Air Quality was found satisfactory however it is variable and changes with season and anthropogenic activities.

[11] https://cpcb.nic.in/who-guidelines-for-noise-quality/,http://cpcbenvis.nic.in/noisepollution/noise_rules_2000.pdf , https://www.mpcb.gov.in/sites/default/files/noise-pollution/archives/noise-monitoring/Metro_city_Noise_Monitoring_Report_Final.pdf

[12] https://www.accuweather.com/en/in/wardha/189305/air-quality-index/189305

Campus

Lab

Classroom

Office

Readings of sound at various locations in college

Annexure –XVII: Energy Audit Report

Description of Energy Audit

An energy audit is an inspection, survey and analysis of energy flows, for energy conservation in a building, process and system to reduce the amount of energy input into the system without affecting the output(s). An energy audit is the first step in identifying opportunities to reduce energy expenses and carbon footprints.
The term energy audit is commonly used to describe a broad spectrum of energy studies ranging from a quick walk-through of a facility to identify major problem areas to a comprehensive analysis of the implications of alternative energy efficiency measures sufficient to satisfy the financial criteria of sophisticated investors.

The process of energy audit:-

- The analysis of building and utility data, including study of the installed equipment and analysis of energy bills;
- The survey of the real operating conditions;
- The understanding of the building behavior and of the interactions with weather, occupancy and operating schedules;
- The selection and the evaluation of energy conservation measures;
- The estimation of energy saving potential;
- The identification of customer concerns and needs.

Generally, four levels of analysis can be outlined

Level 0: Benchmarking:

Breakout of electric and fuel consumptions into end-use components (space heating, fan energy, lighting consumption, etc.) Comparison of the building's consumptions to other buildings of typical size, use and geographic location.

Level- I: Walk-through audit: Preliminary analysis made to assess building energy efficiency to identify not only simple and low-cost improvements but also a list of energy conservation measures to orient the future detailed audit. This inspection is based on visual verifications, study of installed equipment and operating data and detailed analysis of recorded energy consumption collected during the benchmarking phase;

Level- II: Detailed/General energy audit: Based on the results of the pre-audit, this type of energy audit consists in energy use survey in order to provide a comprehensive analysis of the studied installation

Level- III: Investment-Grade audit: Detailed Analysis of Capital-Intensive Modifications focusing on potential costly ECOs requiring rigorous engineering study.

Description of Process and Measurements

Instrument Used for the Study:-

1. Power Analyser – ALM 30 Krykard

The 3 phase power analyzer and data logger were used to measure and log the electrical parameters data for the various load centers in the facility. Most of the loads have variation in power requirement and therefore logging helps to observe the variations as well as the average electrical consumption of the load centers.

Using the logger, all major electrical parameters of voltage, current, power, power factor, apparent power, harmonics etc. are recorded at fixed intervals of time.

The variation of parameters like power are plotted and shown with time on X axis and parameter on Y axis. Observations are made on the basis of these measurements.

Some Basic terms:

1. Power – kilowatt (kW) – It is the power consumed by the equipment. This value is varying as per load requirements.
2. Energy – kilowatt hour (kWh) – It is the energy (electrical units) consumed by the equipment. If average power for an electrical load is 2 kW, it means that it consumes 2 kWh units per hour.
3. Apparent power kilo Volt Ampere (kVA) – It is a measure of demand Power / power factor.

Electricity Bills Analysis

Consumer Name	The Principal Institute of Pharmacy, Vidarbha You
Consumer no	510019011180
Contract Demand	38 kVA
60 % of Contract Demand	22.80 kVA
Sanctioned Load	150 kW
Connected Load	150 kW
Tariff	146 HT-VIIIB

Sr. No.	Month	Electricity Consumption	Amount	Rs./kWh
1	Apr-21	4884	77688	9.21
2	May-21	4670	75062	9.21
3	Jun-21	5146	80677	9.21
4	Jul-21	5386	83528	9.21
5	Aug-21	5213	81483	9.21
6	Sep-21	5323	155972	9.21
7	Oct-21	5304	82472	9.21
8	Nov-21	5529	85055	9.21
9	Dec-21	8158	16166	9.21
10	Jan-22	6993	102203	9.21
11	Feb-22	8115	74739	9.21
12	Mar-22	13735	126499	9.21
Total		**78456**	**1041544**	
Average		**6538**	**86795**	**9.21**

