



CRITERION - 7 INSTITUTIONAL VALUES AND BEST PRACTICES

KEY INDICATOR - 7.1 INSTITUTIONAL VALUES AND SOCIAL RESPONSIBILITIES

METRIC NO. - 7.1.3





SHRI GAJANAN SHIKSHAN SANSTHA'S
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SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA

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7.1.3: Quality audits on environment and energy regularly undertaken by the Institution

CONTENT

7.1.3

**Environmental Promotional Activities
conducted beyond the campus**



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Environmental Promotion and Sustainable Activities –Beyond the Campus

SN	Description	Link
1	Plastic Free Campaign at Kherda Village	Click Here
2	University Level Water Conservation Competition	Click Here
3	Tree Plantation	Click Here
4	Zero Waste Management and Cleanliness drive at Kherda Village	Click Here
5	Benefits of Solar and Biogas at Chincholi Village	Click Here
6	Energy Audit Study at Ganesh Oil Mill Khamgaon	Click Here




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Plastic Free Campaign

On August 9th, 2020, NSS volunteers conducted a plastic-free campaign in the adopted village of Kherda. The initiative involved collecting plastic waste from village households and conducting demonstrations on proper disposal methods for the villagers.



Plastic Free Campaign at Village Kherda



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University Level Water Conservation Competition

On October 4th, 2021, SGBAU Amravati organized a university-level water conservation competition at Shri Shivaji Vidyalaya, Akola. As part of this event, a group of students from the NSS unit prepared a water conservation model and presented their ideas on water conservation and its importance.



Students participation at Water Conservation Competition



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Tree Plantation Drive

On August 18, 2020, the NSS Unit of SSGMCE organized a tree plantation drive within the premises of the Kherda village. Approximately 40 trees were distributed across the village as part of this initiative.



वृक्षारोपण

Tree Plantation Drive at Kherda



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Title of Activity	Zero Waste Management and Cleanliness (NSS Camp)
Organizer	NSS Unit SSGMCE Shegaon
Schedule of Activity	09/03/2022
Objective of Activity	Encourage and educate the residents of Kherda Village about sustainable living practices, with a focus on waste reduction, proper waste disposal, and environmental conservation. Empower the villagers by imparting knowledge and skills related to waste segregation, composting, and recycling.
Overview of Program	<p>In a commendable effort to contribute to community welfare, the NSS unit of Shri Sant Gajanan Maharaj College of Engineering (SSGMCE) initiated a Zero Waste Management and Cleanliness Drive in the adopted village of Kherda. The objective of this initiative was to promote sustainable living practices, enhance cleanliness, and instill a sense of environmental responsibility among the villagers. The NSS students actively engaged with the community, conducting awareness sessions on the importance of waste management and the adverse effects of improper disposal. They organized workshops to educate villagers about segregating waste at the source, emphasizing the principles of reduce, reuse, and recycle. To kickstart the cleanliness campaign, the NSS unit organized cleanliness drives within the village, involving both students and villagers. The focus was not only on waste collection but also on creating a sense of ownership and pride in maintaining a clean and hygienic environment. In addition to the cleanliness drives, the students implemented sustainable waste management practices such as composting and recycling. They set up compost pits for organic waste and collaborated with local authorities for the proper disposal of non-biodegradable waste, thereby contributing to a reduction in environmental pollution. The initiative also included tree plantation drives to enhance green cover and promote ecological balance. The NSS students worked collaboratively with the villagers, fostering a sense of community ownership for the sustainable development of Kherda.</p>
Venue	Shegaon
No. of Participants	100 Students
Outcomes of the activity	The event facilitated meaningful engagement with the local community, allowing students to collaborate with villagers, local authorities, and other stakeholders, fostering a sense of teamwork and community involvement. Students gained a deeper understanding of environmental issues, especially related to waste management, pollution, and the importance of sustainable practices.



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Photographs :



Zero Waste Management and Cleanliness drive at Kherda Village

Dr. D.P. Tulaskar
NSS Programme Officer

Principal
Shri Sant Gajanan Maharaj
College of Engineering, Shegaon.



