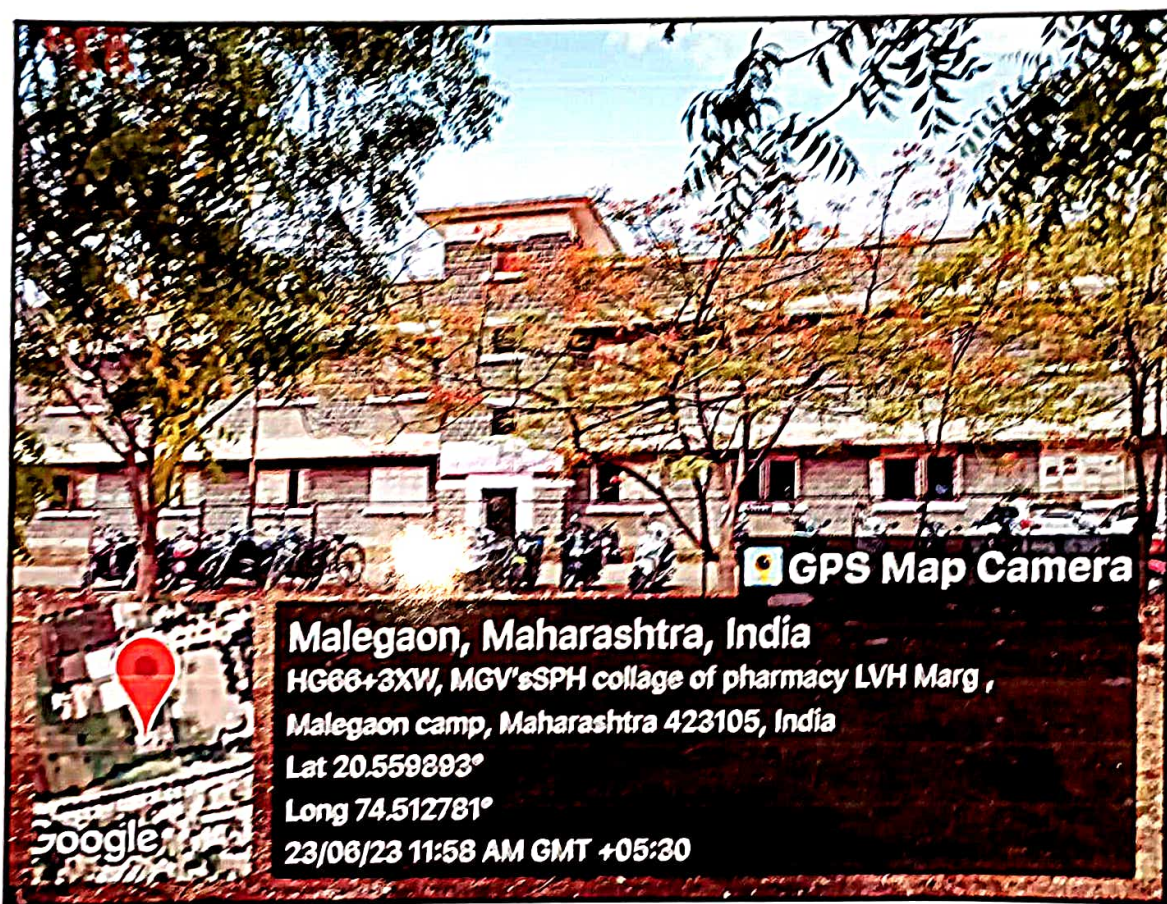


COMPREHENSIVE GREEN AUDIT REPORT  
FOR  
MAHATMA GANDHI VIDYAMANDIR'SAMAJSHRI PRASHANTDADA  
HIRAY COLLEGE OF PHARMACY  
COLLEGE OF PHARMACY, LVH MARG,MALEGAON  
CAMP,MALEGAON. DIST. NASHIK.

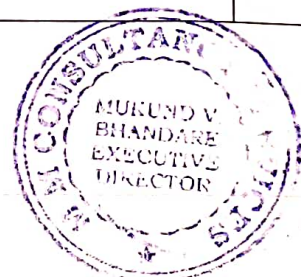


DATE OF AUDIT—APRIL 3, 2023  
AUDIT CARRIED OUT BY—  
MM Consultancy Services, Nashik



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## ACKNOWLEDGEMENT.

MM Consultancy Services Nashik is grateful to the Principal Dr.Santosh R.Tambe and Management of Mahatma Gandhi Vidya Mandir's Samajshri Prashantdada Hiray College of Pharmacy , LVH marg Malegaon Camp, Malegaon . Dist. Nashik for giving us an opportunity to carry out a detailed GREEN audit of their complex to identify potential for Green Initiatives taken in their complex to optimize environmental up gradation.

Environmental improvements by following green initiatives have gained utmost importance today for education institutions as environmental conditions are deteriorating day by day and therefore efficient GREEN management is the need of the hour. Apart from energy savings, Green Initiative effort leads to reduction in Greenhouse gas emissions which improves our environment to protect our planet earth from drastic climate changes and overall natural disturbance. We really appreciate the mission and vision of Dr.Aapoorva Hiray coordinator of Mahatma Gandhi Vidyamandir and his team to acknowledge the importance of energy and environment upgrades for sustainable development for present and future generation.

National Assessment and Accreditation Council (NAAC) has also emphasized energy conservation and environment protection for educational institutions by providing an adequate platform for accreditation and rating to encourage them for special efforts for these noble causes. Needless to say, our present and future generation can survive only if sufficient weightage and importance is given from our end to upgrade our present systems more in line with Nature and natural processes.

We are also grateful to College of Pharmacy Team for their necessary technical inputs and proper co-operation provided for audit.

We are also grateful to Principal Dr.Santosh R Tambe for his valuable inputs, support and hospitality to make this audit transparent.

It may be noted that our audit is not faultfinding exercise but is intended to bring about continual improvements in your college campus for the benefits of all of us incl. our future generation.

Our Sincere thanks to MGV<sup>S</sup> Samajshri Prashantdada Hiray College of Pharmacy Team who provided us with adequate data and technical information to make this audit successful.



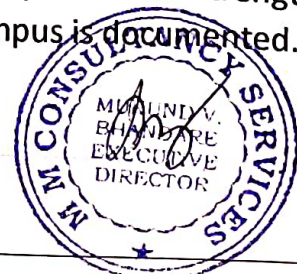
## EXECUTIVE SUMMARY.

The future of humankind depends very much on our ability to change our lifestyles and agree to follow a low consumption pattern of living in terms of resources taken from the globe and return to a sustainable development path at the earliest. The opportunity window for restoring nature to its prolonged state of hosting life forms to flourish under its caring environs is according to scientists, very short and lasting only up to 2030. Within this time, with the willing actions of every citizen wherever they are, coordinated and directed actions should start and continue thereafter till a balancing stage is reached where moderate use of resources and mitigation actions for healing the hurts already inflicted, balance positively to a sustainable nature.

Eco campus is a concept implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment. MGVS Samajshri Prashantdada Hiray College of Pharmacy College believes that there is an urgent need to address these fundamental environmental problems and reverse the trends. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution.

Green Auditing of a Higher Education Institution is required as a part of Criterion VII (of the 7 criteria prescribed) under the Guidelines for Submission of the mandatory annual Internal Quality Assurance Report (IQAR) by Accredited Institutions. It works on the several facets of Green Campus including Water Conservation, Tree Plantation, Waste Management, Paperless Work, and Alternative Energy. With this in mind, the specific objectives of the audit was to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards.

Initially a questionnaire survey was conducted to know about the existing resources of the campus and resource consumption pattern of the students and staff in the college. In order to assess the quality of water and soil, water and soil samples were collected from different locations of the college campus and analysed for its parameters. Collected data was grouped, tabulated and analysed. Finally a report pertaining environmental management plan with strength, weakness and suggestion on the environmental issue of campus is documented.



