case study

ENERGY MANAGEMENT SYSTEM (EnMS)

JOHNSON MATTHEY SOUTH AFRICA

Automotive component suppliers

September 2013

BACKGROUND

Johnson Matthey, a British company established in 1817, is a global manufacturer of automotive components, specifically autocatalysts. The South African operation began in 1953 and since 1992 Johnson Matthey South Africa (JMSA) has been manufacturing catalysts at its Germiston (Gauteng) plant, supplying several local "canners" who fit the catalyst into the catalytic converter system for export to the motor vehicle assemblers.

In response to the increase in energy costs, JMSA Germiston signed up with the IEE Project in 2012 as a candidate plant for the implementation of an ISO 50001-based energy management system. The plant holds management system certification for ISO 9001/TS16949, ISO 14001 and OHSAS 18001 and adopted the ISO 50001 approach as an integration and extension.

IMPLEMENTATION OF AN ENERGY MANAGEMENT SYSTEM

An IEE Project energy consultant facilitated a systems review and conducted an ISO 50001 initial audit. The expert then assisted JMSA to develop and implement an energy management system (EnMS) and energy efficiency measures were systematically implemented in both production and utilities.

Existing structures, such as policies, procedures and sustainability reporting, were expanded to include energy specific requirements.

An energy team was appointed, under the chairmanship of the Engineering (Energy) Manager which met weekly to identify, co-ordinate and implement energy performance improvements. Two members of the energy team attended the IEE Project's advanced EnMS training and further training is planned for additional energy team members and energy management system auditors.

Key findings	
Total number of projects	Four large and various small Kaizen projects
Monetary savings	
Total savings	**R7,728,569**
Four main projects	*R4,540,098*
Balance	*R3,188,470*
Energy savings	
Total savings	**9,425,084 kWh**
Large projects	*5,469,998 kWh*
Balance	*3,888,379 kWh*
Total investment made	**R620,000**
Payback time period	**1 month**
GHG emission reduction	**9,020 tonnes of CO_2**

HIGHLIGHTS OF INTERVENTIONS

Four main projects were identified as potentially large energy savers. Three of these, namely the air compressors, chillers and mixing vessels, could be implemented immediately with nominal or no investment required.

The fourth project was the optimisation of the ovens, which was implemented as phase two, during the December shut-down period.

These four projects resulted in approximately R4.5 million of the R7.7 million in savings. The balance was realised through behaviour changes and a process of continuous improvement (Kaizen projects). A summary of the interventions and savings realised is outlined in the table below.

Summary of all interventions

System	Intervention	Capital Cost ZAR	Energy saving	Savings ZAR (Average of R0.82/kWh)
Compressors	Reduce waste – repaired leaks, increased awareness and optimal usage of the **equipment**	Zero	1,072,163 kWh	R879,174
Chillers		R20,000	933,973 kWh	R765,858
Production mixing vessels	Identified areas of waste – vessels left running when production lines were stopped. Introduced a lockout system.	Zero	2,180,862 kWh	R1,788,307
Oven Optimisation	• Shutdown 3 De-humidifier units by re-routing the air • Re-circulation ratio increased to ~50%-60% • All fan cowlings were cooled and insulation was replaced	R600,000	1,283,000 kWh year on year despite a 9.73% increase in running time	R1,065,000
Other projects and factors	Behaviour changes e.g. switching equipment off when not in use) Focus on production efficiencies Kaizen projects	Zero	3,888,379 kWh	3,188,470

CHALLENGES AND LESSONS LEARNED

- **Behavioural changes** – various communication and suggestion campaigns were run and the energy awareness increased. It is critical to ensure that energy influencers understand the energy impacts of their work and actions.
- **Measurement / metering** – it is important to have sufficient metering, and to ensure sub meters on significant energy users to allow for accurate measurement and better inform future implementation.
- **Selection of correct energy team members** – selecting the correct individuals and representation of all the relevant sections of the plant is critical to drive and EnMS. It is advisable to be willing to make changes where necessary and to ensure significant involvement by production personnel.
- **Knowledge and awareness** – this process showed the critical nature of becoming aware of the potential for energy savings and how to realise them effectively.
- **Attitude is of paramount importance.**

If you don't know about potential savings opportunities, you won't look for them and if you don't look for savings you won't find them.

If you don't care, the savings won't happen – it's all about attitude. Awareness and knowledge are key, and attitude is king.