Energy Management System Implementation

Raymond Limited, Chhindwara Unit

– Mr. Jayant Joshi, General Manager (Engineering), Raymond Ltd, Chhindwara Division

Introducing the Plant

Incorporated in 1925, Raymond Limited has five manufacturing divisions at present, which make products such as textiles, denim, engineering files and tools, aviation, designer wear, prophylactics and toiletries. With a capacity of 45.28 million meters in wool and wool-blended fabrics, Raymond commands over 60% of the market share of worsted suiting in India, and ranks amongst the first three fully integrated manufacturers of worsted suiting in the world.

The Chhindwara Unit is one of the three production units of the Textile Division; its installed capacity is 128 looms and 33528 spindles as against the licensed capacity of 1500 looms and 50000 spindles. The unit, which became operational in 1991, has a work force of more than 2600. The plant is well equipped with the most modern machinery, ensuring high efficiency and productivity. The work force is skilled, well- trained and competent. An in-house laboratory carries out quality tests on in-coming material, in-process material and the final product.

Development strategies adopted for implementing ISO 50001, Energy Management System

Development phase:

- In order to have a well-defined and functional energy management system, the members of the organization should become conscious of energy consumption, conservation and wastage.
- With a well-organized system for collecting and measuring data in place, consumption figures for different departments were readily available, allowing a systematic approach to understanding energy use. With this data we were able to study our past consumption and finally, a baseline was arrived at: the financial year, 2014-2015.

  Analysis of the data suggested that electricity was the form in which most energy was consumed. Hence, monthly electricity consumption for all departments was recorded separately and the annual total was determined. This allowed determination of areas of significant energy use (SEU): if the area consumed more than 5% of the total electrical energy consumed it was considered an area of significant energy use. For each department, Energy Performance Indicators (EnPIs) were based upon the energy consumed per unit of production.

Use of Professional Experience:

The plant identified the level of training for different personnel according to their job profile. The top management's commitment to EnMS implementation was high and hence a management representative (MR) was appointed with immediate effect. The MR was given powers to make decisions with respect to the EnMS and he was also responsible for assigning roles and responsibilities to other members of the organization. The major resource was a team which comprised 15 experienced and dedicated members from all over the plant, specialists in their respective roles: this team was hence called the Energy Management Team (EMT) with the MR as their leader.

The MR and EMT played key roles in implementing the EnMS and hence specialized training by certified external experts from the Bureau of Energy Efficiency (BEE) on EnMS implementation and internal auditor training was arranged.

These members were, in turn, responsible for training the other staff members in their departments. In particular, a number of training sessions were arranged for ground level workers working in the SEU area, because they were the first in line to work on the machines and had a significant role to play in energy conservation and preservation.

A clear communication system was set up with details and updates on EnMS were

Figure 1: Share of different types/sources of energy used in the plant

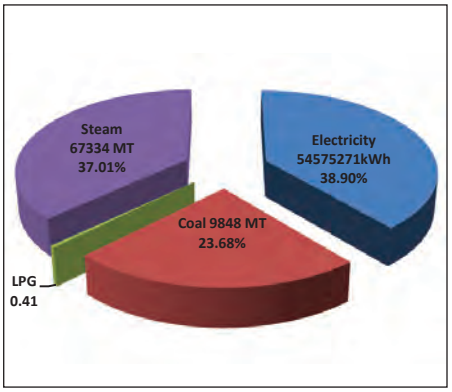
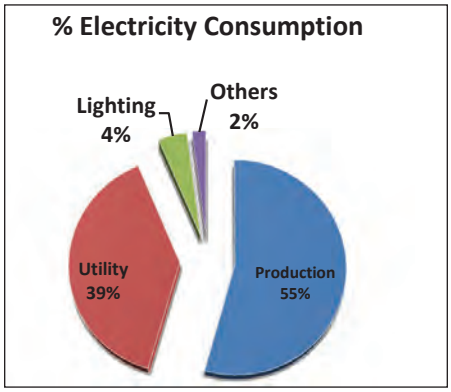
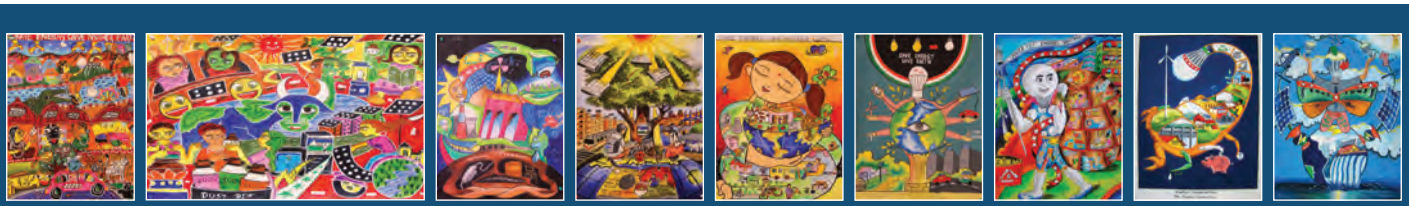