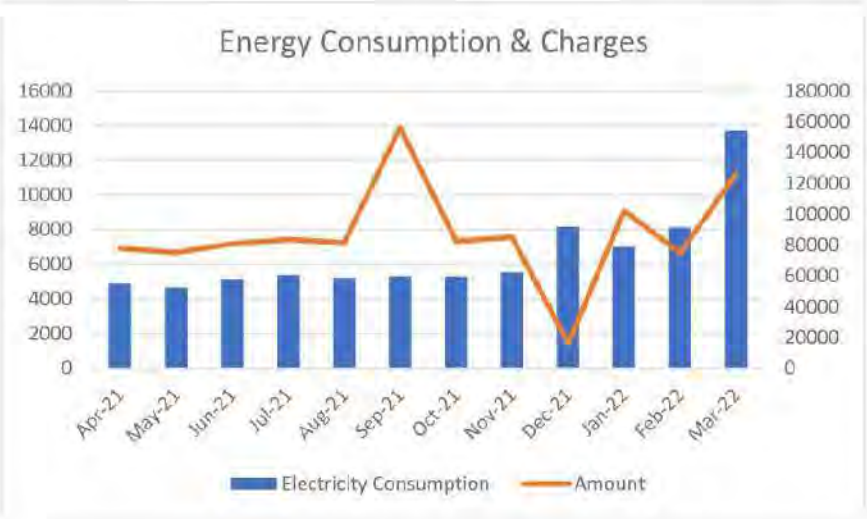


Table 1 : FOLLOWING TABLE SHOW VOLTAGE, CURRENT AND FREQUENCY

	VOLTAGE SINGLE PHASE			VOLTAGE LINE TO LINE			CURRENT			Frequency
Time	R	Y	B	RY	YB	BR	R	Y	B	Hz
11:30:30 AM	235	239	235	408	412	407	141.6	119.3	177.7	50.1
11:31:00 AM	232	237	233	404	408	403	178.1	159.8	217.3	50.1
11:31:30 AM	234	239	235	407	412	407	146.8	117.8	178.8	50.1
11:32:00 AM	234	239	235	407	412	407	152.7	121.9	182.6	50.1
11:32:30 AM	233	237	233	405	409	405	182.9	155.9	212.0	50.1
11:33:00 AM	234	238	235	407	411	407	156.1	129.4	187.6	50.1
11:33:30 AM	234	238	235	407	411	407	157.0	129.3	184.9	50.1
11:34:00 AM	233	237	234	405	409	406	173.3	149.9	204.7	50.1
11:34:30 AM	234	237	234	405	409	406	173.5	152.4	204.4	50.1
11:35:00 AM	235	238	234	407	411	407	154.5	132.4	189.6	50.1
11:35:30 AM	234	238	234	406	410	406	163.7	143.3	198.4	50.0
11:36:00 AM	233	236	232	404	407	404	184.7	166.4	222.3	50.0
11:36:30 AM	234	238	234	406	410	406	159.7	137.7	195.3	50.0
11:37:00 AM	234	238	233	406	410	406	162.5	135.5	198.2	50.0
11:37:30 AM	232	236	232	402	406	402	198.7	171.6	234.5	50.0
11:38:00 AM	234	238	233	406	410	406	164.7	133.2	197.3	50.0
11:38:30 AM	234	238	234	406	410	406	165.4	138.3	192.0	49.9
11:39:00 AM	233	237	233	405	408	405	186.2	164.7	211.2	49.9
11:39:30 AM	233	237	234	405	408	405	183.3	163.7	207.6	49.9
11:40:00 AM	233	238	235	406	410	406	168.4	145.2	189.9	49.9
11:40:30 AM	233	237	234	406	410	406	172.9	149.7	194.3	49.9
11:41:00 AM	232	236	233	404	407	404	200.9	180.6	223.6	49.9
11:41:30 AM	234	238	234	406	410	407	164.7	147.4	196.0	49.9
11:43:00 AM	234	238	234	407	410	407	162.4	147.5	199.4	49.9
11:43:30 AM	235	239	235	408	412	408	138.1	121.6	175.0	49.9
11:44:00 AM	235	238	235	407	411	408	147.4	130.5	184.4	49.9
11:44:30 AM	237	241	241	413	418	415	102.9	83.8	106.3	49.9
11:46:00 AM	239	242	242	416	420	418	71.8	52.7	59.0	49.9
11:46:30 AM	239	242	243	416	420	418	72.3	52.7	59.4	49.9
11:47:00 AM	240	242	242	416	420	418	66.2	52.8	59.6	50.0
11:47:30 AM	240	242	242	416	420	418	64.6	56.7	60.9	50.0
11:48:00 AM	240	242	242	417	420	418	63.7	57.2	61.5	50.0

11:48:30 AM	240	242	242	417	420	418	59.7	57.1	61.6	50.0
11:50:00 AM	236	239	235	409	413	408	127.7	121.2	177.8	50.0
11:50:30 AM	238	241	236	412	415	410	102.7	93.5	151.2	50.0
11:51:00 AM	238	241	237	413	416	411	97.4	85.5	144.5	50.0
11:51:30 AM	237	240	236	411	414	410	116.0	102.4	160.2	50.0
11:53:00 AM	235	239	235	408	412	408	143.4	120.9	172.5	50.0
11:53:30 AM	234	237	233	406	409	405	167.5	157.4	207.2	50.0
11:54:00 AM	235	238	235	408	411	407	145.1	131.8	181.7	50.0
11:54:30 AM	235	239	235	408	412	408	137.7	124.2	172.9	50.0
11:55:00 AM	235	238	234	407	411	407	146.2	133.8	181.6	50.0
11:55:30 AM	234	237	233	406	409	405	162.1	151.0	200.3	50.0
11:56:00 AM	235	238	235	408	411	407	138.6	124.0	174.0	50.0
11:56:30 AM	235	239	235	408	412	407	139.9	123.7	171.7	50.0
11:57:00 AM	233	237	234	405	409	405	169.8	154.1	203.9	50.0
11:57:30 AM	234	238	235	407	412	407	142.8	123.4	175.0	50.0
11:58:00 AM	235	239	235	407	412	408	139.5	118.6	171.0	50.0
11:58:30 AM	234	238	234	406	410	406	157.1	138.3	189.6	50.0
11:59:00 AM	234	238	234	406	409	406	160.9	141.4	192.2	50.0
11:59:30 AM	235	239	235	409	412	408	137.4	118.0	168.9	50.0
12:01:00 PM	236	239	235	409	412	408	134.0	122.9	169.4	50.0
12:01:30 PM	236	239	235	409	412	408	132.8	123.3	170.3	50.1
12:02:00 PM	235	237	234	407	410	406	156.5	150.2	194.9	50.1
12:02:30 PM	235	238	235	408	411	408	153.5	139.9	184.8	50.1
12:03:00 PM	236	239	236	409	412	409	139.4	124.1	170.2	50.1
12:03:30 PM	235	238	235	408	411	408	149.2	134.3	180.7	50.1
12:04:00 PM	234	238	234	407	410	407	164.6	144.1	193.8	50.1
12:04:30 PM	235	239	235	408	412	408	140.1	119.0	169.9	50.1
12:05:00 PM	235	238	235	408	412	408	137.9	123.8	173.9	50.0
12:05:30 PM	234	237	233	405	408	405	166.3	157.4	206.0	50.0
12:06:00 PM	236	239	235	409	412	408	132.1	119.3	169.7	50.0
12:06:30 PM	236	239	235	409	412	408	132.7	121.4	170.7	50.0
12:07:00 PM	239	241	241	415	418	417	71.7	68.8	85.5	50.0
12:07:30 PM	240	242	242	416	420	418	61.2	54.1	56.2	50.0
12:09:00 PM	239	242	242	415	419	418	69.8	54.4	56.1	50.0
12:09:30 PM	239	242	242	415	419	418	69.9	51.3	56.0	50.0
12:10:00 PM	240	242	242	416	419	418	63.0	49.8	55.8	50.0
12:10:30 PM	240	242	242	417	419	419	57.6	49.6	55.6	50.0
12:11:00 PM	240	242	243	417	420	419	55.4	49.7	55.8	50.0
12:11:10 PM	241	242	243	417	420	419	55.4	49.8	55.6	50.0