## INTRODUCTION.

Environmental audit or Green audit reflects evaluations that help us to identify environmental compliance and management system, implementation gaps, along with related corrective actions. Green audit is a useful tool to determine how and where the most energy or water resources are being used, the type and volume of waste generated and can then considerations be given on how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. Overall, it plays a vital role in imparting a better understanding of Green impact on campus to staff and students.

### Need for green audit

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 prevalent. In this context, it becomes imperative to adopt the system of the Green Campus for the Institutes which will lead to sustainable development. Besides, it also reduces a sizable amount of atmospheric carbon dioxide from the environment.

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that accredits the institution according to the scores assigned at the time of accreditation. NAAC has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

### Objectives of the audit.

- \* Understanding the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc;
- \* Establishing a baseline of existing environmental conditions with focus on natural and physical environment;
- \* Creating awareness among students and staff concerning real issues of environment and its sustainability;
- \* To create a report that document baseline data of good practices and provide strategies and action plans towards improving environmental quality for the future.



## PROFILE OF MGV'S SAMAJSHRI PRASHANTDADA HIRAY COLLEGE OF PHARMACY COLLEGE OF PHARMACY, MALEGAON CAMP.

Samajshri Prashantdada Hiray College of Pharmacy provides a congenial environment to the students to impart excellent and high quality education. Highly qualified faculties are chosen to teach the students of the college. The college is highly reputed for providing excellent education in pharmacy. It also allows research works carried out by the faculties and the students of the college and help them by providing various facilities related to their work. Some of the faculties have even published their own books. Numerous facilities are provided to the students within the college campus. They are showered with knowledge so that they can give their best in their jobs.

- **Facilities:** The college management is always keen to provide various facilities to its students. Various field activities and industrial visits are organized to introduce the students with the practical aspects of the related subjects and to introduce them to their probable working place in the future

Facilities like Library and ultra modern computer lab, adds more stars to the college's salient features.

- Samajshri Prashantdada Hiray College of Pharmacy Malegaon, Nashik Maharashtra was established in the year 2006 as Private Educational Institute to provide higher education to build a career in the field of Pharmacy. Samajshri Prashantdada Hiray College of Pharmacy Malegaon is approved by the reputed PCI and AICTE, and is affiliated with SPPU, Pune.



## METHODOLOGY.

In order to perform green audit, the methodology that included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations was adapted.

### Onsite Visit.

Field visit was conducted by the Green Audit Team. The key focus of the visit was on assessing the status of the green cover of the Institution, their waste management practices and energy conservation strategies etc.

### Focus Group Discussion.

The Focus Group discussions were held with staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

### Energy and waste management.

With the help of Teaching, Non- teaching staff, students, Administrative officer, Building Management Engineer and electrical Supervisor, the audit team has assessed the energy consumption pattern and waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

The study covered the following areas to summarize the present status of environment management in the campus:

- \* Water management
- Energy Conservation
- Waste management
- E-waste management
- Green area management
- Environmental Monitoring.



## OBSERVATIONS and RECOMMENDATIONS.

### 1. WATER MANAGEMENT.

The study observed that the main source of water for the institute is received from recharge wells and Muncpal Corporation(One Bore well)and lifted to 3 nos. above ground tanks on terrace of 500 Lit.capacity each. Water for potable purpose is received from 1000 Lit tanks to RO Plant and then used by staff and students as required. Water is used for drinking purpose, toilets and gardening. The waste water from the RO water purifier is used for Gardening purpose. During the survey, no loss of water is observed, neither by any leakages, or by over flow of water from overhead tanks. The data collected from all the departments is examined and verified. On an average the total use of water in the college is 40,000L/month, which include 10,000 L/month for domestic, 15000 L/Month for gardening purposes and 15,000 L/month for drinking purpose.

There is a potential for Good Rain water harvesting initiatives observed in the college premises.

Harvesting of rain water is presently not possible due to construction activities going on under expansion of main college Building. There is however an opportunity for Rain water harvesting from New Building Roof where 10 Kw solar plant is installed.

#### Recommendations—

- It is however recommended to further make use of terrace space of Main buildings available to optimize rain water harvesting. As rain water is purest form of water, it could be conserved in large storage tanks for efficient use in summer season.
- Quality analysis of RO outlet water used for drinking purpose is desirable and should be carried out every three months in college Lab it self to know parameters like pH, TDS and Hardness for the safety of students and Staff.
- There should be a suitable frequency to clean the Terrace water storage tanks preferably every six months.
- RO Units should be maintained properly to keep them in working condition.
- Building terrace is not available eliminating the possibility of systematic rain water harvesting.





## 2. ENERGY MANAGEMENT.

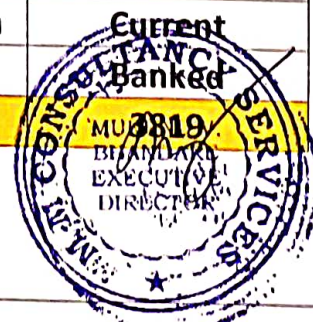
This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. The study carried out also analysed the use of alternate energy resources that are eco-friendly.

The energy is utilized in the Campus for lighting, space heating and cooling, running of laboratory instruments, appliances, water heating, ground water pumping, cooking and transportation. The source of energy for all the buildings within the campus is through electricity only.

The institution consumes about 1000 KWH per Month average as indicated in the following Table. Besides, Concentrated Solar Power Plant of 10 KW Capacity having 32 solar panels is Installed in the Campus provides of the daily additional generation of 40 Units/Day from solar Source. The campus contains Lights and fans in use. Average cost of power purchased from MSEDCL is estimated @ Rs.9.12 per KWH.

The entire campus including common facility centres are equipped with LED lamps and LED tube lights, except at few locations as observed. Computers are set to automatic power saving mode when not in use. Also, campus administration runs on switch-off drill on regular basis.

Month	Units Kwh	Bill Rs.	Unit Rate-Rs/Kwh	Remarks
Jan-23	0	384	--	10 Kw
Dec-22	0	384	--	Solar
Nov-22	0	384	--	Available
Oct-22	0	384	--	
Sep-22	0	384	--	
Aug-22	0	384	--	
Jul-22	0	384	--	
Jun-22	0	384	--	
May-22	0	384	--	
Apr-22	0	384	--	
Mar-22	260	2350	9.04	
Feb-22	217	1999	9.21	
<b>TOTAL</b>	<b>477</b>	<b>4349</b>	<b>9.12</b>	
Month	Import	Export	Solar Generation	Current Banked
Feb-23	11	990	1132	



## **Energy Rating**

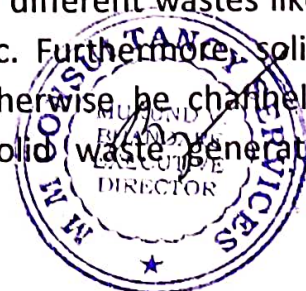
After the complete survey and analysis of the campus as per ISO 50001:2018 Energy Management System Standards, we rate the campus Score 4/5.

### **RECOMMENDATIONS.**

- As % age of present solar power generation to Total power consumption is greater than 1 as solar power generation from 10 Kw solar plant is estimated @ 1000 Units per Month. Considering the power consumption of college campus, excess power generation can be exported to GRID and suitable credit can be obtained from MSEDCL. Present Import from the GRID should be Zero as evident from the Bills in above Table
- A suitable preventive maintenance program is recommended for execution every month to clean the solar panels for optimizing solar generation capacity as the collection of dust and sticky material on the panel surfaces affects drastically the efficiency of solar power generation.
- Existing Ceiling fans may be replaced stepwise with energy efficient BLDC Motor Fans to cut down electricity consumption of existing fans by more than 50 % and therefore capital investment made for this initiative could be recovered within one year.
- All present energy inefficient lighting is replaced with energy efficient LED Lighting which is commendable on the part of management.
- There is reflection of Imported Units, Exported Units and Solar power generated in the electricity Bill issued by MSEDCL . It is however recommended to connect solar power to old building as well to optimize available solar capacity and achieve further savings in electricity bills of both the buildings.
- Efficient use of existing renewable energy source is recommended.
- Adequate lighting is recommended in Class Rooms.
- LED Energy efficient lighting optimization is strongly recommended all over college premises including old and new buildings to lead green initiative and also save energy. All present energy inefficient lighting to be replaced with energy efficient LED Lighting.