Figure 2: Apportionment of electricity consumption in the plant





circulated to all concerned personnel via e-mail; all the latest documents, records and data were placed on the intranet so as to be accessible to all staff members. Notice boards were also used to intimate workers of progress; control was maintained throughout by using passwords to protect all relevant documents on the intranet.

Workers were trained on the process flows of the machines. They were also given proper instructions about how to operate the machine efficiently. For this purpose the instructions were noted down on a paper and placed near the machine to ensure good operational control.

Implementation roadmap of ISO 50001 and approach adopted

A number of activities were undertaken to improve the energy performance of the plant, and included replacement of old inefficient motors by IE2 class high-efficiency motors, as also VFD and LED light installation, all of which resulted in significant improvements in energy consumption. The energy efficiency improvement projects were first documented and a detailed action plan consisting of responsibilities and time frames was drawn up, with steps taken to implement it. Performance was measured using regression since it considered all variables affecting energy use.

The energy team prepared a template for determining energy consumption and validation in Excel format. This template used the baseline data, regression, and some mathematical calculations to compute the energy consumption for the current period. A report was generated showing the difference between the actual and computed values of energy consumed with values deviating from preset limits, being colour-coded. Reasons for these deviations were given by the department's energy team member.

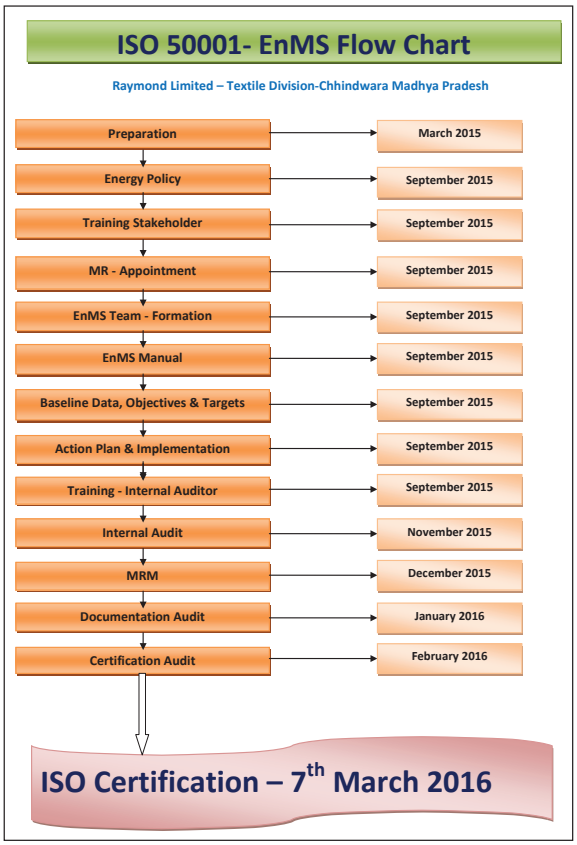
Since the system was fully integrated and scattered bits brought together, preparing for audits was no trouble. Only minor things such as placing the instructions at proper places near the machines, checking the availability of documents, needed to be checked.

ISO 50001 and the PAT scheme

After implementing ISO 50001, the plant was able to reduce its energy consumption by 9.81% during the 1st PAT cycle.

Cost-benefit analysis

Replacing conventional lights by LEDs and installing VFDs in place of conventional starters saved Rs. 2.55 million, with a total investment of Rs. 2.44 million. Other contributions to savings came from the installation of solar light pipes, interlocking for ETP aerator motor, and replacement of obsolete motors by high-efficiency motors. It was the hard work of our team that led to a timely completion of the projects aimed at saving energy, giving a payback period of one year.



