

“ENERGY EFFICIENCY ASSESSMENT REPORT”



SWAMI VIVEKANAND SHIKSHAN PRASARAK MANDAL'S

SWAMI VIVEKANAND COLLEGE OF EDUCATION

**Survey No.184, Jalkot Road, Bodhan Nagar, Tq. Udgir, Dist- Latur,
Maharashtra, 413 517, India.**

[Date: 14/05/2024]

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Chapter 1. Introduction



Fig 1.1 Institute Structure View

A nation is tiring to advance in quantity and quality to the spread of education among the common India and development of their intelligence. In India the entire field of education and other fields of intelligent activities had been monopolized by a handful of men before independence. But today we are marching towards the desirable status of a developed nation with fast strides. But the development should be a sustained one. For achieving such an interminable development energy management is essential. As far as concerning electricity crisis, we are facing lack of electricity during office work. So, institutional management is taking design regarding production of electricity and saving electricity for Eco social aspect. Energy requirement of India is growing and incomplete domestic fossil fuel treasury. The country has motivated strategy to enlarge its renewable energy resources and policy to establish the nuclear power plants. India increases the involvement of nuclear power to largely electrical energy development facility from 4.2% to 9%. India's industrial demand accounted for 35% of electrical power requirement, domestic household use accounted for 28%, agriculture 21%, commercial 9%, and public lighting and other miscellaneous applications accounted for the rest. Energy conservation means reduction in energy consumption without making any sacrifice of 5 quantity or quality. A successful energy management program begins with energy conservation; it will lead to adequate rating of equipment's, using high efficiency equipment and change of habits which causes enormous wastages of energy. By observing all these study lack of electricity and huge electricity demands. It is necessary to plan to be self-sufficient in electricity requirement. In the present study, the college electricity audit has been done. In this study considered practical laboratory, instrument, Fans, air conditioners, Computers etc are considered in this study. We have studied total budget of the college, total economic investment of college on the electricity and total generation electricity from the solar wind hybrid electricity generation unit. Also, we have studied total saving of electricity and money from solar wind generation and requirement of solar energy. Also, it

is studied that exact contribution of bulb, fans, computer, instruments etc in the total requirement of electricity. We studied all these mentioned things by collecting exactly data form survey.

ABOUT THE ORGANISATION:

SWAMI VIVEKANAND COLLEGE OF EDUCATION, has been founded by **2001 at (Maharashtra)**. It was managed by SWAMI VIVEKANAND SHIKSHAN PRASARAK MANDAL’S. It is one of the premier colleges established to impart & provide in the field of higher education for the deserving candidates and prove to be a milestone in their part of progress. **Dr. Gopal Pawar** is the principal of the institute. He a Philanthropist and a Visionary person, He firmly believed that modern education had to have its roots in strong values. This underlying theme and legacy of SWAMI VIVEKANAND COLLEGE OF EDUCATION was continued and further strengthened by competent Staff.

The College offers a Low pollution environment as it’s far from the city life. The vision and mission of the college clearly reflects the commitment of the college towards promoting quality and excellence in education to cater to the needs of society & also the main aim to carries the Poor students in the flow of basic education that was clear.

The College always proves excellence through comparable academic results. The College believes in faculty development so that, they can serve better to the students. In Academics Infrastructure is also playing vital role to create the healthy environment for the education.

The institution always believe the external audit to ensure its perfection and quality in the field of excellence in academic and its qualitative process. With this objective Institute has decided to make its quality evaluation by National Assessment and Accreditation Council (NAAC), which will help us to institutional developments and contribution to society’s development.