### **WASTE MANAGEMENT.**

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Solid waste generation and



management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

### **Liquid Waste Management-**

Water conservation is a key activity as water availability affects on the development of the campus as well as on all area of development such as farming, industries, etc. Keeping this view water conservation activity is carried out.

The waste water generated is disposed off into the underground sewage tanks/Pits through waste water drainage to municipal server. The source of wastewater is Domestic Waste Water i.e., Sewage water, Lab water and chemical wastes. The Sewage water mainly comes from Toilets of college, hostel, kitchen and canteen.

### **RECOMMENDATIONS-**

- A Suitable Sewage Treatment Plant (SWP) is recommended to be installed to treat sewage water for recycling and reuse purpose. Treated water can be used for Gardening. As water scarcity is becoming serious issue day by day, recycle and reuse of waste water is highly recommended.
- Sludge generated from SWP can be effectively used to produce manure which can be utilized for various plants in the Campus.

### **Solid Waste Management-**

Waste generated from tree droppings and lawn management are major solid wastes generated in the campus. Separate dustbins are provided for Bio-degradable and Plastic waste in order to segregate them at the source itself.

Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Important and confidential reports/ papers are sent for pulping and recycling after completion of their preservation period. Very less plastic waste (0.1Kg/day) is generated by some departments, office, garden etc and campus is declared as Plastic Free zone. Metal waste and wooden waste is stored and sent to authorize scrap agents for further processing. Glass bottles are reused in the laboratories.

The college has to arrange separate bins to collect biodegradable and non-biodegradable waste generated in the campus. Regular meetings are conducted with ground staff regarding the cleanliness of the campus and proper disposal of waste.

Vermicompost is the product of earthworm digestion and aerobic decomposition using the activities of micro- and macroorganisms at room temperature. Vermicomposting, or



worm composting, produces a rich organic soil amendment containing a diversity of plant nutrients and beneficial microorganisms.

Campus have already plans for Vermi composting project in the cool zone to dispose off collected solid wastes on regular basis and thereby generating a compost which is used exclusively in Campus Garden.

## RECOMMENDATIONS.

- It is therefore recommended to install high capacity Vermi Composting disposal systems in a cool location. Apart from efficient disposal of solid wastes, the process can generate a good quality manure which can be sold in market if exceeded the campus demands.
- Regular cleaning and collection of solid wastes is recommended to avoid huge spread all over spoiling the beauty of Campus. Housekeeping efforts need to be increased to maintain the site clean and waste free.

## E-Waste Management-

E-waste is a consumer and business electronic equipment that is near or at the end of its useful life. This waste makes up about 5% of all municipal solid waste worldwide. It is hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

E-waste generated in the campus is of minimal quantity. It is being effectively managed, keeping in mind the environmental hazards that may arise if not disposed properly.

The cartridges of laser printers are refilled outside the college campus. Awareness programme was conducted by college regarding E-waste Management. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective Manner.

The dismantled hardware of personal computers are used in PC trouble shooting lab. The dismantled electronic spare parts are immediately sold for reuse. The minimal amount of e- waste that is generated is taken by external vendor with Proper MOU.

The Campus at present works on 70 % paperless functioning. Only critical circulars and Displays are printed out where necessary. 30 % Paper wastes are disposed off through Municipal take away system.



## RECOMMENDATIONS.

- A wastewater treatment plant should be installed to recycle and reuse the waste water generated from domestic/Lab use.
- Use reusable resources and containers and avoid unnecessary packaging wherever possible.
- The management should take an initiative to purchase recycled resources when they are available.

## GREEN AREA MANAGEMENT.

This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy enacted, enforced and reviewed using various environmental awareness programmes.

Many trees are maintained in the campus (around 90 species) to maintain the biodiversity. Various tree plantation programmes are being organized at college campus through NSS (National Service Scheme) unit and Management. This program helps in encouraging eco- friendly environment which provides pure oxygen within the institute and creates awareness among campus students. The plantation program includes various types of indigenous species of ornamental and medicinal wild plant species.

Well developed Botanical Garden should be planned in the premises with Barcode system provided for Minimum of 100 Trees planted. Management should celebrates Birth day of each member who gifts one plant to management which is instantly planted on the same day. This is a noteworthy feature which highlights Green Area awareness of the Staff.

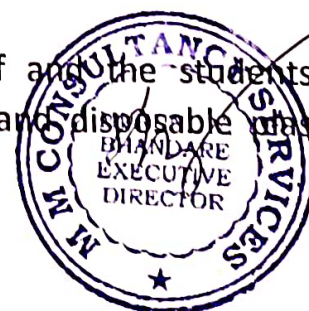
### Roads-

Roads in college are laid with provision for rainwater to seep through easily. This enables the easy recharge of ground water.

Electric Vehicles are being used by students and Staff as a green initiative and is appreciated and notable. Use of electrical vehicles to be increased in future.

### Plastic free campus

The usage of plastic in college is minimal. The staff and the students are not encouraged to use one time use plastic, plastic bags and disposable plastic things throughout the campus.



## **E – communication.**

The principal's office, all the Departments of the college, Examination cell, and laboratories are very well connected with a good and efficient LAN network. Hence all the inter office correspondence is done through email. This reduces the usage of papers.

## **RECOMMENDATIONS.**

- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records.
- ➤ Establish a College Environmental Committee that will hold responsibility for the enactment, enforcement and review of the Environmental Policy.
- ➤ Environmental Committee shall be the source of advice and guidance to staff and students on how to implement this Policy.
- ➤ Ensure that an audit is conducted annually and action is taken on the basis of audit report, recommendation and findings.
- ➤ Indoor plantation to inculcate interest in students, Bonsai can be planted in corridor to bond a relation with nature. Environmental monitor.
- Use of Bicycles and Battery operated vehicles is recommended in the Campus to eliminate Green gas emissions to improve the environment.

## **ENVIRONMENTAL MONITORING.**

As part of green audit of campus, the Green Audit Assessment Team has carried out the environmental monitoring of campus. This includes Illumination, Noise level, ventilation and indoor air quality of the class rooms. It was observed that illumination and ventilation is adequate considering natural light and air velocity present. Noise level in the campus is well below the limit.

Campus has maintained pollution free environment with good use of available resources.



## CONCLUSION.

Though the institution is predominantly college of Pharmacy, there is significant environmental research both by faculty and students. The environmental awareness initiatives taken by the management are substantial. The installation of solar Power Plant, Usage of Tree plantation through a gift on Birth Day celebration and Bar Coding for each tree in Botanical Garden practices are recommended. Besides, environmental awareness programmes initiated by the administration proves that the campus is going green. The Herbal garden maintained by the College is highly appreciable. Few recommendations are added for waste management and waste reduction using alternate eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus aid in a sustainable environment and community development

Vermicomposting sites for solid waste treatment are to be initiated and should be expanded in capacity to take care of total solid waste generated in the Campus.

There is a vast scope to utilize the present capacity of solar power by availing the credit for excess power generation. Optimizing use of renewable energy is the first step taken to reduce green house emission contributing a lot in Green Development.

Temperature/Humidity Display at the helm of the main building is recommended and to be initiated thereby indicating a totally dedicated Team spirit for taking green house project on management priority.

Students have been assigned responsibility for keeping the campus clean and it was a pleasure to note that students are equally cautious and interested in a noble cause of waste management.

Solar Street Lights Should be effectively installed to beautify the campus in the evening and all credit goes to staff and Management for this wonderful initiative.