Table 2: Following Table show Voltage and Current Harmonic Distortion

Voltage Distortion			Current Distortion		
R	Y	B	R	Y	B
1.17	1.16	1.09	1.5	2.3	1.9
1.16	1.09	1.05	2.1	2.5	2.2
1.21	1.31	1.13	4.9	2.6	1.9
1.20	1.33	1.14	5.3	2.6	1.9
1.20	1.30	1.13	4.4	2.2	1.6
1.21	1.32	1.14	5.1	2.4	1.8
1.18	1.29	1.12	5.0	2.2	1.8
1.16	1.29	1.11	4.6	2.0	1.6
1.19	1.32	1.12	4.6	2.0	1.6
1.19	1.30	1.13	5.2	2.3	1.6
1.15	1.24	1.13	4.8	2.2	1.6
1.16	1.21	1.11	4.3	1.9	1.4
1.15	1.22	1.10	5.0	2.3	1.5
1.16	1.26	1.10	4.9	2.3	1.5
1.17	1.24	1.10	4.0	1.8	1.3
1.16	1.25	1.13	4.8	2.3	1.5
1.15	1.18	1.12	4.8	2.1	1.6
1.16	1.18	1.12	4.2	1.9	1.5
1.16	1.20	1.11	4.3	1.9	1.5
1.15	1.21	1.12	4.6	2.2	1.6
1.14	1.22	1.13	4.5	2.0	1.6
1.15	1.19	1.13	3.9	1.7	1.4
1.13	1.18	1.11	4.7	2.0	1.5
1.15	1.18	1.09	4.8	1.9	1.5
1.16	1.19	1.10	4.2	1.7	1.4
1.20	1.25	1.12	4.8	2.0	1.5

1.21	1.26	1.13	5.7	2.4	1.6
1.20	1.24	1.12	5.3	2.2	1.6
1.26	1.35	1.25	7.8	3.9	3.0
1.29	1.40	1.31	11.2	6.2	5.7
1.27	1.39	1.30	11.2	6.2	5.7
1.27	1.38	1.30	11.2	6.1	5.8
1.25	1.37	1.29	11.0	6.2	5.8
1.30	1.39	1.31	12.2	6.1	5.6
1.29	1.36	1.32	12.4	5.8	5.5
1.30	1.36	1.32	12.8	5.7	5.4
1.31	1.38	1.30	13.7	5.8	5.3
1.31	1.39	1.32	13.7	5.9	5.3
1.27	1.34	1.24	9.9	4.1	3.0
1.22	1.27	1.14	6.2	2.4	1.6
1.25	1.31	1.17	7.8	3.1	1.9
1.24	1.31	1.17	8.3	3.4	2.0
1.24	1.30	1.16	7.0	2.9	1.8
1.25	1.29	1.17	6.6	2.6	1.7
1.22	1.30	1.16	7.3	3.2	1.9
1.20	1.24	1.11	5.5	2.4	1.6
1.22	1.19	1.12	4.7	2.0	1.4
1.22	1.23	1.15	5.4	2.4	1.6
1.20	1.21	1.12	5.7	2.6	1.6
1.22	1.19	1.12	5.4	2.4	1.6
1.21	1.18	1.10	4.9	2.2	1.4
1.20	1.20	1.12	5.7	2.8	1.6
1.20	1.21	1.14	5.6	2.6	1.6
1.23	1.23	1.13	4.7	2.1	1.5
1.26	1.30	1.17	5.6	2.5	1.6
1.24	1.29	1.16	5.7	2.5	1.7

1.24	1.25	1.15	5.0	2.2	1.6
1.25	1.26	1.16	4.9	2.1	1.5
1.25	1.26	1.15	5.7	2.5	1.7
1.24	1.26	1.16	5.7	2.4	1.7
1.24	1.22	1.16	4.7	2.0	1.5
1.25	1.24	1.16	5.9	2.6	1.7
1.26	1.25	1.17	6.0	2.5	1.7
1.27	1.24	1.15	5.1	2.1	1.5
1.22	1.26	1.16	5.2	2.3	1.6
1.21	1.26	1.16	5.7	2.6	1.7
1.21	1.25	1.15	5.4	2.4	1.6
1.22	1.28	1.15	4.9	2.1	1.5
1.22	1.28	1.14	5.7	2.4	1.7
1.24	1.27	1.14	5.8	2.3	1.7
1.26	1.25	1.14	4.8	1.9	1.5
1.24	1.26	1.15	6.1	2.4	1.7
1.25	1.25	1.14	6.0	2.4	1.7
1.36	1.37	1.31	11.8	5.1	3.8
1.36	1.41	1.37	13.6	6.5	6.1
1.32	1.41	1.38	12.2	6.4	6.2
1.29	1.38	1.36	11.7	6.1	6.2
1.30	1.42	1.37	11.6	6.4	6.2
1.30	1.44	1.38	11.6	6.7	6.3
1.36	1.48	1.42	13.1	6.8	6.5
1.40	1.49	1.41	14.5	6.8	6.5
1.40	1.47	1.40	15.1	6.7	6.4
1.38	1.47	1.40	15.0	6.8	6.5

Table 3 : Following table shows Power Factor

KW in R phase	KW in Y phase	KW in B phase	POWER FACTOR IN R	POWER FACTOR IN Y	POWER FACTOR IN B
31.3	26.9	39.2	0.942	0.947	0.940
39.0	35.7	47.2	0.941	0.945	0.934
32.7	26.8	39.5	0.949	0.952	0.941
34.1	27.7	40.4	0.954	0.950	0.942
40.3	34.7	46.1	0.947	0.939	0.933
34.7	29.1	41.3	0.950	0.942	0.939
35.1	29.1	40.9	0.952	0.943	0.942
38.4	33.2	44.8	0.948	0.934	0.935
38.3	33.6	44.5	0.944	0.929	0.932
34.5	29.6	41.8	0.953	0.939	0.940
36.3	31.8	43.3	0.949	0.933	0.935
40.7	36.6	48.1	0.946	0.930	0.930
35.7	30.7	42.8	0.953	0.938	0.937
36.2	30.2	43.3	0.954	0.937	0.936
43.7	37.9	50.5	0.950	0.935	0.931
36.7	29.7	43.2	0.953	0.938	0.937
36.9	31.1	42.2	0.953	0.946	0.939
41.1	36.6	46.0	0.947	0.938	0.932
40.3	36.3	45.1	0.945	0.936	0.930
37.6	32.7	41.8	0.955	0.948	0.939
38.5	33.6	42.6	0.953	0.945	0.936
44.2	40.1	48.5	0.949	0.941	0.931
36.7	33.2	43.2	0.953	0.948	0.940
36.8	33.2	44.2	0.953	0.947	0.941
41.4	38.4	48.8	0.948	0.939	0.935
35.6	32.4	43.4	0.936	0.924	0.930
31.1	27.7	39.0	0.958	0.952	0.947

