



**M.V.P. Samaj's
Arts Science and Commerce College
Ozar Mig**

Tal-Niphad, Dist-Nashik

(MAHARASHTRA)

NAACRe-accredited "B⁺⁺" Grade (CGPA 2.77)

**ENERGY AUDIT REPORT
2023-24**

PREPARED BY
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ENERGY AUDIT TEAM

A) EXTERNAL AUDIT TEAM:

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.....

B) INTERNAL AUDIT TEAM:

Sr. No.	Name of Member	Designation	Title in Committee
1	Dr.S.R.Gadakh	InchargePrincipal	Chairman
2	Smt.V.S.Shimpankar	Assistant Professor	Coordinator
3	Smt.S.B.Dhikale	Assistant Professor	Member



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1. INTRODUCTION OF THE ENERGY AUDIT

1.1 About Parent Institution:

Maratha Vidya Prasarak Samaj is 108, an old, renowned education institute in Maharashtra, established in 1914. It was one of the most significant milestones in Nashik's pre-independence history. Well-being in general and education in particular were considered the sole things human beings were concerned with.

The great visionaries of MVP Samaj rightly laid the "Well well-being & happiness of masses" as the motto for the samaj. The founders of the samaj were inspired and driven by the great work of Mahatma Jyotiba Phule and Rajarhi Shahu Chhatrapati of Kolhapur.

The pioneers, devoted and dedicated team of MVP Samaj includes the names of great social workers and educationalists such as Karmaveer Raosaheb Thorat, Bahusaheb Hiray, Annasaheb Murkute, Ganpatdada More, Kirtiwanrao Nimbalkar, D.R. Bhosale, Vithoba Patil Jadhav. They were the men who envisioned a culture and knowledge-centric society.

M.V.P. Samaj manages more than 485 educational & professional institutions. The spectrum of educational institutions encompasses Primary Schools, Secondary Schools, Graduate & Postgraduate Colleges, and Professional & Vocational Colleges. The total strength of students is over **1146**. Under the jurisdiction of the University of Pune, Maharashtra University of Health Sciences, MSBTE, M.V.P. Samaj spearheading and propagating education from primary to upper crest management and professional streams like Medicine, Physiotherapy, Nursing, Pharmacy, Engineering, Polytechnic, Architecture, and Computer Science, etc. The Samaj has strived to create a niche for itself in the education world by uplifting the education standard in society.

The students & professionals produced by the institutions of MVP Samaj forum are the real backbone of modern society.

1.2 About College:

Maratha Vidya Prasarak Samaj's Arts, Science & Commerce College, Ozar (MIG), Tal-Niphad, Dist-Nashik, was established in 1984. The college is affiliated with Savitribai Phule Pune University, Pune. It has been recognized under 2 (f) and 12 B of the University Grants Commission Act, 1956. It receives grants-in-aid. The College is in its own spacious, beautiful building on a magnificent, serene campus. It is 2 kilometers from the Ozar (MIG) Bus Stand, 3 km from Ozar Air Port, 20 km from the Nashik City Central Bus Stand, and 27 km from the Nashik Road Railway Station. The College imparts education leading to

Bachelor's Degrees in Arts, Science and Commerce and Master's Degree in Hindi, Physics and Chemistry. It has well-furnished and ventilated classrooms, well-equipped laboratories and a rich library, an internet facility, an adequate number of clean Washroom blocks, playgrounds, a health center, well-preserved trees, lawns, and landscapes, experienced, qualified, and devoted teaching and supporting staff.

The College does its best to contribute to National Development by serving the cause of social justice and ensuring equity by providing access to education to socially and economically backward students. Thanks to their education, the students' standard of living is enhanced.

The college sincerely tries to develop life skills and core competencies among the students, which are on par with their counterparts elsewhere, to face the requirements and challenges in the liberalized, privatized, and globalized world.

The College imbibes appropriate value systems among the students through proper NSS, NCC, curricular, and extra-curricular (cultural) activities, emphasizing universal values like truth, righteousness, cooperation, mutual understanding, a sense of justice and equity, etc.

We are aware that we live in the era of science, technology and commerce in which traditional methods of delivering education and governance have become less effective and less motivating for the stakeholders in the College. Therefore, through the Information and Communication Technology (ICT) department, internet, intercom, telephone, and services, the College spreads ICT literacy among the students, teachers, and supporting staff, making them use ICT in all activities.