Presently solar power is connected to new building only while old building is consuming power from MSEDCL. Existing solar power to be connected to old building as well to minimize electricity bill of old building and also to optimize solar capacity available.

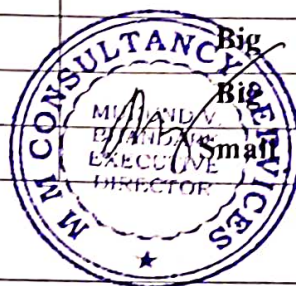
Last but not the least, Green awareness in the campus is of very high order and Team work is really appreciated. Lot of work has been done with initiative and awareness to keep College Campus Clean and Green and adequate maintenance provided to sustain the efforts already taken.



## LIST OF PLANTS

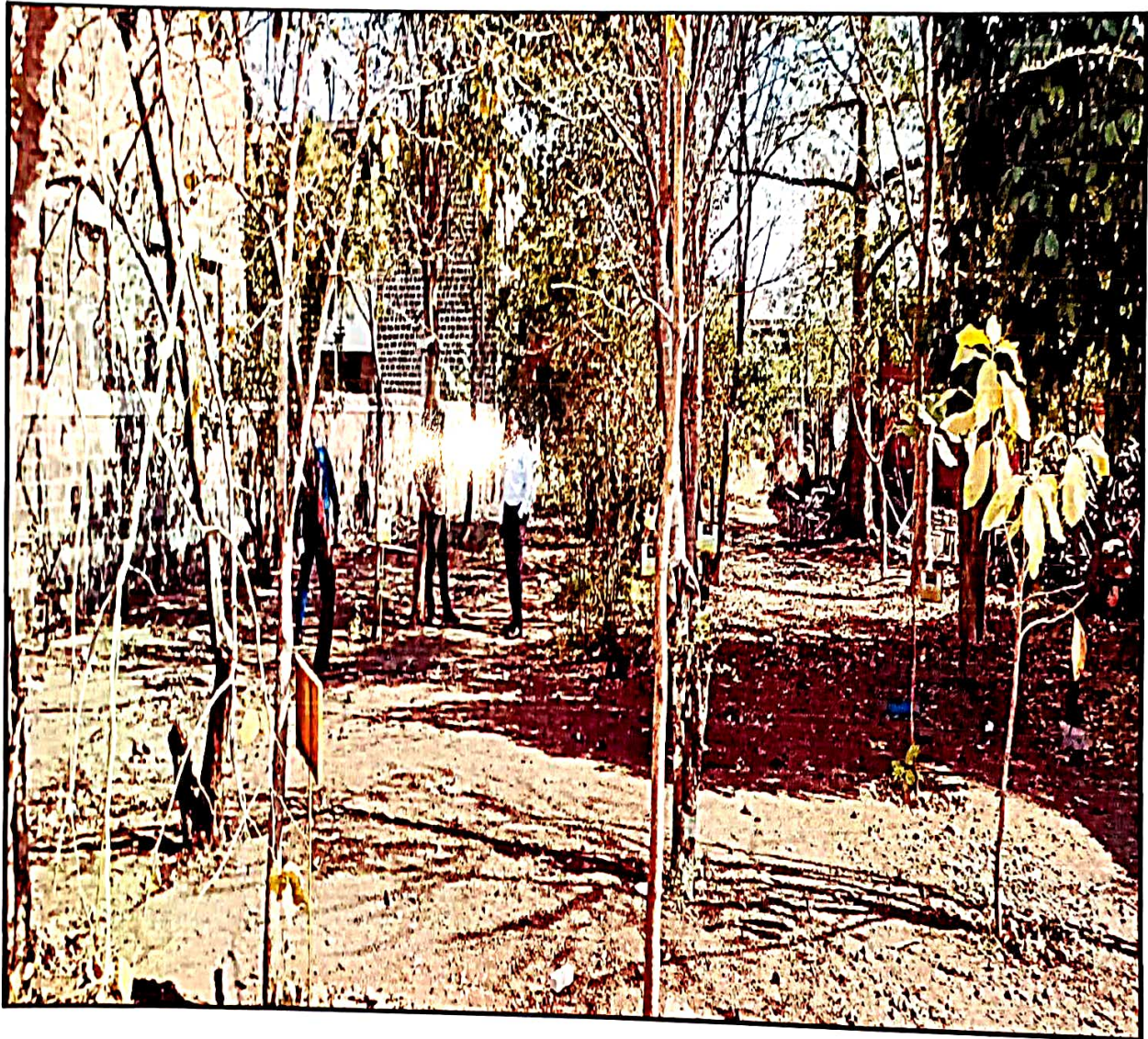
## ANNEXURE-I

Sr. No.	Name of Plant	Biological Source	Type of plant
1.	Aloe	<i>Aloe barbadensis</i>	Small
2.	Vasaka	<i>Adhatoda vasica</i>	Big
3.	Neem	<i>Azadirachta indica</i>	Big
4.	Henna	<i>Lawsonia intermis</i>	Big
5.	Kadipatta	<i>Murraya koenigii</i>	Big
6.	Bael	<i>Aegle marmelos</i>	Big
7.	Sagargota	<i>Caesalpinia crista</i>	Big
8.	Kawat	<i>Limonia acidissima</i>	Big
9.	Parijatak	<i>Nyctanthes arbor-tristis</i>	Big
10.	Bahawa	<i>Cassia fistula</i>	Big
11.	Paras bhendi	<i>Thespesia populnea</i>	Big
12.	Arjuna	<i>Terminalia arjuna</i>	Big
13.	Karwand	<i>Carissa carandus</i>	Big
14.	Kanher	<i>Nerium indicum</i>	Big
15.	Guggul	<i>Commiphora mukul</i>	Big
16.	Khirmi	<i>Manikara hexandra</i>	Big
17.	Nirgudi	<i>Vitex negundo</i>	Big
18.	Raktrohida	<i>Tecomella undulate</i>	Big
19.	Sarpagandha	<i>Rauwolfia serpentina</i>	Big
20.	Esenbeckia	<i>Esenbeckia alata</i>	Big
21.	Gulmohar	<i>Delonix regia</i>	Big
22.	Jambhule	<i>Syzygium cumini</i>	Big
23.	Hadga	<i>Sesbania grandiflora</i>	Big
24.	Almond	<i>Prunus amygdalus</i>	Big
25.	Amala	<i>Phyllanthus emblica</i>	Big
26.	Mango	<i>Mangifera indica</i>	Small
27.	coconut	<i>Cocos nucifera</i>	Small
28.	Sisum	<i>Dalbergia sissoo</i>	Big
29.	Lemon	<i>Citrus limon</i>	Small
30.	Tulsi	<i>Ocimum sanctum</i>	Small