33.0	29.4	40.8	0.951	0.945	0.943
21.9	17.5	20.7	0.896	0.865	0.811
16.9	12.9	14.1	0.991	-0.997	0.987
16.9	12.7	14.2	0.991	-0.997	0.987
17.0	12.7	14.1	0.991	-0.996	0.987
17.1	12.7	14.2	0.991	-0.996	0.987
15.7	12.8	14.3	0.991	-0.996	0.988
15.3	13.7	14.6	0.991	-0.996	0.987
15.1	13.8	14.7	0.990	-0.998	0.987
14.2	13.8	14.7	0.988	-0.997	0.986
14.2	13.8	14.7	0.989	-0.997	0.986
17.8	17.2	22.0	0.923	0.923	0.863
28.9	27.9	39.9	0.959	0.962	0.954
23.3	21.6	34.3	0.956	0.959	0.960
22.5	20.1	33.1	0.971	0.977	0.969
26.5	23.5	36.2	0.963	0.956	0.959
27.9	25.1	37.3	0.957	0.948	0.953
25.3	21.5	33.7	0.960	0.962	0.964
32.4	27.5	38.5	0.962	0.952	0.949
37.4	35.2	45.4	0.955	0.943	0.941
32.7	29.6	40.2	0.956	0.943	0.944
31.2	28.3	38.6	0.964	0.954	0.949
32.9	30.2	40.2	0.958	0.947	0.944
36.1	33.7	44.0	0.953	0.941	0.941
31.4	28.2	38.9	0.963	0.954	0.952
31.5	28.2	38.3	0.960	0.954	0.949
37.8	34.6	44.8	0.954	0.948	0.940
32.0	28.0	38.9	0.957	0.950	0.946
31.4	27.0	38.2	0.960	0.956	0.950
35.0	31.0	41.8	0.952	0.944	0.942

35.8	31.5	42.2	0.951	0.939	0.939
31.1	26.9	37.7	0.962	0.955	0.951
31.5	28.1	38.6	0.960	0.950	0.948
37.5	35.6	44.8	0.955	0.946	0.940
30.3	28.0	37.9	0.961	0.954	0.950
30.0	28.1	38.1	0.959	0.955	0.951
34.9	33.7	43.0	0.951	0.945	0.942
34.3	31.4	40.8	0.950	0.941	0.941
31.5	28.3	38.1	0.959	0.955	0.951
33.5	30.4	40.2	0.955	0.949	0.945
36.7	32.3	42.7	0.953	0.941	0.940
31.7	27.2	38.0	0.963	0.956	0.951
31.1	28.1	38.7	0.957	0.952	0.948
37.0	35.3	45.2	0.952	0.947	0.942
29.8	27.2	38.0	0.958	0.957	0.952
30.0	27.7	38.2	0.958	0.956	0.952
15.9	15.5	18.1	0.927	0.936	0.878
14.5	13.0	13.5	0.987	-0.996	0.990
16.0	13.1	13.5	0.991	-0.996	0.992
16.4	13.1	13.5	0.992	-0.996	0.993
16.5	13.1	13.5	0.992	-0.996	0.992
16.6	12.3	13.5	0.992	-0.993	0.993
15.0	11.9	13.4	0.990	-0.991	0.993
13.7	11.9	13.4	0.988	-0.990	0.993
13.2	11.9	13.4	0.988	-0.990	0.993
13.2	12.0	13.4	0.988	-0.990	0.993