We also facilitate distance education through our study center of YCMOU (YeshwantraoChavan Maharashtra Open University), Nashik, for students who cannot do regular courses at Pune University for their reasons. Thanks to this study center, these students' dream of becoming graduates is realized.

In short, this college does whatever it can to develop itself into a center of excellence. In other words, we quest for excellence in all we do in and off the college...

The College was accredited in July 2019 with a CGPA2.77 and a B++ grade.



Figure 1. College location and Photograph

1.2.1 Vision of College:

To promote the educational, social, cultural, and economic development of the students and inculcate in them the skills of employability entrepreneurship and balanced emotional growth

1.2.2 Mission of The Institute:

We are committed to providing value-based holistic education in the fields of Arts, Science, & Commerce with an emphasis on individual excellence & social commitment. We focus on the continual quality of all the stakeholders.

1.2.3 Objectives of the leadership:

- To provide quality education to students from various parts of society and make them academically and technically competent.
- To improve the existing infrastructural facilities of the college
- To create higher levels of intellectual abilities
- To create centers of excellence for research and development and for sharing knowledge and its application.
- To emphasize teaching, research, and extension activities
- To inspire the students to remain uncorrupted and lead a dignified life
- To emphasize character building by imbibing strong moral characters

1.3 Energy Conservation Committee:

Table 1 Energy Conservation Committee

Sr. No.	Name of Member	Designation	Title in Committee
1	Dr.S.R.Gadakh	Principal	Chairman
2	Smt.V.S.Shimpankar	Assistant Professor	Coordinator
3	Smt.S.B.Dhikale	Assistant Professor	Member

1.4 Function of the Energy Conservation Committee:

The following are among the various functions assigned to the Bureau of Energy Efficiency:

- ✚ Creating awareness and proper dissemination of information on energy efficiency and conservation;

- ✚ We are organizing training for the efficient use of energy and its conservation for the personnel associated with it.
- ✚ Promotion of the use of energy-efficient processes, equipment, devices, and systems in the general domain;

1.5 Courses Offered:

Table No. 2 Courses Offered by College

Sr.NO.	Name of Faculty	Name of Program	Name of Subject
1.	Arts	BA	English, Economics, Geography, Hindi, History, Marathi, Political Science, Psychology,
		MA	Hindi
2.	Commerce	B.Com	Business Administration, Marketing, Management
		M.Com.	Business Administration
3.	Science	B.Sc.	Botany, Chemistry, Mathematics, Physics, Statistics, Zoology
		M.Sc.	Chemistry, Physics
4.	Vocational	B.Voc.	Electrical Technology
5.	Any other	Certificate Course	Medicinal Plant and Nursery Technique, Student Solar Ambassador Electrical Vehicles

1.6 Total Population of Campus:

Table 3 Total Population of Campus

Sr.No.	Particulars	Total number
1	College Staff (Teaching and Non-Teaching)	86
2	College Students (Girls and Boys)	1146
	Total	1232

1.7 Introduction of Energy Audit:

The need for Energy has increased significantly as the economy has risen. Furthermore, the high energy intensity of several sectors is a source of worry. In such a setting, the efficient use of energy resources and their conservation become critical for reducing wasteful consumption and ensuring long-term development. Recognizing that efficient energy usage and conservation is the most cost-effective way to satisfy rising energy demand, the Indian government adopted the Energy Conservation Act, 2001. It formed the Bureau of Energy Efficiency in March 2002.

The Act establishes and strengthens the delivery system for energy efficiency services in the country and provides much-needed coordination among the various authorities. Energy conservation is a national cause. We must all join hands and make every effort to make India an Energy-efficient economy and society so that we can compete in both our local and international markets.

An energy audit is an inspection, survey, and analysis of energy flow for energy conservation in a building, process, or system to reduce the amount of energy input into the system without negatively affecting the output(s). An energy audit is the first step in identifying opportunities to reduce energy expenses and carbon footprints in commercial and industrial real estate.