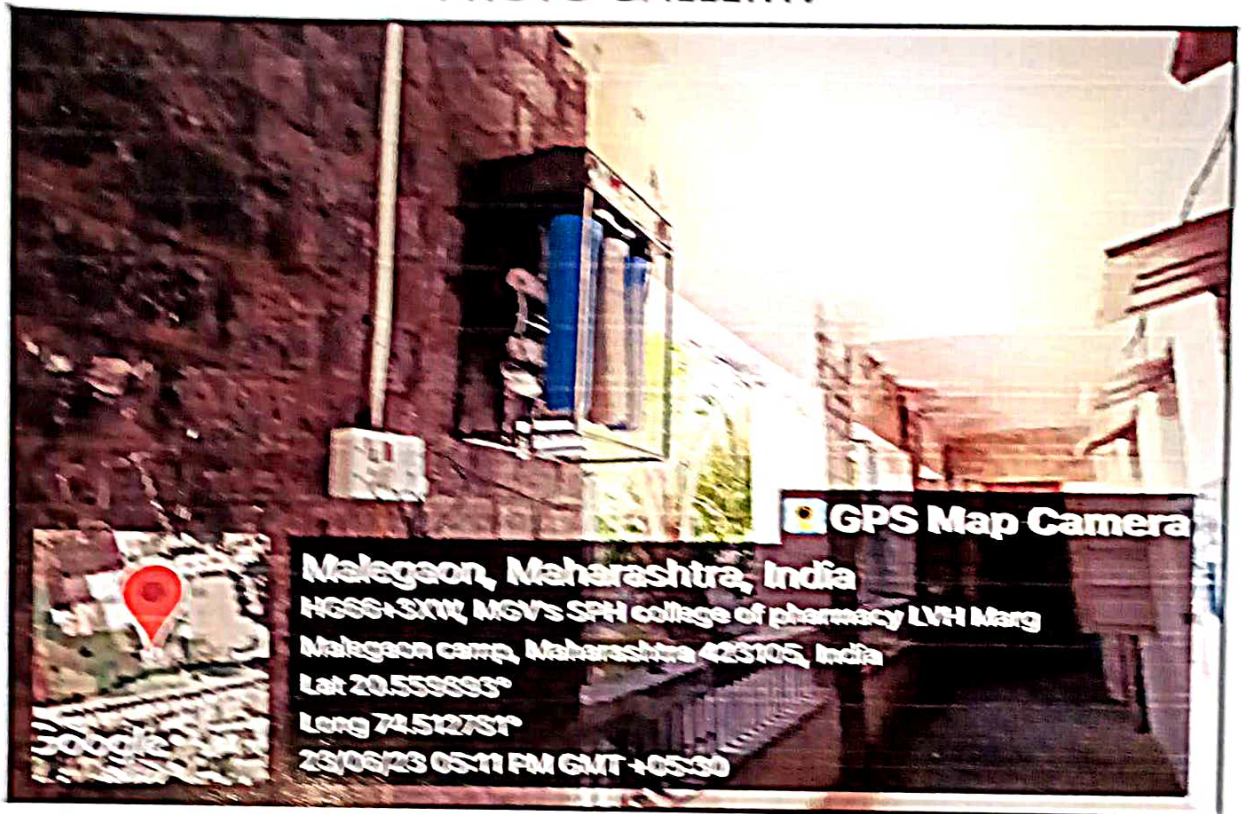
31.	Adulsa	<i>Justicia adhatoda</i>	Small
32.	Shatavari	<i>Asparagus racemosus.</i>	Small
33.	Vinca	<i>Catharanthus roseus</i>	Small
34.	Hibiscus	<i>Hibiscus syriacus</i>	Small
35.	Betel	<i>Piper betle</i>	Small
36.	Ashwagandha	<i>Withania somnifera</i>	Small



**MEDICINAL GARDEN**



# PHOTO GALLERY.

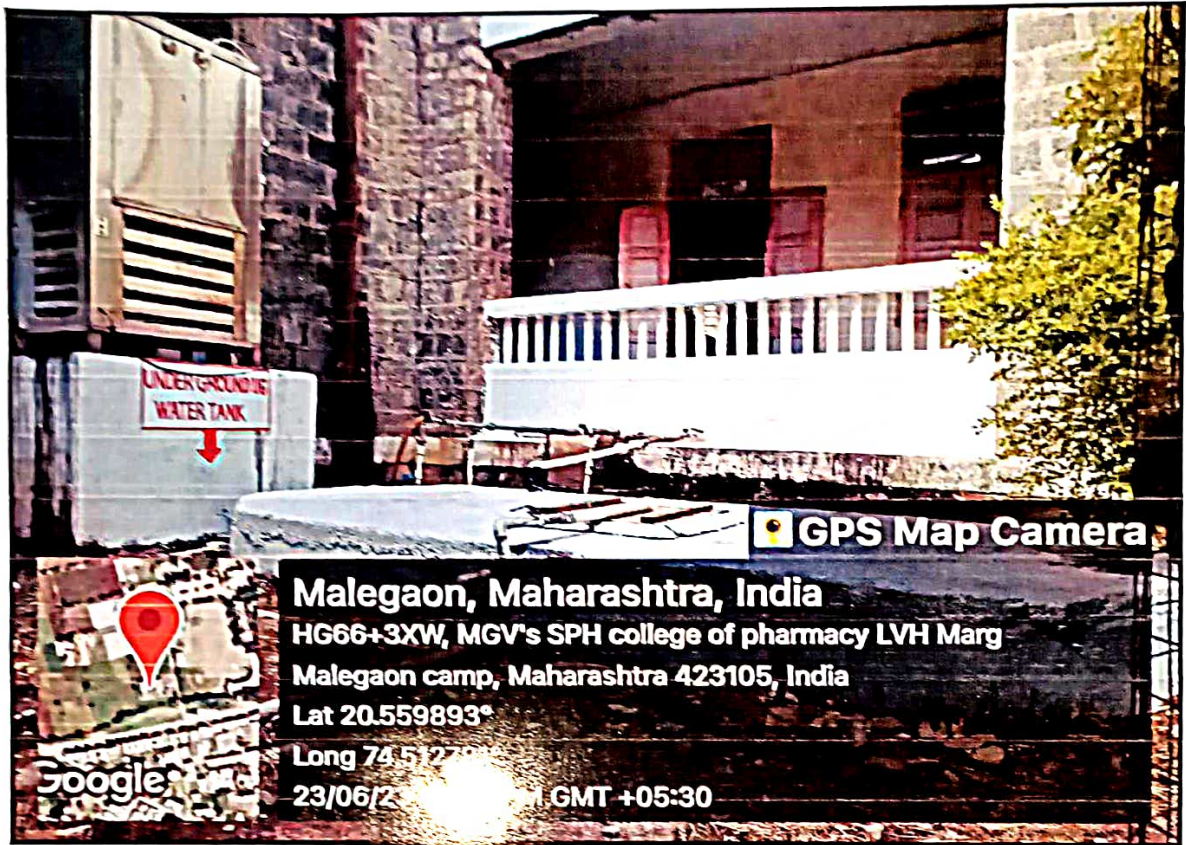


PLANT FOR DRINKING WATER.



SOLAR POWER PLANT ON THE ROOF.





**WATER STORAGE TANK**



## INTRODUCTION.

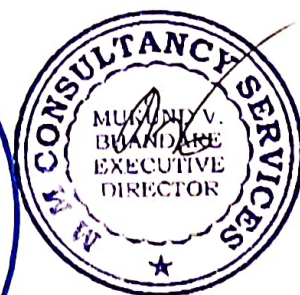
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MM Consultancy Services Nashik is grateful to the Principal Dr.Santosh R.Tambe and Management of Mahatma Gandhi Vidya Mandir's Samajshri Prashantdada Hiray College of Pharmacy Malegaon Camp, Dist. Nashik for giving us an opportunity to carry out a detailed energy audit of their complex to identify potential for energy saving in their complex to optimize energy consumption and energy cost.

Energy Management and Energy Conservation have gained utmost importance today for education institutions as energy costs are on rising day by day and therefore efficient energy management is the need of the hour. Apart from energy savings, energy conservation leads to reduction in Greenhouse gas emissions which improves our environment to protect our planet earth from drastic climate changes and overall natural disturbance. We really appreciate the mission and vision of Dr. Aaproova Hiray and his team to acknowledge the importance of energy and environment upgrades for sustainable development for present and future generation.

National Assessment and Accreditation Council (NAAC) has also emphasized energy conservation and environment protection for educational institutions by providing an adequate platform for accreditation and rating to encourage them for special efforts for these noble causes. Needless to say, our present and future generation can survive only if sufficient weightage and importance is given from our end to upgrade our present systems more in line with nature and natural processes.

We are also grateful to MGV's Samajshri Prashantdada Hiray College of Pharmacy Team for their valuable inputs in data collection during our audit.

Our Sincere thanks to Dr. Santosh R.Tambe Principal who provided us with adequate data and technical information to make this audit successful.



