INDUSTRIAL ENERGY EFFICIENCY IMPROVEMENT PROJECT IN SOUTH AFRICA

case study

ENERGY MANAGEMENT SYSTEMS (EnMS)

Zimco Aluminium Company (ZIMALCO)

A division of the Zimco Group (Pty) Ltd

Metallurgical – EnMS Expert level candidate plant 2015

BACKGROUND

Zimalco is the largest manufacturer of secondary aluminium products in sub-Saharan Africa. Specialising in the production of aluminium foundry alloys, powders and deoxidants, Zimalco is also South Africa's only manufacturer of primary aluminium-based master alloys, hardeners and grain refiners. The Zimalco plant has a capacity in excess of 30 000 ton per year and employs more than 160 people. Raw materials are obtained from many of the South African aluminium converters, scrap metal recyclers and when required from the primary aluminium smelters.

The EnMS implementation approach has been recognised as a way to systematically improve energy efficiency. ECOBAT, the holding company, issued a directive to all Zimco Group companies that all sites should implement EnMS as per international standard.

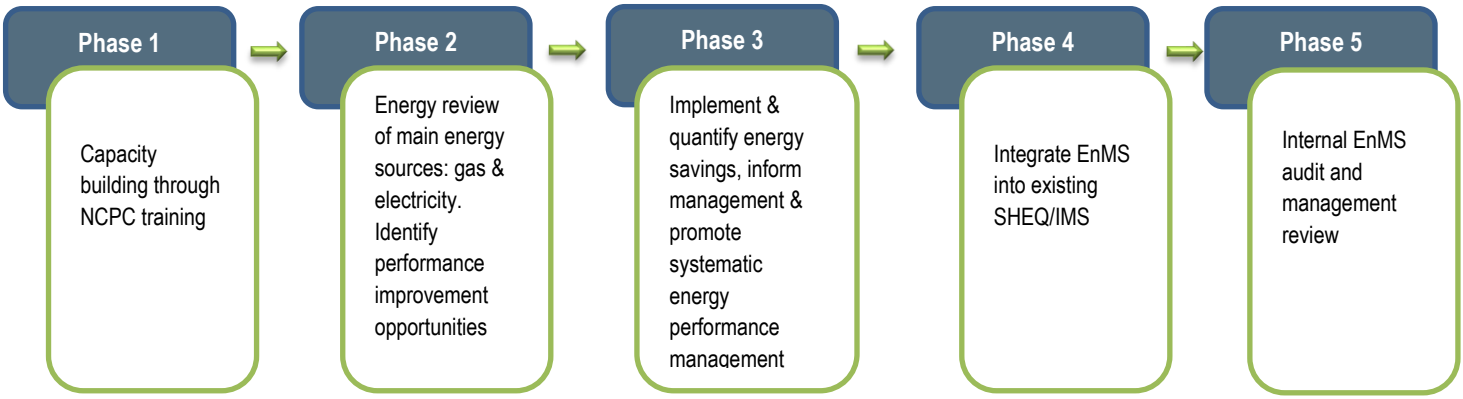
IEE Project capacity building programme

In response to this, the Group SHEQ Manager contacted the NCPC to enrol in the Industrial Energy Efficiency (IEE) Project's EnMS programme. The Zimalco Engineering Manager and Electrical Foreman attended the in-house two-day end user training presented by the NCPC in March 2015. The value of the systematic approach was immediately realised and further training arranged. The Engineering Manager, Electrical Foreman and Technical Manager progressed to the EnMS Expert programme which commenced in May 2015, using the Zimalco plant as one of the four candidate plants. The attendance of the training and participation in these programmes significantly influenced the Zimalco IEE initiatives, enabling a complete EnMS to be integrated with the existing SHEQ Integrated Management System (IMS) within five months.

KEY FINDINGS

During 2015, three projects were undertaken on Furnace no. 12, resulting in a total energy saving over six months of 1 479 444 kWh, valued at R 501 000. With a total investment of R335 000, the estimated average payback period was less than a year. A reduction of 299 tonnes CO_2 was achieved.

IMPLEMENTATION OF AN ENERGY MANAGEMENT SYSTEM



IMPLEMENTATION CHALLENGES

- **Credibility of Energy Management**: Once the energy performance was quantified to validate the savings, initial caution to accept the potential savings was overcome. Improvement targets were achieved and exceeded and new ones set to support continual improvement.
- **Energy Team:** A critical success factor was that the Energy Team included members with technical knowledge and understanding of the plant and its energy usage.
- **Data Management:** No formalised way to measure savings existed. Sub-metering has been in place for some time, but there was no systematic way to analyse the data to compare actual to expected consumption. The use of the IEE EnMS Tool provided as part of the NCPC training was of great assistance.

SUMMARY OF INTERVENTIONS

Resource	Carrier	Intervention	Utility saving (Units) Period	Investment (ZAR)	Savings (ZAR/yr)	Payback (Yrs)	Period	GHG Emission Reduction (Kg CO_2/ year)
Reverbratory Furnace No. 12 Retrofit	Gas	Retrofit burners and modify capacity of No 12 Reverbartory furnace from 5 ton to 12 ton	5326GJ – from July to Dec 2015 calculated as savings against expected consumption using the 2014 baseline regression. ***Reference*** No 12 Furnace Regress & EnPIsTab: Zimalco EnMS Data for Case Study 2016-02-11	R 335 000 ***Reference*** CAPEX Tab: Zimalco EnMS Data for Case Study 2016-02-11	R501 442 Using average cost of R94.15/GJ for Sasol Gas ***Reference*** No 12 Furnace Regress & EnPIsTab: Zimalco EnMS Data for Case Study 2016-02-11	< 1 year	6 months: July 2015 to Dec 2015	299 tons* for six months 598 tons/year- * CO2 Conversion Factor for Natural gas used 0.0561 ton CO2e per GJ ***Reference***: The GEF / IPCC Index applied for IEEP Phase II
Dross heat recovery	Gas	Pre-heating of sows ***Reference*** Dross Sow Heat Recovery Tab: Zimalco EnMS Data for Case Study 2016-02-11						
Behavioural changes and operational control improvement	Gas	Training and awareness understanding – for example keeping furnace doors closed, response poor operational control						

LESSONS LEARNED

- Staff understanding of energy performance improvement concepts and 'energy language' is key.
- Buy in and understanding of energy performance and saving by reporting factual data that supports success reporting.
- Back up staff training with technology to promote behavioural changes, for example the implementation of sound incident logging that highlights efficiency deviations to which supervisors can respond.
- Correct composition of the Energy team.

UNIDO Enquiries NCPC NATIONAL CLEANER PRODUCTION CENTRE SOUTH AFRICA

For more information about the training workshops and participation opportunities:
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For more information about partnership opportunities: www.unido.org • Tel.: 012 394 1567 (Pretoria)