Figure 1 : FOLLOWING FIGURE SHOW ENERGY STUDY

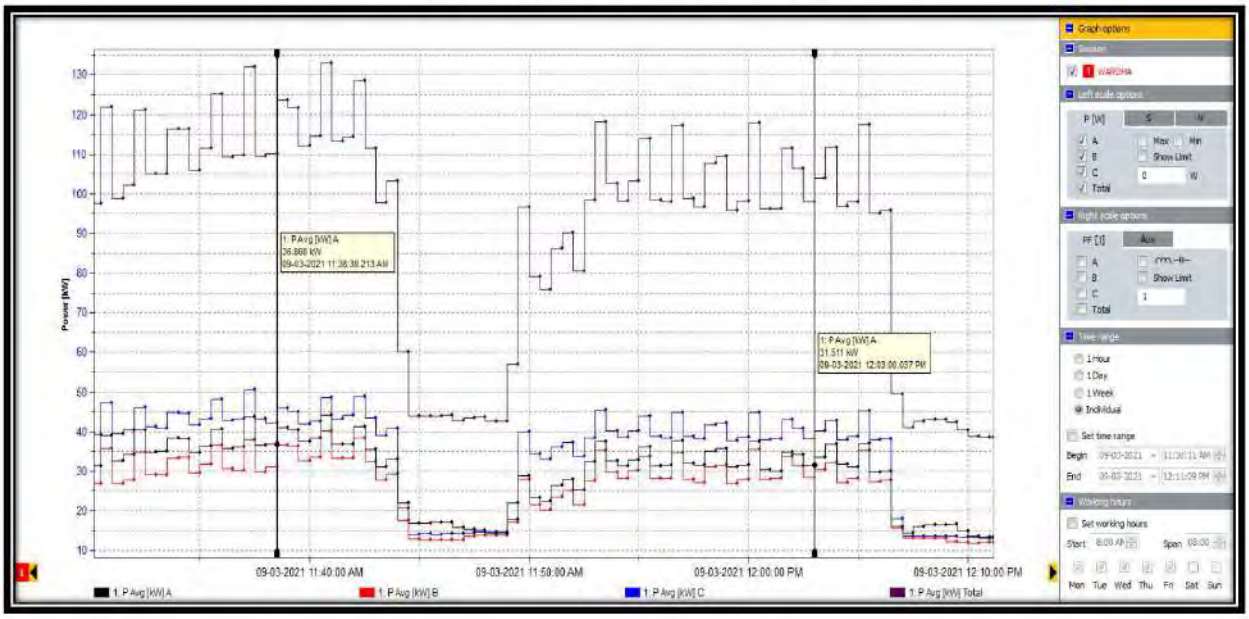


Figure 2: FOLLOWING FIGURE SHOW VOLTAGE HARMONIC

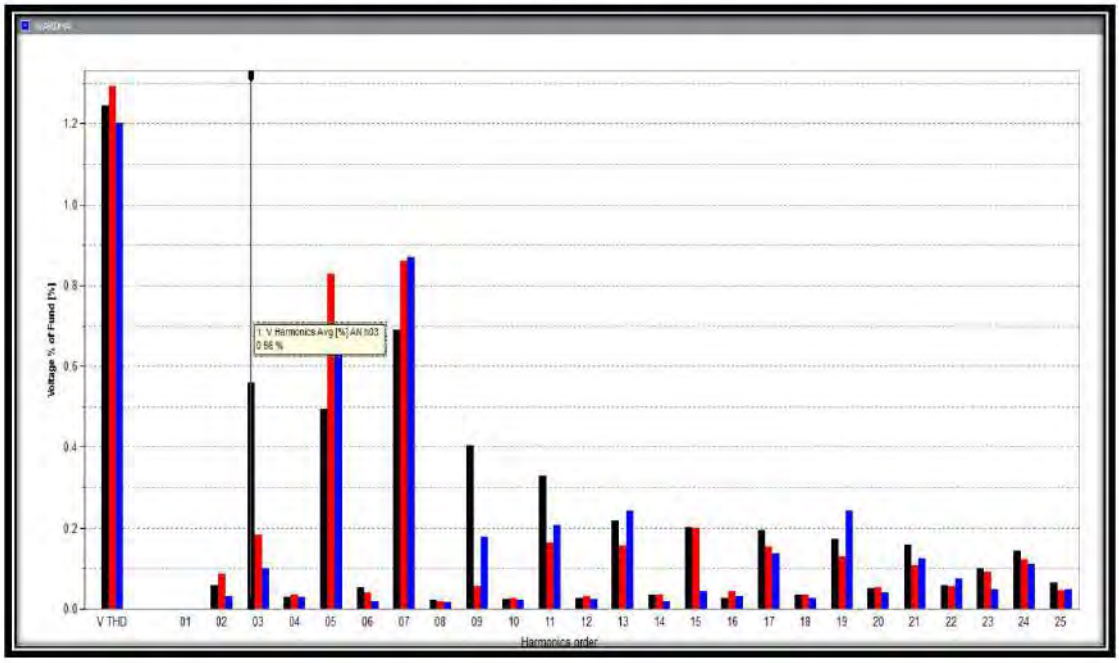
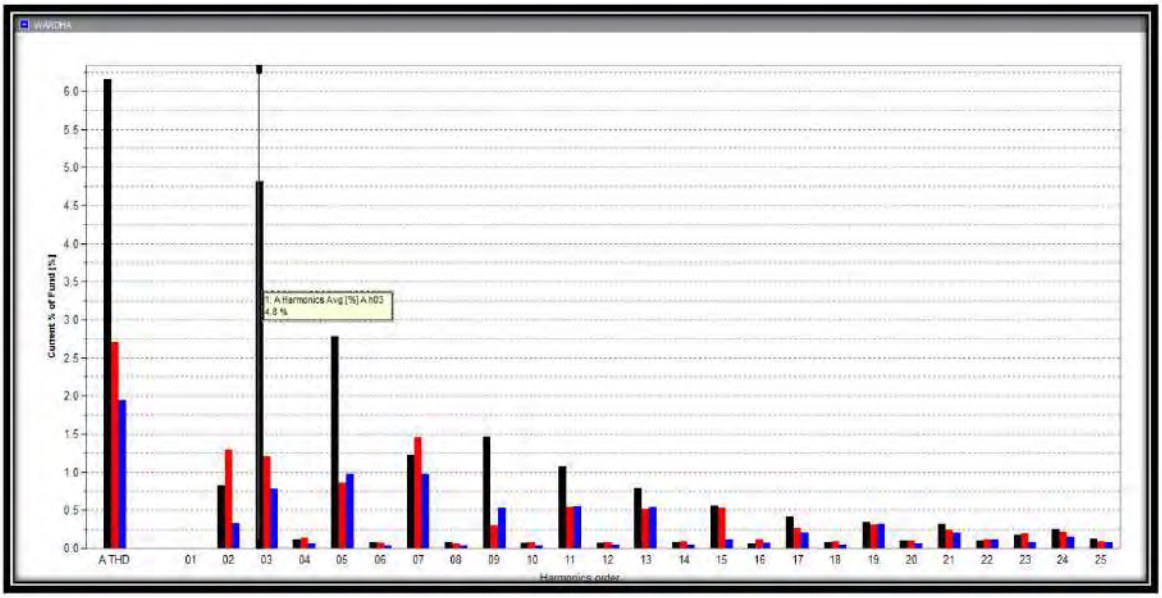


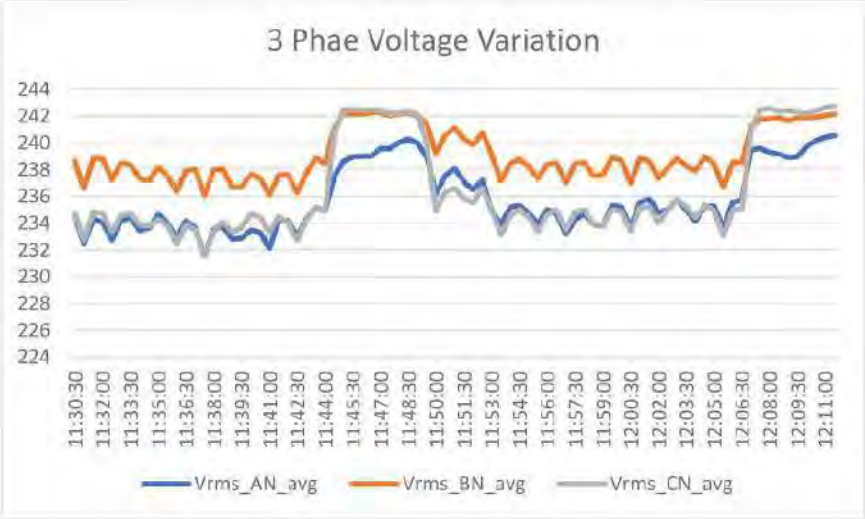
Figure 3: FOLLOWING FIGURE SHOW CURRENT HARMONIC



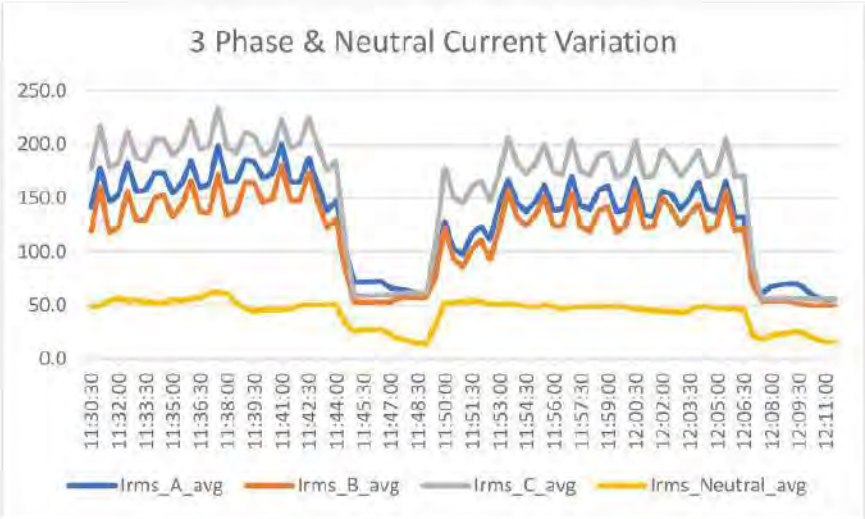
Electrical Measurements Observations

All electrical parameters for main feeder were logged using electrical data logger.
The logging was conducted on 11th April 2022 and all the electrical parameters were recorded at 30 seconds intervals. The cycle was logged during day time at normal college working day.
Below are variations observed during from the measurement and Main feeder.