As per The Energy Conservation Act, 2001, Act No. 52 of 2001, “Energy Audit” means the verification, monitoring, and analysis of the use of energy, including submission of a technical report containing recommendations for improving energy efficiency with cost-benefit analysis and an action plan to reduce energy consumption;’

1.8 Objectives of Study:

- An Energy Audit aims to balance the total energy inputs with their use and identify the energy conservation opportunities in the stream.
- Energy audits also focus on energy costs and the costs involved in achieving higher performance through technical and financial analysis.

- The best alternative is selected on a financial analysis basis.

The primary objectives of Energy Audits are

- To study the present level of Energy Consumption
- To assess the various equipment/facilities from the Energy efficiency aspect
- To study the Scope for the usage of Renewable Energy
- To study various measures to reduce the Energy Consumption

1.9 Methodology:

The methodology adopted for this audit is


- Formation of audit Team for specific areas and end-use.
- Visual inspection and data collection
- Observations on the general condition of the facility and equipment and quantification
- Identification/verification of energy consumption and other parameters by Measurements
- Detailed calculations, analyses, and assumptions Validation
- Potential energy-saving opportunities
- Suggestions for Implementation


As the first step, an internal auditor team was formed and assigned to a particular area or application of Energy on the campus. The energy audit approach comprises several instruments, such as questionnaire development, physical inspection of the campus, observation and study of paperwork, interviewing key people, data analysis, measurements, and suggestions.

1. 10 Steps in Energy Audit:


Pre-Audit

1. Make a plan for the audit.
2. Form an auditing team.
3. Schedule for an audit.

- 
4. Gather the necessary background information regarding the institute and Energy Audit.

 On-Site

1. Understand the scope of the audit
2. Analyze the strengths and weaknesses of the internal controls
3. Conduct the audit
4. Evaluate the observations of the audit program
5. Prepare a report of the observations side by side

 Post-Audit

1. Produce a draft report of the data collected
2. Produce a final report of the observations and the inference with accuracy
3. Distribute the final report to the management
4. Prepare an action plan to overcome the flaws
5. Keep a watch on the action plan

1.11 Scope of Work:

The following environmental issues were studied for the campus mentioned above.

- The present level of Energy Consumption Energy Audit
- Assess the various equipment/facilities from the Energy efficiency aspect
- Scope for the usage of Renewable Energy
- Various measures to reduce the Energy Consumption

This study has been prepared based on the available data, samples, and information supplied by MVP Samaj's College of Architecture, Nashik, and college officials who have made recommendations for improving the efficient use of energy.

2. Energy Consumption Analysis

2.1 Introduction

The College uses Electricity as a primary Energy Source. The sectioned load for College is 2.2k watts.

Table 4 Basic Information of the College regarding Energy

Sr.No.	Particulars	Inputs
1.	Name of College	M.V.P.Samaj's Arts, Science, and Commerce College Ozar Mig
2.	Year of Establishment	June 1987
3.	Built up-Area (sq. ft):	8222 sq meter
4.	Sanctioned Load (KVA):	2.2 watt
5.	Type of Supply : (1/3 phase)	3 PHASE
6.	Tariff Cat : (Commercial/Domestic)	DOMESTIC
7.	Transformer Distance (in Mtr):	65 METER
8.	List ways that use energy in your College (Electricity, Diesel, Firewood, etc)	ELECTRICITY, LPG GAS, SOLAR PANEL ETC
9.	Alternative energy Sources:	Solar Roof Top System
10.	Energy Conservation and Efficiency Implementation Measures :	Use of LED Lights
11.	Year of Implementation:	2016
12.	Date of previous Energy Audit : (If any)	March-2023

The college uses electricity, LPG gas, and solar panels as energy sources. Colleges are using LED lights as energy conservation and efficiency measures to reduce energy.