Sr. No.	Basic information	Details
1	Organization Name	SWAMI VIVEKANAND SHIKSHAN PRASARAK MANDAL’S
2	College Name	SWAMI VIVEKANAND COLLEGE OF EDUCATION
3	Postal Address	Survey No.184, Jalkot Road, Bodhan Nagar, Tq. Udgir, Dist- Latur, Maharashtra 413 517, India.
4	Running Faculties	Bachelor of Education (B.Ed.)
5	Establishment	2001
6	E- Mail	dr.pawargopal@gmail.com, svcoedu380@gmail.com
7	Phone No. (02559)	9822108625

8	Chairman's/ Directors name	SWAMI VIVEKANAND SHIKSHAN PRASARAK MANDAL'S COMMITTEE
9	Principal Name	Dr. Gopal Pawar
10	Purpose	Providing the Various Courses of Graduate Level for the Stream of B. Ed.
11	Affiliation ID: / NCET	Aff.: Ref.Acad/affi-3/2023-24/826 (cert No: SRT-L23-00100), NCTE: WRC/APW00807/123141/2015
12	Region Type	Urban
13	Management	Private (Permanent Aided)

Table 1.1: Basic Details of Organization

• **Mission**

To the national educational programme of B.Ed. & to provide competent, capable, committed, trained, ideal teacher educators to the globalize Indian society

Objectives :-

- To equip and facilitate pupil teachers with knowledge and skills so as to enable them to enhance the quality in education.
- To acquaint the pupil teacher with the new technologies to enable them to integrate I in the teaching, learning, evaluation and research.
- To inculcate commitment to words teaching profession amongst the pre-service and in – service teachers.
- To inculcate dignity towards labor accountability and social commitment amongst the pre-service and in-service teacher.
- To establish healthy relationships with by conducting various interactive, social, cultural, educational programs.
- To develop and sustain as a center of excellence in the field of teacher education to implement objectives recommended by NCTE, UGC, NCERT regarding teacher education programs.
-

• **Vision**

To create a center of excellence for multidisciplinary education & training for empowerment of the future generations & build a strong India.

• **Philosophy**

Enhancing Knowledge Building Careers Begins from the academia and continues through industry interactions, seminars, conferences, workshops and research. Approach that goes beyond a job to career the art of amalgamating the various talents and qualities in a person and directing it towards the goal of professional success.

Acknowledgement

Einzigartig International Certifications Private Limited extends gratitude to SWAMI VIVEKANAND COLLEGE OF EDUCATION, for extending us the opportunity to conduct the Energy & Green Audit.

We are thankful to the professors & supporting staff of the college for their transparency & consistent support in sharing relevant information and for providing data about policies and projects along with their other valuable information. This report would not have been possible without their support.

The study team would like to acknowledge the following distinguished personnel's of SWAMI VIVEKANAND COLLEGE OF EDUCATION, in person for the diligent involvement and cooperation.

- Dr. Gopal Pawar (Principal)
- Dr. Khurpe Goroba Tukaram
- Dr. Howal Siddharth Sudhakarrrao
- Kesarkar Mahesh Pandurang
- Sarvade Nagesh Dattatraya
- Chandanshive Tanaji Aba
- Dr. Bhurle Vijayanta Balasaheb
- Mane Kalappa Alappa
- Dr. Shinde Baliram Nivrutti

IQAC coordinator NAAC for motivating us for energy audit

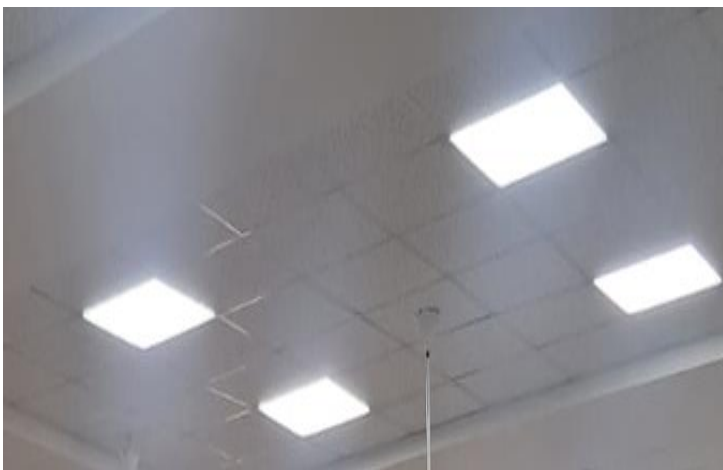
Chapter 2

Energy Sources

An energy audit is an inspection, survey and analysis of energy flows, 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). In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprints.