Cleanliness Drive at Kherda Village on 9-03-2022

Dr. D.P. Tulaskar
NSS Programme Officer

Principal
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Event-Report

Title of Activity	Benefits of Solar and Biogas(NSS Camp)
Organizer	NSS Unit SSGMCE Shegaon
Schedule of Activity	16/03/2022
Objective of Activity	<p>To provide villagers with essential knowledge about abstract energy sources, specifically focusing on the applications and benefits of solar energy in the context of agriculture.</p> <p>To increase awareness among villagers about the pivotal role of technology in driving agricultural development and overall progress.</p>
Overview of Program	<p>The NSS unit of SSGMCE organized a thought-provoking session at the village of Chincholi, focusing on the intriguing topic of " Benefits of Solar and Biogas." The session, led by a dedicated NSS student, aimed to shed light on the pivotal role of technology in driving development, with a specific emphasis on leveraging abstract energy sources for agricultural progress. Dr. Ajay Kumar Damral, a respected authority in the field, served as the author of the session, bringing valuable insights to the forefront. The primary objective of the session was to explore the potential of solar energy in fostering the development of agriculture.</p> <p>The session delved into the intricate relationship between technology and progress, highlighting the transformative impact that abstract energy sources, particularly solar energy, can have on agricultural practices. Dr. Damral explained on the various applications and benefits of incorporating solar energy into farming techniques, showcasing its potential to enhance productivity, reduce environmental impact, and contribute to sustainable agricultural development..</p>
Venue	Shegaon
No. of Participants	100
Outcomes of the activity	<p>Organizing and leading the session provides students with opportunities to exercise leadership skills, fostering their ability to initiate and manage educational initiatives within the community.</p> <p>Students engage in experiential learning by applying theoretical knowledge gained in the classroom to a practical context, reinforcing the practical relevance of their academic studies.</p>



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Photographs:



Benefits of Solar and Biogas lecture by Dr A.K.Damral

Dr. D.P. Tulaskar (NSS Programme officer)

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Energy Audit performed at Ganesh Oil Mill Khamgaon

For identifying opportunities for energy conservation, the best option is an energy audit. An energy audit is a process aimed at determining how and where energy is being used and identifying opportunities to reduce energy consumption. Students from the Electrical Engineering department conducted an energy audit for Ganesh Oil Mill, with the main objective of evaluating energy usage, particularly in motors, within the industry. The goal was to identify opportunities for energy savings using efficient techniques to reduce the monthly electricity bill. The students submitted a paper to a journal based on the findings of the audit report.




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Energy Audit in Oil Mill: Considering Motor Load

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Abstract: Day by day energy demand keeps rising as there is a limited amount of resources that can help us to generate electricity. So that it is essential to reduce energy consumption. The main aim of paper is to perform an in-depth study in industry in order to reduce energy consumption. For finding the scope for conservation of energy the best option is energy audit. Energy audit is a process to determine how and where energy is being used and to identify opportunities to reduce energy usage. This paper is based on energy audit performed for an industry Ganesh oil Mill, specialized in producing oil as a main product and by product as cotton seed cake. Main objective is to evaluate used of energy in above industry for energy conservation in motors and determine opportunities for energy saving with efficient techniques to reduce monthly electricity bill. Calculation of payback period for each recommended action has been made. The result of this activities are documented. Execution of audit in oil mill can develop the plant efficiency.

Keywords: Textile Industry, Energy audit, three phase motor, Efficiency.

1. Introduction

Energy audit is verification, monitoring and analysis of energy use including submission of technical report containing all recommendations with cost benefit analysis and action plan to reduce consumption. The energy audit was conducted at Ganesh Oil Mill of Khamgaon MIDC, Buldhana. The above industry produces cotton seed oil and by product as cotton seed cake whose annual input is 1 lakh 70 thousand quintal in form of cotton seed and annual output is 17 thousand quintal oil and 1 lakh 40 thousand quintal cotton seed cake. It is under the category of HT-1(A) Industry-General having Transformer of 250 KVA, 11Kv/433v, connected load at 433v is 200 Kw and actual load is 197 Kw which comprises of lightning as well as motor load. It has sanctioned maximum demand of 190 Kw. It has many types of equipment and heavy machinery like oil expeller, oil extracting pump, oil neutralizer, dryer etc. As heavy load of industry is motor load therefore paper majorly focused on it.

2. Methodology

Methodology includes the discussions with the plant officials

to identify the areas for energy conservations. Energy audit team visits the site, and collects data of operations and distribution of load within the plant. This collected data is then analyzed and measures are identified to get best possible energy conservation opportunity. Detailed energy auditing is carried out in three phases:

1. Phase I: Pre Audit
2. Phase II: Audit Phase
3. Phase III: Post Audit

The information to be collected during detailed audit includes energy consumption in various sections and major equipment, energy cost and tariff.

1) Pre-audit phase

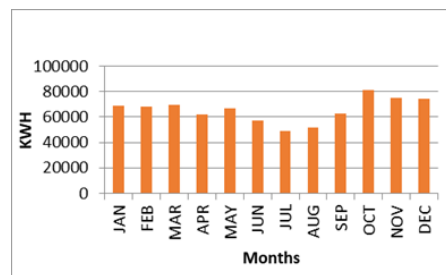


Fig. 1. Monthly Unit Consumption in KWH

Table 1
Sectioned Wise Motor load

Sr. No.	Sections	No. of Motors & Ratings
1	Storage & Dryer	3 HP (2 Nos.) 2 HP (6 Nos.)
2	Cleaning	5 HP (3 Nos.) 3 HP (2 Nos.)
3.	Production	25 HP (8 Nos.) 3 HP (2 Nos.) 5 HP (1 Nos.)
4	Oil Section	3 HP (1 Nos.) 5 HP (2 Nos.)
Total motor load		263 HP (196.19 kW)

In pre-audit phase includes Informal Interview with Plant Manager, Walk through Audit. Schedule of operation of industry is about 12 hrs. Daily for 20 days of month. By conducting the survey total motor load is calculated as 196.19

kW as shown in Table1. From the analysis of annual energy bill, it was observed, during the month October to February energy consumption is more as compared to other month which is represented in the form of graph as shown in figure1.