2.2 Electricity Bill Analysis of the College:

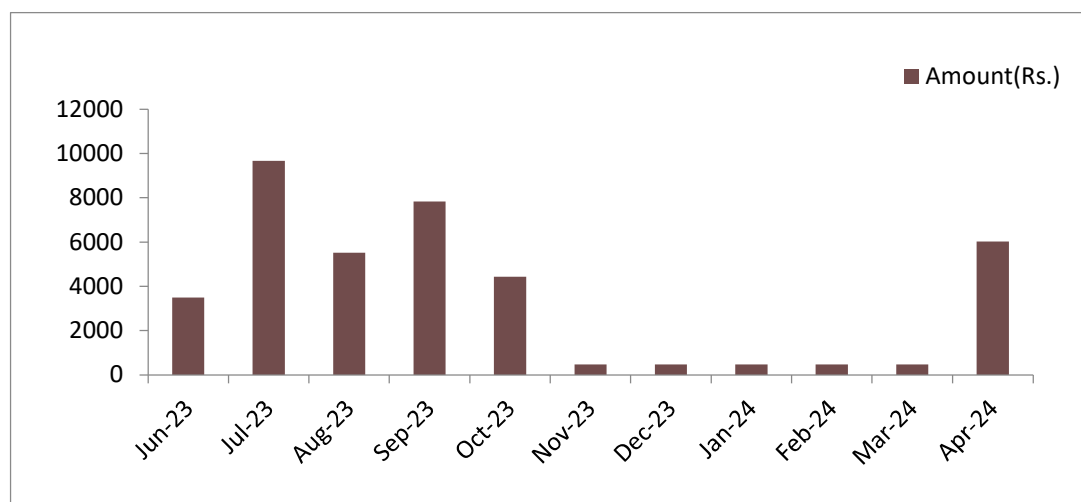
Table 5 Electricity Consumption and Bill Analysis

Months	Unit	Total Units	Amount(Rs.)	Unit Rate(Rs./kW)
April 24	750	62246.4	5860	50 Units @Rs. 1.40
March 24	732	61496.4	470	150 Units @ Rs2.10
Feb 24	533	60764.4	470	200 Units @Rs 2.60
Jan24	691	60231.6	470	2840 Units @ Rs. 3.20
Dec 23	891	59540.9	470	
Nov 23	616	58649.5	470	
Oct 23	828	58033.1	4425.89	
Sep 23	1099	57205.4	7830.69	
Aug 23	957	56106.6	5522.92	
July23	1078.00	55149.800	9676.58	
June 23	891	54071.500	3492.5	
Avarage	824.18		3355.59	

(Data Source: Electricity Bill Provided by College)

As per the above table, the average monthly Electricity Consumption is 824.18 Units per month, and there are more fantastic Electricity savings due to solar rooftop systems. It reduced the monthly electricity bill. e Rs 470/-

Graph Electricity Consumption and Bill Analysis



2.3 Analysis of Connected Load List:

Table 6 Collected Load List

Sr · No	Floor	Area/Dept	Room No	Tube Light 40W att	Light type LED 16/20 Watt	Ceilin g Fan (60 Watt	Exhaus t Fan	computers	Printer s/ Scanne r	Freez e	Xerox Machine	Projector
1	B	Classroom B2	B2		6	4						
2	B	Classroom B3	B3		6	4						
3	B	Classroom B4	B4		6	4						
4	B	Classroom B5	B5		6	4						
5	B	Classroom 6	B6		6	4						
6	B	ClassRomm 7	B7		9	6						1
7	G	Staff Room	G28	3	1	2						
8	G	English Department	G29	1	3	2		1	1			1
9	G	Politics Department	G30		1	1		1	1			
10	G	Marathi	G31		1	1		1	1			
11	G	History	G31		1	1		1	1			
12	G	Economics	G31		1	1		1	1			
13	G	Psychology	G31	1		1		1	1			
14	G	IQAC Room	G27		5	3		2	2			1
15	G	Seminar Hall		2	1	11						1
16	G	Math	G8	2	2	1		2	1			
17	G	IT room	G9	8		2		25	1			1
18	G	Gents Washroom	G10		1	1	1					
19	G	Ladies Washroo m	G11		1	1	1					
20	G	Commerce Department	G12	1	3	2		10	2			1
21	G	G13 Classroom	G13		6	4						1
22	G	Girls Tiolet	G14		1	1	1					
23	G	Boys Washroom	G15		1	1	1					
24	G	Botany department	G16	3	5	3		2	2			1
25	G	Research Lab Chem	G17	5	4	2	1					
26	G	Practical Lab I Chem	G18	5	8	2	4					
27	G	Practical Lab IIChem	G18		8	2	1					
28	G	Chem Department	G19		4	2		4	2			
29	G	Jr Chemistry Lab	G19		8	2	4					
30	G	Zoology Department	G20		1	1		2	1			1
31	G	Practical Lab Zoology	G20		4	2						1