Energy/Fuel	Please mark in appropriate box	Unit	Consumption (per annum)	Cost Annun (Rs.)
Coal	NA	NA	NA	NA
Lignite	NA	NA	NA	NA
Fuel Wood & Biomass	NA	NA	NA	NA
HSD oil	NA	NA	NA	NA
Light Diesel oil	NA	NA	NA	NA
Furnace oil	NA	NA	NA	NA
LSHS	NA	NA	NA	NA
LPG	NA	NA	NA	NA
Natural Gas	NA	NA	NA	NA
	NA	NA	NA	NA
	NA	NA	NA	NA
Captive(DG Set)		1	2.5 KW	As Per Requirements
MSEDCL			54534	261648

Table 2.1: Energy Sources and Consumptions



a) LED Light



b) Fan



c) Classroom: 6 Nos.



d) Solar Plant



g) Water Tank: 1000 Ltr/5 Nos.



h) DG Set: 2.5KW (1 Nos.)

Fig: 2.1 Sample representative Electrical instruments Usage

The total lighting (luminary) load of the college includes fluorescent tubes 06w, CFL Bulb etc. LED lights is good from energy efficiency point of view. LED tube lights are also available in the market, which is also good in terms of energy efficiency point of view. Whenever 36/40w tube gets fuse (not in warranty period) then it could be replaced by 18w/ 9w LED tube. There are 10 nos of streetlights which are working on conventional power with battery.

During study, tube lights were ON in the classroom, and it was observed that lux level was good (240 – 320) in the classroom near to the window. But Lux level was down (120 – 200) near the entrance door and its wall side. It is advisable to increase some tube lights in the classroom for better lux value.

Chapter 3

Introduction to Energy Audit

3.1 ENERGY AUDIT OBJECTIVE:

- Our objective is to acquire and analyze the data to find the possible ways of energy Conservation.
- It will be useful to calculate the amount of power consumed and wasted in a network of specified location.
- To find and implement solutions that is acceptable and feasible.

3.2 Scope:

- ❖ Data Collection - walk through audit.
- ❖ Facility Description - characterize building usage, occupancy, size and construction.
- ❖ Component Inventory - detailed components list including utility, life and efficiency.
- ❖ Energy Conservation Measures – identify and evaluate opportunities for cost savings and /economic returns.
- ❖ Renewable /Distributed Energy Measures – evaluate economic viability of various renewable/distributed energy technologies.
- ❖ Energy Purchasing and Procurement Strategies – perform utility tariff analysis and assess potential for savings from energy procurement strategies.
- ❖ Awareness – to create awareness regarding efficient energy consumption and to provide with deserving rewards.

3.3 General

The SWAMI VIVEKANAND COLLEGE OF EDUCATION, entrusted the work of conducting a Detailed Energy Audit of campus at College Premises 2.0 Acres s with the main objectives as below:

- To study the present pattern of energy consumption
- To identify potential areas for energy optimization
- To recommend energy conservation proposals with cost benefit analysis.

3.4 Scope of Work, Methodology and Approach

Scope of work and methodology were as per the proposal. While undertaking data collection, field trials and their analysis, due care was always taken to avoid abnormal situations so as to generate normal/representative pattern of energy consumption at the facility.

3.5 Approach to Energy Audit

We focused our attention on energy management and optimization of energy efficiency of the systems, sub systems and equipment. The key to such performance evaluation lies in the sound knowledge of performance of equipments and system as a whole.



3.6 Energy Audit

The objective of Energy Audit is to balance the total energy inputs with its use and to identify the energy conservation opportunities in the stream.

Energy Audit also gives focused attention to energy cost and cost involved in achieving higher performance with technical and financial analysis. The best alternative is selected on financial analysis basis.

3.7 Energy Audit Methodology

Energy Audit Study is divided into following steps

- **Historical Data Analysis**

The historical data analysis involves establishment of energy consumption pattern to establish base line data on energy consumption and its variation with change in production volumes.