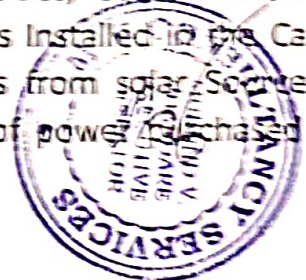
## ENERGY SCENARIO.

MGV's SAMAJSHRI PRASHANTDADA HIRAY College Campus is having electricity supply from MSEB Grid (LT Supply ) which meet the power requirement of various sections/departments. Electricity Bills analysis is summarized in following Table-

Month	Units Kwh	Bill Rs.	Unit Rate-Rs/Kwh	Remarks
Jan-23	0	384	—	10 Kwr Solar Available
Dec-22	0	384	—	
Nov-22	0	384	—	
Oct-22	0	384	—	
Sep-22	0	384	—	
Aug-22	0	384	—	
Jul-22	0	384	—	
Jun-22	0	384	—	
May-22	0	384	—	
Apr-22	0	384	—	
Mar-22	260	2350	9.04	
Feb-22	217	1999	9.21	
<b>AVERAGE</b>	<b>477</b>	<b>4349</b>	<b>9.12</b>	
<b>Month</b>	<b>Import</b>	<b>Export</b>	<b>Solar Generation</b>	<b>Current Banked</b>
<b>Feb-23</b>	<b>11</b>	<b>990</b>	<b>1132</b>	<b>3819</b>

The energy is utilized in the Campus for lighting, space heating and cooling, running of laboratory instruments, appliances, water heating, ground water pumping, cooking and transportation. The source of energy for all the buildings within the campus is through electricity only.

The institution consumes for both old and New Buildings about 1000 KWH per month maximum as indicated in the above Table. Besides, Concentrated Solar Power Plant of 10 KW Capacity having 32 solar panels is installed in the Campus provides of the daily additional generation of 40 Units from solar Source. The campus contains Lights and fans in use. Average cost of power purchased from MSEDCL is estimated @ Rs.9.12 per KWH.



The entire campus including common facility centres are equipped with LED lamps and LED tube lights, except at few locations where these are already provided. Computers are set to automatic power saving mode when not in use. Also, campus administration runs on switch-off drill on regular basis.

### ***Energy Rating***

After the complete survey and analysis of the campus as per ISO 50001:2018 Energy Management System Standards, we rate the campus Score 4/5.

### **RECOMMENDATIONS.**

- As % age of present solar power generation to total power consumption is more than 1 as solar power generation from 10 Kw solar plant is estimated @ 1200 Units per Month. Considering the power consumption of college campus, excess power generation can be exported to GRID and suitable credit can be obtained from MSEDCL. Present Import from the GRID should be Zero as evident from the above Table.
- A suitable preventive maintenance program is recommended for execution every month to clean the solar panels for optimizing solar generation capacity as the collection of dust and sticky material on the panel surfaces affects drastically the efficiency of solar power generation.
- Existing Ceiling fans may be replaced stepwise with energy efficient BLDC Motor Fans to cut down electricity consumption of existing fans by more than 50 % and therefore capital investment made for this initiative could be recovered within one year.
- All Roof water storage tanks should be provided with Automatic Level Controllers and Level switch to save power as well as overflow water.
- There is a reflection of Imported Units, Exported Units and Solar power generated in the electricity Bill issued by MSEDCL. Also it is highly recommended to record daily solar power generation in a register for a reference so that import, export and solar captive generation can be monitored on regular basis for verification.
- 100 % adaption to LED Energy Efficient lighting in the campus is recommended It is however recommended to prepare a detailed report on this by college management on actual energy savings made, Investment done and probable financial pay-back to present before central management.



## Benefits of Roof Top Solar System.

- Rooftop solar is a great step toward combating climate change
- Solar panels contribute to the “green economy”
- Solar power is incredibly efficient
- It can be installed quickly
- Solar energy requires minimal maintenance
- Solar panels have zero emissions.

What’s more, solar power operates silently and there is no need for costly transmission infrastructure.

So what are the advantages of rooftop solar panels vs. ground-mounted panels? While each has pros and cons, the benefits of rooftop solar power are hard to ignore.

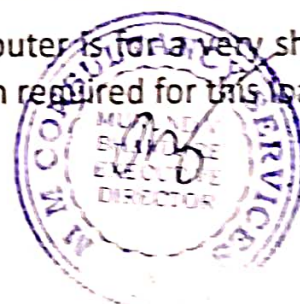
### Homeowners Benefit from Rooftop Solar Panels

As one of the most affordable types of solar products on the market, it’s not surprising that rooftop panels represented over 72 percent of all power added in the United States in 2013. The systems are proven to enhance a property’s green credentials, and home resiliency. Solar panels can even add thousands of dollars to a home’s resale value.

### Details of Present Electrical Load Equipment wise.

Ele. Equipment	Numbers	Load-Waats	Usage /Day	Remarks
Ele. Tubes LED	80	20	8	Energy Conservation Measures Suggested in this report to be implemented. Annual Load is very low due to minimum hours
Other Lights	8	200	8	
LED lights	18	10	8	
Ceiling Fans	45	70	8	
Computers	30	–	8	
Lab Ovens	4	1800	2	
Pump Motors	3	2250	4	
DG Set	1	500 Kva	Negligible	

Most of the above load except lighting Fans and computer is for a very short time during the year and no special energy conservation required for this load.





## ENERGY SAVING TIPS



The light-emitting diode (LED) is today's most energy-efficient and rapidly-developing lighting technology. Quality LED light bulbs last longer, are more durable, and offer comparable or better light quality than other types of lighting. Check out the [top 8 things you didn't know about LEDs](#) to learn more.

### Energy Savings

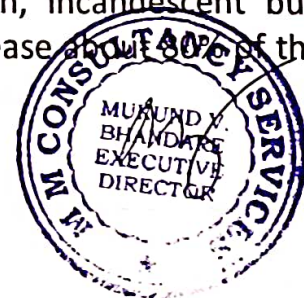
LED is a highly energy-efficient lighting technology, and has the potential to fundamentally change the future of lighting in the United States. Residential LEDs – especially ENERGY STAR rated products – use at least 75% less energy, and last up to 25 times longer, than incandescent lighting.

Widespread use of LED lighting has a large potential impact on energy savings in the United States. By 2035, the majority of lighting installations are anticipated to use LED technology, and energy savings from LED lighting could top 569 TWh annually by 2035, equal to the annual energy output of more than 92 1,000 MW power plants.

### How LEDs are Different

LED lighting is very different from other lighting types such as incandescent and CFL. Key differences include:

- **Light Source:** LEDs are the size of a fleck of pepper, and can emit light in a range of colors. A mix of red, green, and blue LEDs is sometimes used to make white light.
- **Direction:** LEDs emit light in a specific direction, reducing the need for reflectors and diffusers that can trap light. This feature makes LEDs more efficient for many uses such as recessed downlights and task lighting. With other types of lighting, the light must be reflected to the desired direction and more than half of the light may never leave the fixture.
- **Heat:** LEDs emit very little heat. In comparison, incandescent bulbs release 90% of their energy as heat and CFLs release about 80% of their energy as heat.



- Lifetime: LED lighting products typically last much longer than other lighting types. A good quality LED bulb can last 3 to 5 times longer than a CFL and 30 times longer than an incandescent bulb.

## LED Products

LED lighting is available in a wide variety of home and industrial products, and the list is growing every year. The rapid development of LED technology has resulted in increased product availability, improved manufacturing efficiency, and lower prices. Below are some of the most common types of LED products.

### Industrial and Commercial Lighting

The high efficiency and directional nature of LEDs makes them ideal for many industrial uses. LEDs are increasingly common in street lights, parking garage lighting, walkway and other outdoor area lighting, refrigerated case lighting, modular lighting, and task lighting.

### Under-Cabinet Lighting

Because LEDs are small and directional, they are ideal for lighting tight spaces such as countertops for cooking and reading recipes. Since there can be variation in light color and directionality, it is important to compare products to find the best fixture for your space.