32	G	Office	G24		12	6		8	8			
33	G	Principal Cebin	G25		4	2		2	1			
34	G	Exam Department	G25		4	5		3	2		2	
35	G	Jr Staff Room	G22	2		1		2	1			
36	G	Stat Department	G23	2		2		15	1			
37	G	Store Room	G21		1	1						
38	FF	Hindi Department	F32		2	1		2	1			
39	FF	MCVC(Electronics) Department	F33	10	0	6		3	2			1
40	FF	Class Room	F34	4	2	2						
41	FF	Geography Department	F35		7	4		2	1			1
42	FF	Guest Room	F36		5	2						
43	FF	Physics Research Lab	F39		3	2		1				
44	FF	Department Physics	F40		2	1		1	1			
45	FF	PhySr Lab	F41		8	5		6	1			1
46	FF	PhyJr Lab	F42		9	6		1				
47	FF	Class Room	F53		2	4						
48	FF	Classroom	F60		3	2						
49	FF	Class Room	F55 and F54		2	1						
50	FF	Class Room	F 57		1	1						
51	FF	Class Room	F58		4	1						
52	FF	Class Room	F43		3	2						
53	FF	Classroom	F44		3	2						
54	FF	Classroom	F45		3	2						
55	FF	Classroom	F 46		2	1						
56	FF	Classroom	F 47		1	1						
57	FF	Classroom	F48		1	1						
58	FF	Classroom	F 51		1	1						
59	FF	Library	F52		12	12		8	2			
60	FF	B.VocDepartment	F50		3	2		3	2			1
61	FF	MCVC	F49		7	4						
62		NCC ROOM	R1		1	1						
63		NSS ROOM	R2		1							
64		Physical Education Department	R3	8	4	1		1	1			

Observations:

- The Institute has about 223 LED lights, which are more energy-efficient than fluorescent tube lights. All LED tube lights are fitted with electronic ballast.

- The Institute has about 90FTL lights,
- The College has 165 fans in different Classrooms, departments, labs, and offices.
All fans are fitted with an electronic regulator.

2.4 Analysis of Operating Hours:

Table 7 Analysis of Operating Hours

Sr.No	Name of Appliances	Power Rating Watt	Quantity	Power Consumption Watt	Uses Per Day	Power Consumption/day (Watt)
1.	FTL	40	112	4480	8	35840
2.	Seminar Hall fan	25	11	275	30 mn	137.5
3.	Fan	68	139	9452	8	75616
4.	PC	100	90	9000	8	72000
5.	Printer: Standby mode:30-50w/	760	32	24320	4	97280
6.	LED16W	16	91	1456	8	11648
7.	LED20W	20	91	1820	8	14560
8.	Xerox Machine	2520	2	5040	4	20160
9.	LCD projector	282	6	2538	4	10152
10.	CCTV	29	10	290	24	6960
11.	Water Cooler	1440	3	4320	8	34560
12.	Water Purifier	18	3	54	8	432
13.	TVLED	80	2	160	4	640
14.	Loudspeaker	100	1	100	1	100
15.	3HP Motor	37000	2	74000	2	148000
16.	1HP Motor	746	1	746	2	1492
17.	Exhaustfan	60	14	840	8	6720
18.	Electric bell	0.5	2	1	1	1
19.	Refrigerator(165 litre)	150	2	300	8	2400
20.	Refrigerator(213 litre)	260	1	260	8	2080
21.	Microwave	1000	1	1000	1	1000

Observation:

- Energy-efficient equipment is being used to replace the old non-energy-efficient LED Lights.

- Regular monitoring of Equipment and immediate rectification of any problems is being done.
- Care should be taken to keep lights in the classroom off and keep them necessary.