Graph 1. Voltage Variation at Main Feeder

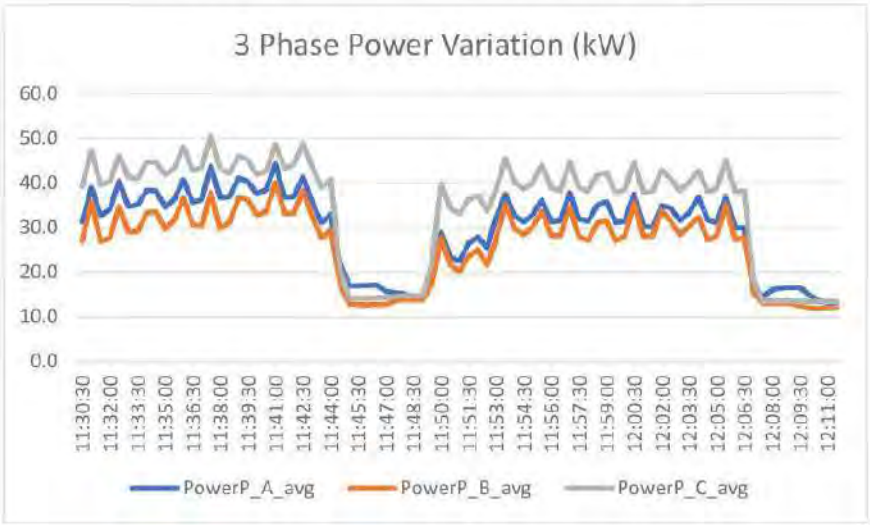


Graph 2. Current Variation at Main feeder

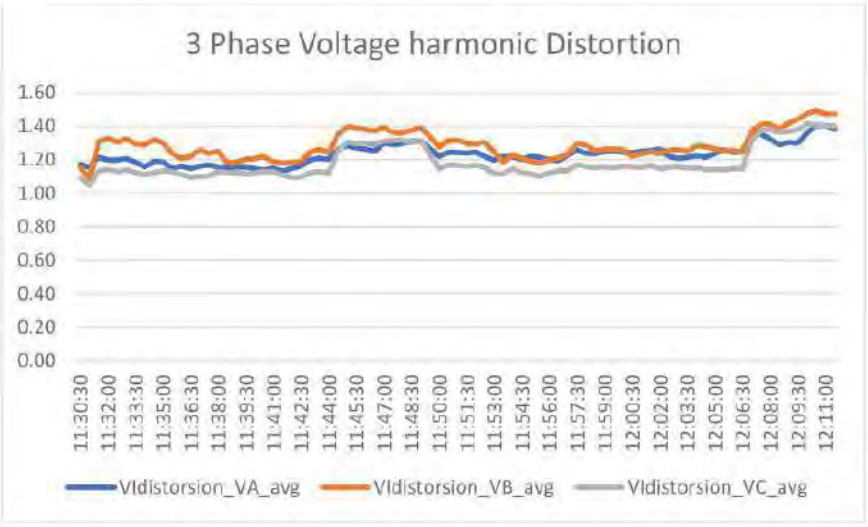


Graph 3. Power Factor Variation at Main Feeder

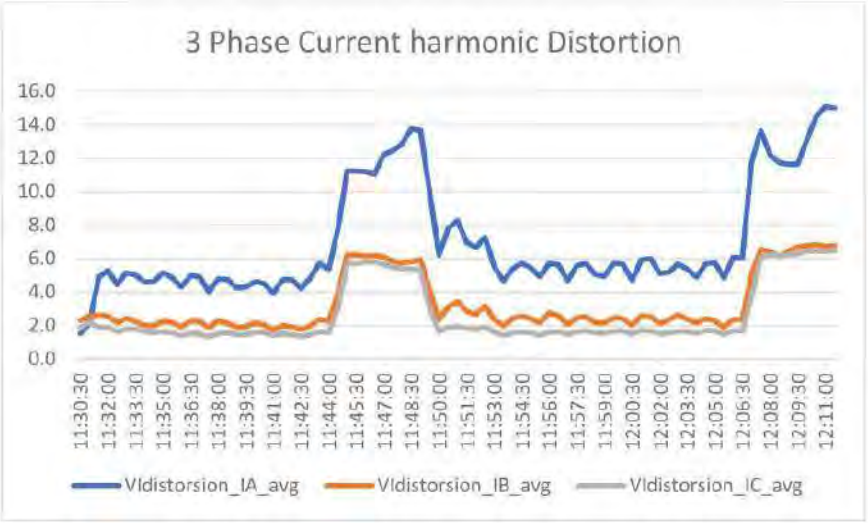
Graph 4. Power Variation at Main Feeder



Graph 5. Voltage Harmonic Distortion at Main Feeder



Graph 6. Current Harmonic Distortion at Main Feeder



The following table gives the results of Voltage and Current data logging for main Feeder.

	Voltage			Current				Power Factor	Active Power		
	Volts			Amperes					kW		
	R	Y	B	R	Y	B	N		R	Y	B
Minimum	232	236	232	55.35	49.58	55.57	14.18	0.84	13.15	11.88	13.37
Average	236	239	236	131.69	115.47	156.26	42.96	0.93	29.60	26.15	34.68
Maximum	241	242	243	200.89	180.56	234.51	62.25	0.98	44.23	40.10	50.53

Observations for Main Feeder Logging

- Power requirement of the complete facility varies between 38 kW to 132 kW during day time maximum power requirement went to about 132 kW.
- The Voltage Variation is between prescribed tolerance limits. The average measured voltage is 239 Volts. The voltage is balanced through the all phases.
- Slight balancing in current distribution required. The unbalance in 3 phases is although less than 10% which is on higher end. The current in Y ***phase is lower than remaining two phases***.

Solution: Distribute of load remaining two phases and balance loads across all 3 phases. The unbalance in network was recorded due to improper distribution of load. It is recommend that the single phase loads on each phase to be distributed properly so that the current in each phase will be balanced. Unbalanced network can cause three-phase motors and other three-phase loads to experience poor performance or premature failure because of the following: Mechanical stresses in motors due to lower than normal torque output. Higher than normal current in motors and three-phase rectifiers.