- **Actual measurement and data analysis**

This step involves actual site measurement and field trials using various portable measurement instruments. It also involves input to output analysis to establish actual operating equipment efficiency and finding out losses in the system.

- **Identification and evaluation of Energy Conservation Opportunities**

This step involves evaluation of energy conservation opportunities identified during the energy audit. It gives potential of energy saving and investment required to implement the proposed modifications with payback period. All recommendations for reducing losses in the system are backed with its cost benefit analysis.



Chapter 4

Study of Energy Consumption Profile

4.1 Source of Energy:

SWAMI VIVEKANAND COLLEGE OF EDUCATION, uses Energy in following forms:

- a. Electricity from MSEDCL Ahmednagar Division.
- b. LPG

Electrical inverter installed which is run whenever power supply from MSEDCL is not available.

The following are the major consumers of electricity in the facility

- Computers
- Modem
- Router
- CCTV
- Lighting
- Printer
- Xerox Machine
- Projectors
- Fans
- Sound System
- Other ICT/ROM Equipment (LED Light, electric Motor Etc.)

4.2 Specific Energy Consumption (SEC)

Specific Energy Consumption (SEC) is defined as energy usage per Square meter of area. It is calculated total electrical kWh/total area of the campus. By calculating SEC, we can crudely target the factors of energy efficiency or inefficiency. SEC for last twelve months was calculated and is as shown in the chart below.



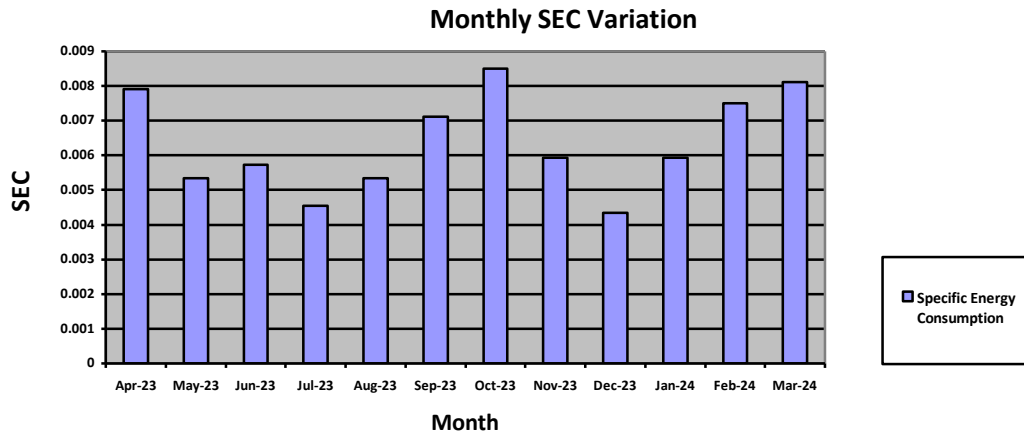


Fig: 4.1 Specific Energy Consumption

- **Observation:**

- The Specific Energy consumptions in the months of **Oct- 2023** is noted as highest as it is the days of Scheduled written exams and Online/ Offline Practicals in concern departmental lab.
- **Availability of Digital Class rooms, low consumption electricity sources are limited.**
- **Awareness and implementation of Non conventional energy Sources are poor need to collect trainings regarding**

Chapter 5

Historical Data Analysis

Class No.	Description	Number/Quantity	5 Wattage	Total Wattage
Office				
	Fan	2	50	100
	LAD BULB 5 Watt	4	5	20
	Printer	2	220	440
	pc	4	220	880
	Thumb Machine	1	12	12
	Wi-Fi router	1	12	12
Management Cabin				
	CCTV DVR	1	12	12
	Setup Box	2	12	24
	Fan	2	50	100
	Charger	2	12	24
	LAD BULB 5 Watt	3	5	15
EXAM SECTION				
	LAD BULB 5 Watt	4	5	20
	PC	1	220	220
	Printer	1	220	220
	Charger	1	12	12
	USB	1	12	12
	RO water purifier	1	260	260
Library				
	LAD BULB 5 Watt	4	5	20
	Fan	3	50	150
	PC	1	220	220
	Printer	1	220	220
	charger	2	12	24
Computer Lab				
	Fan	3	50	150
	LAD BULB 5 Watt	5	5	25
	PC	20	200	4000
	Printer Dot Matrix	2	220	440
	Fax Machine	1	350	350
	Charger	2	12	24
Classrooms				
1	LAD BULB 5 Watt	6	5	30