2.5 Study of Month-wise Electricity Bill Variation:

Sr.No.	Month	Meter 1 (058050065811)		Meter 2 (07302010300 8)	Consumption	Bill Amount		
		A	B	C	A+C-B	Meter 1 (05805006581 1)	Meter 2 (07302010300 8)	Total bill Amount
		Import (Unit in KW)	Export (Unit in Kw)					
1	April 24	750	298	100	552	5860	1820	7680.00
2	March 24	732	562	103	273	470	38.81	508.81
3	Feb 24	533	676	99	-44	470	1082.6	1552.6
4	Jan24	691	820	23	-106	470	693.1	1163.1
5	Dec 23	891	696	13	208	470	136.52	606.52
6	Nov 23	616	964	10	-308	470	591.33	1061.33
7	Oct 23	828	504	0	324	4425.89	104.76	4530.65
8	Sep 23	1099	498	11	612	7830.69	356.19	8186.88
9	Aug 23	957	530	06	433	5522.92	-334.87	5188.05
10	July23	1078	293	66	851	9676.58	-962.25	8714.33
11	June 23	891	459	141	573	3492.50	2303.29	5795.79

2.6 Energy Efficiency Improvement

Table 8 Energy Efficiency Improvement

Sr. No.	Recommendations	Annual Saving Potential (Rs.)	Estimated Investment (Rs.)	Pay Back Period (Years)	Remarks (Feasibility)
1.	Solar On-Grid Rooftop System	15kw	900000/-	4.5or5yrs	MidTerm

1.7 Other Energy sources than Electricity

Sr.No	Department	Kitchen	LPG Usage per day (kg)
1	Chemistry	4Cylinder	0.620 kg per Day
2	Physics	1Cylinder	0.186 Kg per Day

2.8 Electric Pumping System

Serial no	Motor capacity	Electrical loading	Flow rates in m3 / hour
1	3 Phase 5HP	10.45 Amp (3.7 kWatt)	156
2	3 Phase 5HP	10.45 Amp (3.7 kWatt)	156
3	1 Phase 1 HP	4Amp (0.73Kwatt)	52

Serial No.	Tank	Capacity (m3)
1	4	5000 liter
2	3	1000 Lier
3	1	2000 liter

Observations: Try to get the benefit of the TOD time slot, i.e., -01.50 rate at night in addition to the actual rate per unit consumption for electric motor pumping

3. Audit Findings and Recommendation:

Based on the analysis of Power Consumption data, Certain steps have been recommended to improve the campus's energy efficiency. Complete cost analysis of implementing the recommended measure has been performed wherever necessary. Also, the general measure of energy efficiency has been listed. Described below are some crucial recommendations for better energy efficiency:

3.1 Consolidation of Audit Findings:

- 1) The communication process for awareness concerning energy conservation is found adequate.
- 2) Average Power factor is maintained.
- 3) The monthly use of Electricity in the College is not very high.
- 4) Objectives for reducing energy, Water, and Fuel consumption are sufficient.
- 5) Energy-efficient equipment is being used to replace the old non-energy-efficient LED Lights.
- 6) Regular monitoring of Equipment and immediate rectification of any problems.
- 7) All maintenance work is done per the previous energy audit remark.

3.2 Recommendations:

1. Housekeeping:

- **Curtains:** Always keep curtains on windows to prevent direct sunlight inside the room to avoid heating cooled air.

2. Replacing FlorescentTube light to LEDlights:

LED lighting systems are a good option for college students. These systems provide energy-efficient lighting and reduce maintenance costs to a minimum. The College suggests that the College use LED lights instead of fluorescent tube lights. Dominants' light sources at most places on the campus are traditional 36-watt fluorescent tube lights. As per our data collection, the campus has no fluorescent tube lights. If LEDs replace these tube lights, 18 Watts of power can be saved.



3. Use of Master Switch outside each room.

Installation of a Master switch outside a room can make it easy for a person to switch off all the room's applications in case someone forgets to switch off while leaving the room. This can help improve energy efficiency.

4. Use of Motion sensors in Washrooms:

Washrooms have an enormous potential for saving energy by using automated tools. Motion sensors can switch on the lights automatically when there is no movement. This can gradually reduce the total load in the Washrooms.

5. Hibernating

Utilizing the Hibernating feature to power down computers outside of class/work hours will reduce the wasted Energy associated with keeping computers powered on when the building is unoccupied.

6. Conduct more save energy awareness programs for students and staff.

Conduct more save energy awareness programs for students and staff.

7. Energy Substitutions:

On campus, there is a massive electrical energy consumption, which is not economical. Instead of using electrical energy, switch to an alternative energy source, solar power.