- The facility has satisfactory power factor levels having an average power factor maintained at 0.93. Installation of Automatic Power Factor Corrector, will maintain the power factor at unity. There is variation in power factor due to switching loads.

Encon 1. Energy Billing Saving Opportunity by Improving Power Factor.

- The present power factor maintained on average is **0.93**.Minimum PF recorded was 0.84. There is penalty imposed by MSEDCL for not maintaining power factor above 0.90. There is also incentive provide by MSEDCL for maintaining power factor to unity i.e 1. Previously MSEDCL used to charge consumer based on kWh whereas on they'll be charging based on KVAh i.e. (Active Power (kWh) + Reactive Power (kVARh)). The reactive power occupies the capacity of electricity network and reduces the useful capacity of the system for generation and distribution. The source of the most reactive currents is the poor power factor loads (equipment) connected at the consumer premises. As these loads are not compensated by appropriate capacitor installations by consumers, utilities are burdened for installation of capacitors. It is thus imperative that every section of consumers has to shoulder their responsibility to maintain the system PF within permissible limits only.
- Apart from this, the prime objective of the kVAh billing is to encourage the consumers

to maintain near unity Power factor to achieve loss reduction, improve system stability, power quality and improve voltage profile. At the national level, emphasis is being given on energy conservation, energy efficiency and Demand Side Management (DSM) and green energy solutions to optimize the energy usage. By kVAh billing, the consumers will be encouraged to adopt energy efficiency programs and will be benefited by reduced electricity bills.

Solution

- Capacitor required for maintaining power factor near unity- 66 kVAr. Install 70 kVAr Automatic power factor corrector into 5 steps for maintaining power factor near unity.
- Approximate cost of capacitor with installation = Rs. 25000.00

Harmonic Analysis

What is harmonics?

- In an ideal power system, the voltage supplied to customer equipment, and the resulting load current are perfect sine waves. In practice, however, conditions are never ideal, so these waveforms are often quite distorted. This deviation from perfect sinusoids is usually expressed in terms of harmonic distortion of the voltage and current waveforms.
- Power system harmonic distortion is not a new phenomenon - efforts to limit it to acceptable proportions have been a concern of power engineers from the early days of utility systems. At that time, the distortion was typically caused by the magnetic saturation of transformers or by certain industrial loads, such as arc furnaces or arc welders. The major concerns were the effects of harmonics on synchronous and induction machines, telephone interference, and power capacitor failures. In the past, harmonic problems could often be tolerated because equipment was of conservative design and grounded wye-delta transformer connections were used judiciously.
- Distortions of the fundamental sinusoid generally occur in multiples of the fundamental frequency. Thus on a 50 Hz power system, a harmonic wave is a sinusoid having a frequency expressed by the following formula, where n is an integer:

$$f_{harmonics} = n * 50Hz.$$

What are Sources of Harmonics?

- Harmonics are caused by nonlinear loads attached to the power system. Nonlinear loads draw non-sinusoidal current. Resistors, inductors, and capacitors are linear devices. When a resistive load is applied to an AC power system, it draws sinusoidal current. When an inductive or capacitive load is applied, it too draws sinusoidal current although it is phase shifted compared to the resistive load. There are many types of nonlinear loads which cause harmonics. The largest sources of harmonics are converters. Converters range from a huge 1000 MW inverter station for an HVDC line to a 75 W rectifier found in a television. Other nonlinear sources of harmonics include arcing devices such as arc furnaces, transformer magnetizing impedance, fluorescent and high intensity discharge lights. The harmonic current caused by the nonlinear sources can cause harmonic distortion in the system voltage which may cause problems for other devices.

Effects of Harmonics?

The effects of harmonics are divided into four general categories:

- effects on the power system itself
- effects on consumer load
- effects on communication circuits
- effects on revenue billing

- On the power system, harmonic currents are the main culprit, causing equipment overheating and thermal loss-of-life. This may be a concern for motors or transformers. The impact is worse when network resonances amplify harmonic currents. Harmonics may also interfere with relaying and metering to some degree.
- Harmonics can also cause thyristor firing errors in converter and SVC installations, metering inaccuracies, and false tripping of protective devices. The performance of consumer equipment, such as motor drives and computer power supplies, can be adversely affected by harmonics. In addition, harmonic currents flowing on power lines can induce noise on nearby communication lines.

- Harmonic voltage distortion may cause equipment insulation stress, particularly in capacitors. When harmonics cause the voltage impressed on the capacitor bank to be distorted, the peak voltage may be high enough to cause a partial discharge, or corona, within the capacitor dielectric. This may eventually result in a short circuit at the edges of the foil and failure of the capacitor bank.
- High harmonic currents cause fuse blowing in capacitor banks. This results in a loss of reactive power supply to the system which may cause other problems.
- Harmonic voltage distortion can effect revenue billing by introducing error into kilowatt hour metering systems that rely upon accurate discernment of the voltage zero. And, of course harmonic current sums with fundamental current demanded by facility loads to directly increase net billable kilowatt demand and kilowatt hour consumption charges.

System Problem	Common Causes	Possible Effects	Solutions
Harmonics (non sinusoidal voltages and /or current wave forms)	Office – Electronics, UPSs, variable frequency drives, high intensity discharge lighting and electronic and core coil ballasts.	Over- heating of neutral conductors, motors .transformers, switch gear. Voltage drop, low power factors, reduced capacity.	Take care with equipment selection and isolate sensitive electronics from noisy circuits.

What standards are applicable for Harmonic Measurement? What is the acceptable limit of harmonics?

- American standards regarding harmonics have been laid out by the IEEE in the 519 Standard: IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems. There is a combined effect of all nonlinear loads on utility systems that have a limited capability to absorb harmonic current. Further, utilities are charged with the responsibility to provide a high quality supply in terms of voltage level and waveform. IEEE 519 recognizes not only the absolute level of harmonics produced by an individual source but also their size relative to the supply network.

The permissible harmonic limit for different current (I_{sc}/I_L) as per IEEE standard is given in below table

IEEE 519 Standard - Maximum Harmonics Current /distortion in Percentage of I_L						
Maximum Harmonics Current Distortion in Percent of I_L						
Isc/I_L	**<11**	**11<=h<17**	**17<=h<23**	**23<=h<35**	**35<=h**	**Total Demand Distortion**
<20	4	2	1.5	0.6	0.3	5
20<50	7	3.5	2.5	1	0.5	8
50<100	10	4.5	4	1.5	0.7	12
100<1000	12	5.5	5	2	1	15
>1000	15	7	6	2.5	1.4	20

Where,
Isc = Maximum short circuit current at point of common coupling and
I_L = Maximum demand load current (fundamental frequency component) at PCC
TDD = Total Demand Distortion

	Voltage Harmonic Distortion %			Current Harmonic Distortion %		
	R	Y	B	R	Y	B
Minimum	1.13	1.09	1.05	1.52	1.73	1.33
Average	1.23	1.29	1.18	6.97	3.25	2.62
Maximum	1.40	1.49	1.42	15.06	6.83	6.48

Observation Table: Harmonics Measured

The Voltage Harmonics are within permissible limit. However the current harmonics are slight higher side than the permissible limits. It is recommend to use harmonic filters to reduce the current harmonics within permissible limit and to avoid any further future penalty.