	Fan	4	50	200
	Projector	1	400	400
2	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Charger	1	12	24
	PC	1	220	220
3	LAD BULB 5 Watt	6	5	30
	Fan	5	50	250
	Projector	1	400	400
4	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Projector	1		
5	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Projector	1		220
6	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Laptop	1	220	220
	Charger	1	12	12
	Printer	1	220	220
	Wi-Fi Router	1	12	12
	Street Light	10	12	120
	Boar Well Motor 1	2		440
	Boar Well Motor 2	2		440
	Diesel Generator Set	1		2.5 KW

Table 5.1: Average Requirement of various Equipment

Average units consumption per month is around **2294.91 kWh**

Maximum units consumption is **43 kVA** in month of **Oct-23**

- Average bill (Rs.) per month is around **21804 Rs.**
- Maximum bill (Rs.) is **70340 Rs.** In month of **Aug-23**

5.2 . Power Consumption

SR. NO	MONTH	UNIT
1	Feb-23	1898
2	Mar-23	1661
3	Apr-23	1754
4	May-23	3645
5	Jun-23	4192
6	Jul-23	3124
7	Aug-23	3421
8	Sep-23	1404
9	Oct-23	1235
10	Nov-23	1385
11	Dec-23	1720
12	Jan-24	2100
	Total	27539

Table 5.2: Unit Consumption per month

Study of Variation in UNITS Consumption Month Wise:

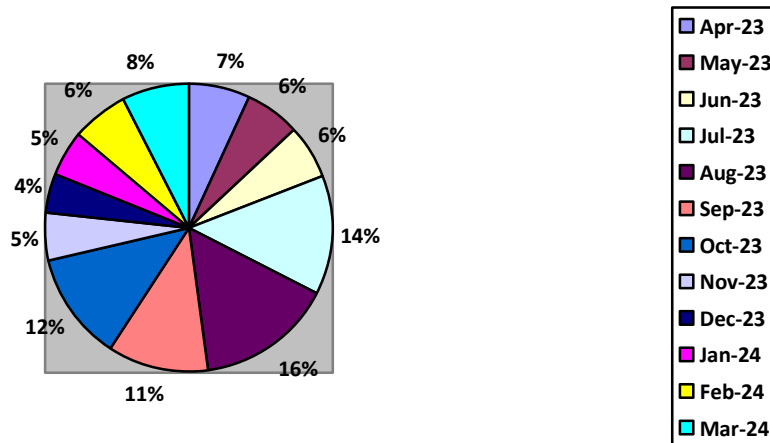


Fig: 5.1 % Variation in UNITS Consumption per Month

5.3 Month Wise Billing Composition

Bill analysis for consumer shown below

Sr. No	Month & Year	Amount
1	Jan-23	11388
2	Feb-23	9966
3	Mar-23	10524
4	Apr-23	21870
5	May-23	70340
6	Jun-23	18744
7	Jul-23	20526
8	Aug-23	11690
9	Sep-23	23490
10	Oct-23	13350
11	Nov-23	29980
12	Dec-23	19780
	Total	261648