### Recessed Downlights

Recessed downlights are commonly used in residential kitchens, hallways, and bathrooms, and in a number of office and commercial settings. DOE estimates there are more than 600 million recessed downlights installed in U.S. homes and businesses.

### LED Replacement Bulbs

With performance improvements and dropping prices, LED lamps can affordably and effectively replace 40, 60, 75, and even 100 Watt incandescent bulbs. It's important to read the Lighting Facts Label to make sure the product is the right brightness and color for its intended use and location.

### LED Holiday Lights

LEDs consume far less electricity than incandescent bulbs, and decorative LED light strings such as Christmas tree lights are no different. Not only do LED



holiday lights consume less electricity, they also have the following advantages:

- Safer: LEDs are much cooler than incandescent lights, reducing the risk of combustion or burnt fingers.
- Sturdier: LEDs are made with epoxy lenses, not glass, and are much more resistant to breakage.
- Longer lasting: The same LED string could still be in use 40 holiday seasons from now.
- Easier to install: Up to 25 strings of LEDs can be connected end-to-end without overloading a wall socket.

### **ENERGY EFFICIENT FANS.**

Ceiling fans are not just a fixture but a major home appliance in India. It is used around the clock for the majority of the year. This causes a huge amount of energy consumption by ceiling fans at the residential level itself. Due to rising environmental concerns and issues evoked in creation of energy, there is a need for conservation of energy and available resources for power generation.

BLDC Infographic explains What is BLDC Motor technology and its top benefits

Crompton has introduced the Active BLDC technology in their ceiling fans. This advanced technology has been a boon to consumers as it not only helps reduce energy consumption but also reduced your electricity bill. BLDC motor stands for Brushless Direct Current Motor and as the name suggests, it works on direct current electricity. BLDC motor uses permanent magnets, instead of electromagnets that are used in conventional motors. The permanent magnets of BLDC motor have less energy and heat losses compared to electromagnets. This motor converts the input of alternate current into direct current, and hence this technology works smoothly even at low voltage or power fluctuations. The technology of Active BLDC motor adds an advance mechanical feature to your regular ceiling fan and changes it to a modern appliance to merge with the smart homes of today. Alongside, it brings you a great deal as it reduces your energy consumption by up to 50%.

### **BLDC Fans vs Normal Fans**

Calculate your savings on BLDC fans [here](#)

As compared to a conventional ceiling fan, a ceiling fan with Active BLDC technology can generate the same amount of airflow with less energy.



usage and better power factor Hence ceiling fans with Active BLDC motors are energy-efficient and give better energy outputs.

Energy Efficient Fans run on Active BLDC motors. BLDC motor fans consume approximately half the power of a traditional motor fans use Active BLDC technology which operates on wide voltage range from 90V-300V. It is observed that a conventional fan's electricity bill comes up to ₹ 2850 annually per fan whereas fans with Active BLDC technology have an electric bill of just of ₹1350, thus saving ₹1500. Also, for 4 fans in a home the saving is ₹6000. This great saving is only possible due to Active BLDC technology.

While using ceiling fans made with Active BLDC technology, these ceiling fans bring an advance touch to your living. They are available in various colours, come with great design, and are equipped with other high-tech features like superior air delivery, smart remote, sleep timer and 5-year warranty, etc. It not only gives you a great opportunity to cut down on your energy usage but also shows a great reduction in your monthly electricity bill.



## APFC PANEL

The Power factor Improvement Unit

### SPECIFICATION- DESIGN

As per IEC-61439,

**Full Form :**

Automatic power factor Control Panel

**Application :**  
Reduce Lightbill Penalties



Function of APFC panel is improve the power factor. Most of the electric load is reactive, resulting in poor power factor. Companies distributing electricity encourage consumers to improve power factor. For improving power factor, electricity consumers have to connect

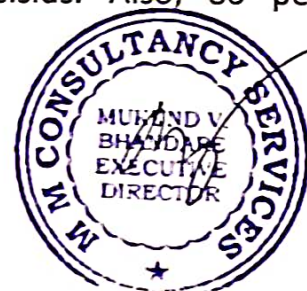
capacitors of optimum rating across inductive load. APFC is an automatic power factor electrical device which is employed to boost the ability factor, whenever required, by switching ON and OFF the desired capacitor bank units automatically.

APFC Panel has microcontroller based programmable controller which switches the capacitor banks of suitable capacity automatically in multiple stages by directly reading the reactive load (RKVA) which works in the principle of VAR sensing tends to keep up the PF to 0.99 Lag. APFC Relay - Automatic Power Factor Controller Relay. Low Power Factor - Harms. In industries we've differing kinds of loads viz. resistive, inductive and capacitive. To improve the facility factor it's required to attach a hard and fast capacitor or capacitor bank at the LT side of the Transformer. For approximate KVAR of capacitors required. If the installation has various small loads with the mixture of huge loads then the APFC should be recommended.

APFC panel also known as automatic power factor improvement Panel because, it can control the power factor for reactive loads. Similarly they are designed as per IS standard IS 8623, IEC 60529. In addition, APFC panels provide high quality and reliability.

RTPFC or APFC mainly used for improvement of PF up to 0.999 or Unity. Everybody knows that how much costly electrical bills. In Conclusion, Function of APFC panel is best quality power factor control Panels with best calculation support also design of panel and provide control drawing for APFC Panel

All the ACCU-APFC with metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50 Hz. Power control centre panel have designed for minimum expected ambient temperature of 45 degrees Celsius. Also, 80 percent humidity and dusty weather.



## ***Tips For Energy Savings in Computers-***

### *Unplug your computer when not in use*

When you're not using your computer, it's best to shut it down and unplug it. This is because a plugged-in PC — even when switched off — still consumes standby power.

### *2. Disconnect external devices*

When they're connected to your PC, devices such as printers, headphones, and webcams consume power even when they're not in use. This is why you should disconnect or remove external devices from your PC once you're done using them.

### *3. Alternatively, use a smart strip, especially for computers you cannot turn off*

A smart strip is a series of several electrical outlets in one strip, with circuits to monitor and maximize your gadgets' power consumption. It can electronically unplug any device so that they stop drawing current, which saves energy. By connecting your PC and peripherals (e.g., printers, scanners) to the smart strip, you won't need to unplug your equipment when you're not using them.

### *4. Adjust your computer's energy settings*

Adjusting your PC's power settings will help you consume less energy. For example, you can opt to put your hard drive and monitor into sleep mode when they're left idle for a few minutes. Lowering the brightness of your screen also saves electricity.

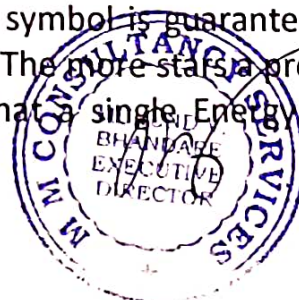
### *5. Use a charger only when your laptop is charging*

When we charge our laptops, we tend to forget about them, leaving them plugged in for hours. Unfortunately, overcharging degrades the battery over time. Leaving the charger plugged in — even if it's not connected to your computer — also consumes standby power.

To save energy, make sure to unplug your laptop charger once you're done charging. Alternatively, you can use a wall outlet with a timer or plug your charger into a smart strip.