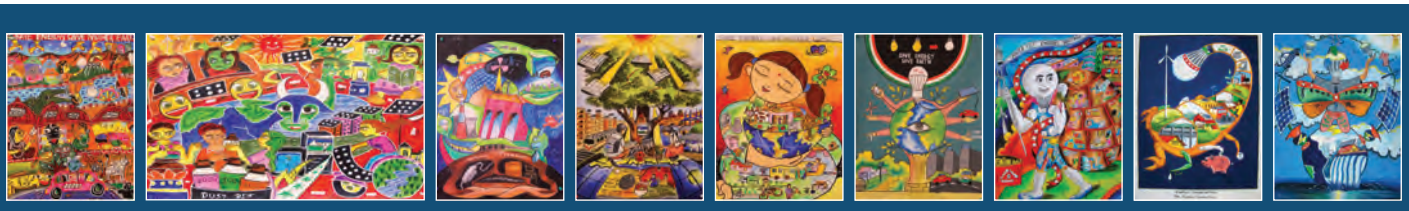
Challenges

- As a composite textile mill, the largest hurdle that came our way was a gap in competence and training. Since the number of processes is large, the training and competence of workers working in each process was different and the gap had to be made up. After a long brain-storming session with the Human Resources personnel, it was decided to make a department-wise competency matrix which would also cover the training needs in a single context.
- Because of the presence of different kinds of machinery with differing loads, varying from 0.375 kW to 135 kW, the number of motors was correspondingly very large, approximately 3000. This made it difficult to identify and set the criteria for SEU equipment; however, after studying all the aspects and possibilities a value of 100 kW for connected load of individual or group of machines was considered to be taken as the base value for further analysis.

It was indeed a big task to implement the energy management system, but the willingness and dedication of the organization brought success. Many lessons were learned as the projects were implemented: team work, sharing of responsibilities, accountability, and time management played a key role in implementing EnMS.

Keys to Success

- A suitable system / method for timely data collection and measurements of energy consumption within the plant's boundary.
- Awareness amongst the people working in the plant is essential because no system/process/method can be brought into practice without knowing its significance.
- Good computer operating skills, especially for working with MS Excel, came in handy in EnPI measurement and analysis.



- ISO implementation guides, ISO 50002, 50003, 50004 and 50006 provided a clear idea about the interpretation and meaning of the EnMS standard and its requirements.
- A well-documented EnMS manual with all necessary procedures and action plans made it a lot easier to manage and implement the energy management system and share responsibilities.

Team of Innovators

The team behind the successful implementation of the project was:

Name of Department	Name of the Employee	Role	Responsibility in the Organization
Engineering	Mr. Jayant Joshi		General Manager
Electrical Engineering	Mr. Chandrakant Choudhary	Management Representative	Assistant Manager
Electrical Engineering	Mr. U.R. Deshmukh		Manager Electrical
Mechanical Engineering	Mr. Akhil Jain		Manager Mechanical
General Store	Mr. Dhirendra Mishra	Energy Management Team member	Deputy Manager
SCM	Mr. Nishikant Shastri	Energy Management Team member	Manager
Mechanical Engineering	Mr. Rakesh Upadhyay	Energy Management Team member	Assistant Manager
Instrumentation Engineering	Mr. Ashish Sharma	Energy Management Team member	Executive
CPP	Mr. Abhijit Pattanayak	Energy Management Team member	Assistant Manager
P.V Spinning	Mr. Ambanna Kore	Energy Management Team member	Deputy Manager
Worsted Spinning	Mr. Ratanlal Verma	Energy Management Team member	Deputy Manager
Re combing	Mr. Sanjay Ekhar	Energy Management Team member	Executive
Grey. Combing	Mr. Himojyoti Nandi	Energy Management Team member	Manager
Dyeing	Mr. Manish Tiwari	Energy Management Team member	Executive
Finishing	Mr. Pinaki Hazra	Energy Management Team member	Deputy Manager
Weaving	Mr. Asit Adak	Energy Management Team member	Manager
Commercial	Mr. Vinod Mokashi	Energy Management Team member	Executive

Mr. Vinod Padmanabhan
Director (Works)
Raymond Limited, Chhindwara

"The implementation of ISO 50001 has resulted in overall awareness among all stakeholders and departmental heads. It has also given us a systematic and practical approach for analyzing the gaps and improvement areas which has resulted in energy efficiency improvement. This resulted in significant improvement of the energy performance level from an initial energy baseline. Individual process has now energy efficiency targets and objectives are being reviewed regularly."

"Saving energy not only saves money but also saves our limited and valuable natural resources".

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