Solution:

- Installation 35 KVAr Active Harmonic Filter.
- Approximate cost of capacitor with installation = Rs. 25000.00

The penalty for harmonics is still under proposal stage. However the suggested harmonics penalty is 5% additional energy charges (Wheeling charges plus Energy charges) for consumers who do not maintain the harmonics levels specified in IEEE STD 519-2014.

1. Estimated Output & Returns

Detailed estimation of output of solar PV system is done considering location of installation, proposed direction of solar panels, data of solar irradiance at the location, system losses, and other related data.

1.1 Basis of estimation

- Solar PV Capacity: 10kWP
- Location: Institute of Pharmaceutical Education & Research, Wardha, Maharashtra
- The solar panels are expected to be free of shadow.
- Generation is based on radiation of 1000W/m2 and grid availability.
- Assumed clear sunny 330 days/year.
- Space required is 800 sq.ft. facing south direction with clear rooftop available.

1.2 Estimated output

- Daily generation from solar: 45 kWh/day
- Monthly generation: 1350 kWh/month
- Total Annual output: 14850 kWh/annum
- Specific Production: 1485kWh/kWp/annum

1.3 Comparison with Bank Fixed Deposit:

Environmental Consciousness

Concern:

The environment issue has become a world –wide concern in the past decade being the focus of dimension in variety of forums both at national and international levels. Because environmental problems are rooted in economics and social policies, they occur at all levels from local to global, and success requires action by many players over long periods of time. The government is responsible for dealing with these problems and working towards solutions. Accordingly, the government is trying to address this over the years by creating various policies, programs enacting environmental legislation and through interaction institutions and treaties laws and regulations and expenditures.

Environment is mutual responsibility of everybody for society. In order to mitigate the risks associated with medical waste, it is important that management should always try to identify and evaluate the nature of the risks involved and then try to devise ways and means of managing those risks. Currently, there have not been any attempts to identify the risks posed by medical waste, a fact which contributes to it being not given the attention it deserves.

Annexure –XVIII: Snapshot of Annual Rainfall Data, Grid Emission Factor

Table: Rainfall data of Wardha District (2002-2011) in mm

Taluka	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Wardha	864.6	951.1	885.4	1121	940.31	152.9	892.7	617.31	393.4	927.9	**974.7**
Seloo	1279.5	968	1105	1395	1084.31	643.1	986.1	758.31	329.5	976	**1152.5**
Deoli	941.7	967	739.6	1165			682.3	581	1242.6	1013.8	**916.6**
Hinganghat	988.2	1048.2	956.9	1246.9			1011	769.3	1513.6	941.4	**1059.4**
Samudrapur	1074	1112	882.8	1281.2			733.9	772.91	440.2	1108.5	**1050.7**
Arvi	793.9	863.7	789.5	1216.7	1146	1132	977.6	605	1147.1	1109.9	**978.1**
Ashti	760.6	706.8	699	1020	843.7	1203.3	578.8	569.4	873.6	820.4	**807.6**
Karanja	876	910.5	879.5	1051.3	958.7	1061.6	705.2	702.2	1253	924	**932.2**
Average	**947.3**	**940.9**	**867.2**	**1187.1**	**994.6**	**1238.6**	**821.0**	**671.9**	**1274.1**	**977.7**	

Web link: http://cgwb.gov.in/District_Profile/Maharashtra/Wardha.pdf

CEA Database Version-13

Emission Factors (tCO2/MWh) (incl. Imports)	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Weighted Average Emission Rate (2)	0.78	0.83	0.82	0.82	0.82	0.82
Simple Operating Margin (1) (2)	0.97	0.99	1.00	0.99	0.97	0.96
Build Margin (not adjusted for imports)	0.92	0.97	0.95	0.93	0.91	0.87
Combined Margin (1) (2)	0.95	0.98	0.98	0.96	0.94	0.92

Action Taken Report

Estd : 1991

VIDARBHA YOUTH WELFARE SOCIETY'S

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Conducting Degree, Post Graduate and Doctorate Programme in Pharmaceutical Sciences

Action Taken Report

Recommendation Of Last Audit	Action Taken
1. College may calculate the water footprint to compare its performance with national and international consumption standards and communicate with its stakeholders	It is under consideration.
2. The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements	It is under consideration.
3. The 2 star AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above)	New three-star ACs are installed in prominent rooms of the institute and remaining two-star ACs will be replaced in future.
4. Evaporative cooling can be availed for computer lab	In computer lab ACs are installed and in summer water cooler also used to maintain normal room temperature.
5. The college management needs to install rain water harvesting system on the auditorium as well as hostel	The rain water on the auditorium as well as hostel get drained in college campus.
6. The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and / or faucet aerators as the replacement for the existing conventional taps.	The push flush buttons are installed in the urinals.

7. College needs to install the metering arrangement to measure the water drawn from well and bore wells	Installation of meter is under consideration to measure the water drawn from well and bore well.
8. College can undertake determination of water footprint and calibrate its specific water consumption with the established National and International Norms	It is under consideration to calculate water footprint.
9. College needs to perform study of all the effluent chemicals (volume, weight, impact) used and accordingly develop mitigation measures under its sustainable strategy	SOPs are displayed in laboratory regarding neutralization of waste chemicals and then collected in chemical soak pit which is build in the campus.
10. College Management should encourage use of bi-cycle and mass transport systems amongst students and faculties	Institute has decided to observe 'No Vehicle Day" on Saturday of every month and encourage the staff members and students to use bicycle, public transport system and electric vehicle for coming in college.
11. The college should further emphasize on the purchase of: • No- to low-odour (VOC) markers • No- to low-VOC paints? (Via Facilities) • Paper / Paper products with maximum recycled content • Refillable pens/pencils • Compostable bags for compost collection	It is under consideration.
12. Proper process for biomedical waste disposal system should be initiated on urgent basis	We are in discussion with the agency for proper handling of biomedical waste.

(Dr. R. O. Ganjiwale)
Principal
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Notes:

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