Table 5.3: Billing Amount per month

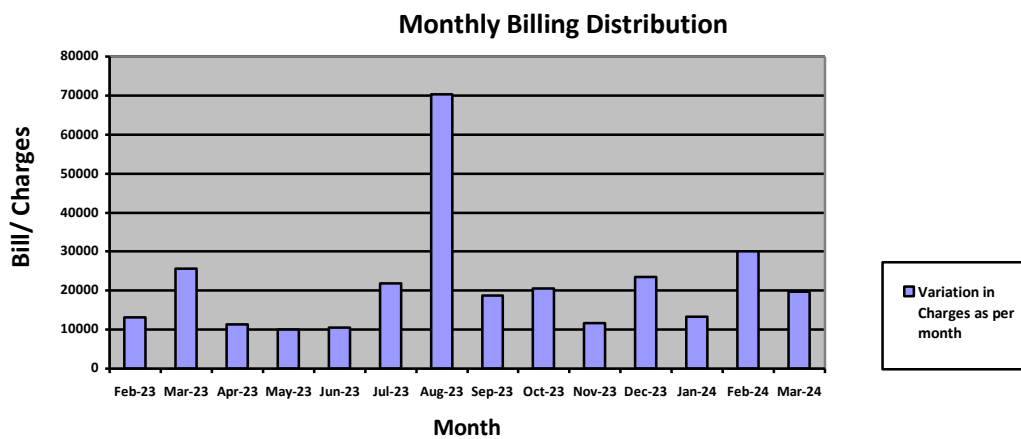


Fig: 5.2 Variation in Monthly charges per Month

Table 5.4: Type wise lighting distribution in college

Type	Qty	KW Load	% Load
LED Light	40	1.088	84 %
T8 TL CC Conventional Lights /CFL Bulb	08	0.16	16 %
Total	48	0.45	

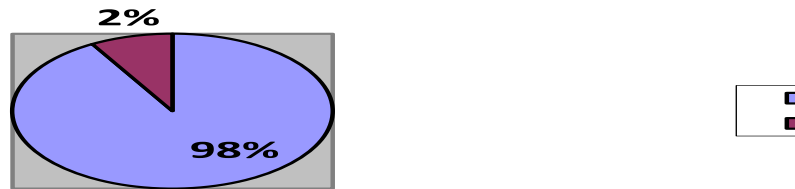


Fig: 5.3 Percentile lighting distribution

5.4 Total requirement of electricity, generation of electricity using renewable energy sources.-

Power requirement met by renewable energy sources	Total power requirement	Renewable energy source	Renewable energy generated and used
<u>Installed solar plant</u>	<u>386 KVA</u>	<u>Solar Power Panels</u>	<u>350 Watt/Hr</u>

Experimental and data collection:

All required data is collected. In building, in every room, how much fans, tubes, fans, computer, instrument AC, etc will these is measured. According to the survey following data is collected.

Requirements of NAAC Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources

= (Power requirement met by renewable energy sources / Total power requirement) X 100

= (0/26.21) X 100

= 0 %

Percentage of lighting power requirement met through LED bulbs

Percentage of lighting power requirement met through LED bulbs

= (Lighting power requirement met through LED Lights / Total lighting power requirement) X 100

= (0.932/8.892)

= 10.48 %

Chapter 6 Study of Actual Measurements and Its Analysis

Campus is divided in following section:

- a) Collage Building (3 floors)
- b) Play Ground
- c) Parking

6.2. Lighting System Observations:

- It is found that LED, Bulbs, CFLs is installed in the facility.
- It is recommended that some tube lights in this area be switched off when sufficient daylight is available.
- Presently there are no reflectors installed for tube lights.



Fig: 6.1 Building Floor Levels



Fig: 6.2 College Play Ground



Fig: 6.3 Parking

Chapter No: 7

Conclusion

Observation & Recommendations

- It is found that LED, Bulbs, CFLs is installed in the facility.
- It is recommended that some tube lights in this area be switched off when sufficient daylight is available.
- Presently there are no reflectors installed for tube lights.
- Future Load Predication: Considering Modern infrastructure & facility which recommended to go Solar Panel or Traditional power.
- Provide Motor guard/ Cover at water tanks to avoid mishaps.
- Use natural ventilation instead fans, as natural air circulation is easy way to reduce electric consumption.
- Recommended that Keep electricity maintenance frequency on record and install power stabilizers to avoid power fluctuations
- Conduct electricity awareness programs amongst the staff and students.
- Recommended that the Playground area street lighting/ Parking area lighting for students' convenience, consider within the proposed solar Power Plant.