2) Pre-audit phase

From the collected data it was found that the major power saving regions are replacing old rewound motors with newer energy efficient motor. Energy conservation for motor load is basically perform by major two ways.

1. Replacing existing 25 Hp motor by lower wattage
2. Efficiency Improvement that is replacing existing old motor by newer energy efficient motor with higher efficiency.

As the plant is using 25 Hp motor for expeller while normally expeller for extracting oil work on 30 Hp motor. Considering this statement there is no scope for reducing Hp rating of motor. Hence second option is chosen toward energy conservation in motor. Total motor load of industry is about 196 kW. Major motor load of industry is occupied by Production unit having 3 phase Squirrel Cage Induction Motor of 25 Hp (18.6 kW). In observation it was found that motors are too old and rewound many times hence to know the operating efficiency of motor experimentation is carried out to measure the parameters. In order to find out energy conservation opportunity by replacing the existing motors with energy efficient motor 18.65 kW, 91% efficiency, following procedure is followed.

- Selection of rewound motor.
- Measurement of motor parameter.
- Calculation of motor losses & efficiency.
- Selection of energy efficient motor.
- Analyzing the motor for energy saving.

3. Analysis

1) Calculation of parameters

The parameters of three phase induction motor are measured by using tong tester and Multi-meter as shown in table 2. These Parameters are used to calculate the power losses of motor and motor efficiency is calculated by using formulas as listed below. Variation in efficiency of 8 motors is between 80% to 82%.

Table 2
Measured Parameters

Type of motor	3 phase squirrel cage induction motor
Rating of motor	25 Hp (18.65 kW), 50 Hz
No of pole	4 pole
No load speed	1449 Rpm
Line voltage	430 V
Loading percentage	75 %
No load current	20.4 A
Operating speed	720 Rpm
Current on load	28 A

- I/P Power = $1.73 * V_l * I_l * P_f$
- Copper Loss = $I^2 R$
- Constant loss = I/P Power – Copper Loss
- Output power = (HP Rating) * 746

- Resistance per phase = $1.2 * 0.9$
- Copper loss = $I^2 R$
- Loading condition = 75%
- Power output= (Output Power) * 0.75
- Input power= output power + (copper loss + constant loss)
- Efficiency % = (output/input) * 100
Efficiency % = 80.28 %

2) Selection of energy efficient Motor

As per the market survey and cost benefit analysis, profile of newer energy efficient motor is Kirloskar 25 Hp (18.5 kw), 430 V, 4 pole, 50 Hz, 1500 Rpm, 3 phase foot Mounted Squirrel Cage Induction Motor,91% efficiency, power factor 0.83 of cost Rs 55000. Analysis of replacement of total 8 motor has been done as shown in table 3. And payback period is about 20 months.

Table 3
Analysis of Implementation

Difference in efficiency	10%
Energy difference	19 kWh
Total energy consumption of 8 motors	152 kWh
Monthly energy consumption	3043 kWh
Monthly cost saving	Rs 21492.8
Yearly Cost saving	Rs 2,57,913

- Prize of Energy Efficient Motor = Rs 55000
- Total Investment = Prize of Motor * Total No of Motor = $55000 * 8 = Rs 4,40,000$
- Payback Period= (Investment/Yearly Cost Saving)* 12 = $(440000/257913) * 12 = 20$ Month

4. Conclusion

In this article, case study depicts that there is a large scope of energy savings in oil mill by replacing the old rewound/ faulty motors by energy efficient motors, there is scope for saving of energy, cost with less payback time of 20 months. The implementation of energy saving measures suggested in this paper is solely dependent on the decision of the industry. Technical Result is as shown in table 4. Energy saving proposals for Oil mil gives approximately saving of Rs. 2.57 Lakhs.

Table 4
Technical result

S. No	Energy Saving proposal	Annual Saving in Rs/Lakhs	Investment required in Rs/Lakhs	Simple Payback in Month
1	Replace Re-Winded Motors by Energy Efficient Motor	2.57	4.40	20

The project has completed with two phases of Audit. Third phase of audit is about implementation of energy saving measures recommended to the Management and monitoring as

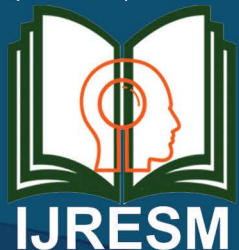
well as analyze the progress of the energy conservation measures if it is implemented by the authority of industry.

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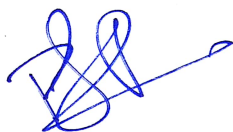
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