### *6. Choose an Energy Star-compliant PC*

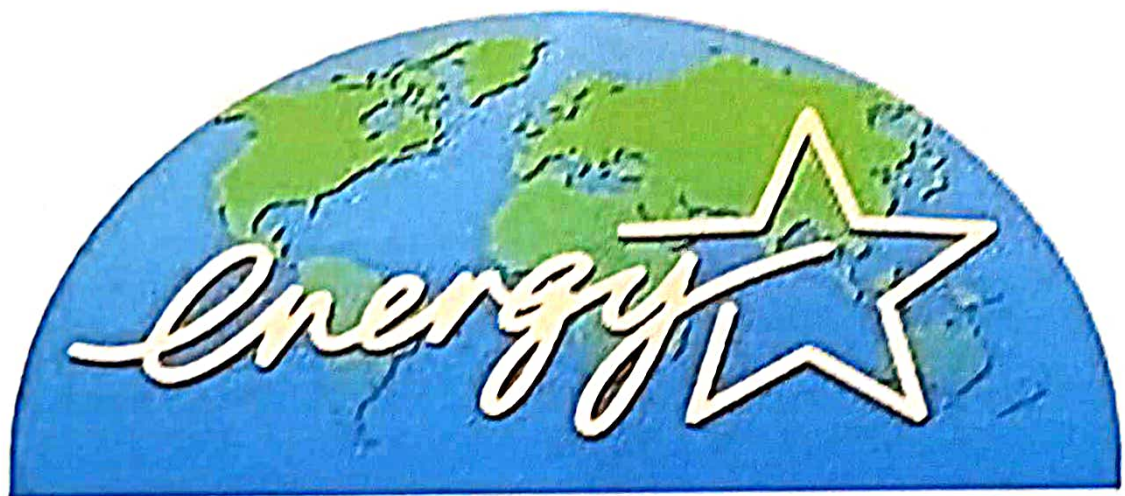
Energy Star is the US Environmental Protection Agency's symbol for energy efficiency. Every product that earns the Energy Star symbol is guaranteed to deliver both quality performance and energy savings. The more stars a product has, the more energy-efficient it is. Studies show that a single Energy Star-



compliant computer and monitor can save between \$7 and \$52 per year in electricity bills.

*These tips should help you lower your electricity costs and make smart hardware choices. If you need assistance in choosing the best hardware for your specific needs, give us a call. We'll be glad to help.*

It may be difficult to save energy when you use your PC every day. In fact, a complete desktop computer setup (i.e., one that includes an internet modem, a pair of loudspeakers, and a printer) that is on for eight hours a day consumes 600 kWh per year. But don't worry, you can use the above tips to reduce your PC power consumption



Money Isn't All You're Saving



## CONCLUSION.

It was really our privilege and honor to work with the team of MGV's SAMAJSHRI PRASHANTDADA HIRAY College of Pharmacy, Malegaon Camp at their site for energy auditing activities. We have made sincere efforts to identify energy wastes in almost all the areas of concern and have noted following shortfalls which should be acknowledged and attended to by the campus management.

- Use of Renewable energy in the form of 10 Kw Solar Power Plant is noteworthy and is appreciated.
- Monitoring of solar power generation on day to day basis is highly recommended.
- Data in MSEDCL Bills is clear as proper import, export and solar generation figures are recorded. Since the solar generation is much higher than actual import of electricity from MSEDCL, an appropriate credit for excess units exported to MSEDCL should be availed by college management on regular basis.
- Proper preventive maintenance of solar panels on regular basis preferably weekly is highly recommended to optimize capacity utilization to generate minimum 1200 Units per month. Dust and other sticky materials on solar panels affects generation efficiency of solar plant and should be maintained to maximum by regular washing/Cleaning of solar panels.
- Water tank levels should be automatically controlled to avoid unnecessary running of bore well and water pumps. Manual level control of water tanks is not recommended. Suitable level switches to be installed on all the water storage tanks.
- All lighting in the campus are to be replaced with energy efficient LED lighting, which shall be commendable achievement of the college management.

We once again thank MGV's SAMAJSHRI PRASHANTDADA HIRAY College Team for their support and cooperation during our site audit and also appreciate the vision of top management including Dr.Aapoorva Hiray , Co ordinator to undertake this audit for a very noble cause and wish the college management all success in their efforts to conserve energy on sustainable basis.

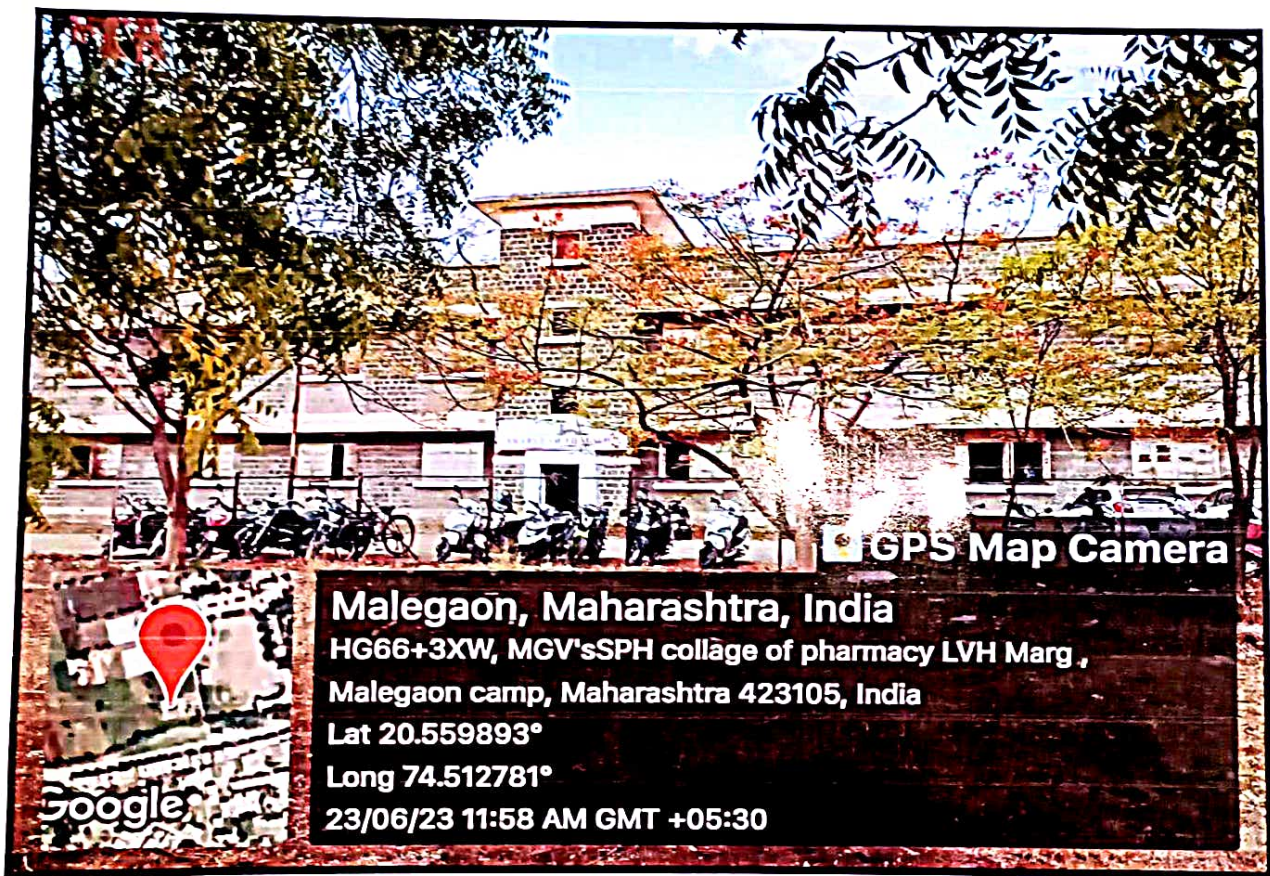
***Good Luck***

**MM CONSULTANCY SERVICES TEAM**





COMPREHENSIVE ENERGY AUDIT REPORT  
FOR  
MAHATMA GANDHI VIDYAMANDIR'S  
SAMAJSHRI PRASHANTDADA HIRAY  
COLLEGE OF PHARMACY, LVH MARG, MALEGAON CAMP,  
MALEGAON, DIST. NASHIK.



DATE OF AUDIT APRIL 3, 2023

AUDIT CARRIED OUT BY—

MM Consultancy Services, Nashik.