Chapter No: 8

References / Bibliography

- Customer Data
- Customer Light Bill
- Solar Training Module

Bibliography:

- ISO 9001 : 2015
- ISO 14001 : 2015
- ISO 45001 : 2018
- ISO 50001 : 2018
- MSEDCL Guideline
- UGC Guideline
- NAAC Guideline

Chapter No: 09

Inspection Agency & Auditor Details.

EINZIGARTIG INTERNATIONAL CERTIFICATIONS PRIVATE LIMITED

It is Pleasure introducing ourselves as one of the leading Certification, Training, Third Party Inspection body in India. We serve organizations seeking certifications to International Standard like Quality Management System ISO 9001, ISO 14001, ISO 45001, ISO 27001, ISO 13485, ISO 22000, GMP, HALAL, KOSHER, etc.

Training as per the customer requirement

Third party Inspection as per customer requirement, National & International standard

EICPL is directly accredited by EGYPTIAN ACCREDITATION COUNCIL (EGAC) & ACCREDITATION SERVICE FOR CERTIFYING BODIES (Europe) Ltd ASCB (E).

The purpose of our existence is to promote proven International Management System standard across organisation and help them adopt & Implement these standards as systematic approach for overall business operations so that they are globally competitive and profitable

We have experience and resources to carry out certification activities for different sectors of economies in three areas of our system certification domains. Our system assessment method lies and procedures are systematic and process based. We have technically qualified and experienced system auditors to verify that you comply with minimum requirement of the standard. Our Eveready Supportive staff will be guiding you through systematic assessment and certification procedures and you can confidently deal with us for your management System requirements

With our unblemished credential and unmatched commitment, We assure you that we will be able to offer you best of our services that will help your business excel and remain competitive, cost effective, profitable and socially responsible organization

Auditor Profile

Nilesh Magare

Sr. Consultant, Lead Trainer, Lead Auditor

- ❖ Chemical Engineer
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- ❖ Lead Auditor – ISO 14001: 2015 – Environment Management Systems (TuV India Pvt. Ltd. & IRCA CQI.)

- ❖ Lead Auditor –OHSAS18001:2007 / ISO 45001:2018 Occupational Health and Safety Management Systems (BSCIC & IRCA CQI.)
- ❖ Registered Lead Auditor –ISO-9001 / ISO-14001 / OHSAS 18001 / ISO 45001 with AGSI, EICPL, BSCIC, IQCS, ECPL.
- ❖ Lead Auditor EnMS ISO 50000 2018
- ❖ Internal auditor for IATF 16949:2016

Jaywant Pagare

Sr. Consultant, Lead Trainer, Lead Auditor



- ❖ Computer Engineer
- ❖ Lead Auditor - ISO-9001 : 2015 – Quality Management Systems (TuV Austria & IRCA CQI)
- ❖ Lead Auditor – ISO 14001: 2015 – Environment Management Systems (TuV India Pvt. Ltd. & IRCA CQI.)
- ❖ Lead Auditor –OHSAS18001:2007 / ISO 45001:2018 Occupational Health and Safety Management Systems (BSCIC & IRCA CQI.)
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- ❖ Lead Auditor EnMS ISO 50000 2018
- ❖ Internal auditor for IATF 16949:2016
- ❖ Certification Head at EICPL
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Snehal Dhengle

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- ❖ Internal Auditor EnMS ISO 50000 2018

- ❖ Internal auditor for IATF 16949:2016
- ❖ Certification Head at EICPL

<p>Lead Auditor/Auditor :- Mr. Jaywant Pagare</p> <p>Signature & stamp :-</p>   <p>Date :- 14/05/2024</p>	<p>CEO/ Representative :- Dr. Gopal Pawar</p> <p>Signature & stamp :-</p> <p>Date :-</p>
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THANK YOU!!!

