UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Industrial Energy Efficiency Project

While enjoying the beauty and utility of the many concrete buildings and road structures around us, we often do not give much thought to the steel supports within infrastructure that hold everything together. Hundreds of meters of steel reinforcing bar or rebar are needed to construct even the most modest pedestrian overpass or office building, and much more for massive infrastructure projects like malls and causeways. None of this urban development would be possible without steel rebar.

Steel Asia Manufacturing Corporation (SAMC) in Batangas, Philippines manufactures large amounts of this vital resource in different sizes and in different grades. The company manufactures its various steel rebar products through a highly efficient straight line automated rolling mill operation. Along with the three other plants in the Philippines, the company boasts of annual production in excess of 1 million metric tons of reinforcing steel bars.

Steel Asia Case Study

Overview:

Product: Steel bars

Web: www.steelasia.com

Number of employees: 1,000

Production capacity: 2 megaton

Leveraging existing knowledge

Steel Asia Calaca Works received a jump start to the Energy Management System implementation as UNIDO had already trained an EnMS expert from another Steel Asia plant. Leveraging on the experience of the SAMC plant in Bulacan with the UNIDO Industrial Energy Efficiency (IEE) project, Steel Asia Calaca Works was in a good position to overcome the existing barriers and successfully implement an EnMS. An energy team was quickly formed in order to tackle the required tasks and assess the energy situation of the plant for a better understanding of their energy costs and usage.

The energy planning process was driven by data obtained from the factory, which led to the identification of Significant Energy Users (SEUs). The company categorized the different users according to the two main departments; the melt shop and the rolling mill. Relying on the experience of their sister company in Bulacan, Steel Asia took a step-by-step approach and focused on these two departments to carry out the EnMS.

The company was already very familiar with management systems, with certification to OSHAS 18001 Management System and ISO 9001 Quality Management System. This strong existing platform facilitated the plant's engagement with UNIDO in the implementation of a structured EnMS into the existing management systems structure.

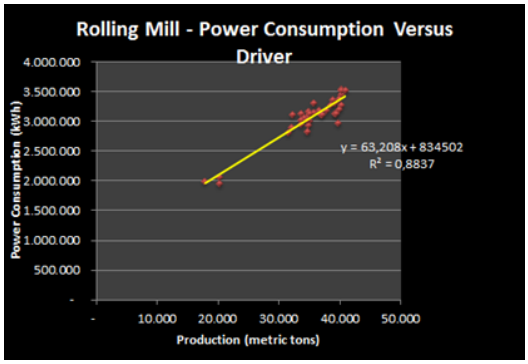
Significant Energy Users (SEU)

Steel Asia has a Distributed Control System with various meters that enabled the smooth realization of the EnMS planning activities. Within the two selected departments, the company initially focused on three main intervention areas, namely:

- Melt shop Electric Arc Furnace (EAF)
- Rolling mill motors
- Furnaces

Energy Performance Indicators

In the past, Steel Asia used kilowatt-hours/ton (kWh/ton) and litre/ton as indicators to monitor the performance of their SEUs; the additional analysis introduced by the IEE project international and national experts was a new concept and played an important role in managing their energy usage. The analysis of the collected energy data included both linear and multivariate regression analysis and provided detailed insights into the performance of the SEUs within the plant.



For example, an odd correlation was noticed in December every year (highlighted in Figure 1 by the arrow), where production dropped sharply due to maintenance closures. This observation led to the development of prediction models to envisage the amount of energy that should be used for the SEUs using CUSUM analysis.

Energy saving opportunities

The primary aim of the company was to gain a better understanding of their energy usage and management and reduce the overall energy consumption.

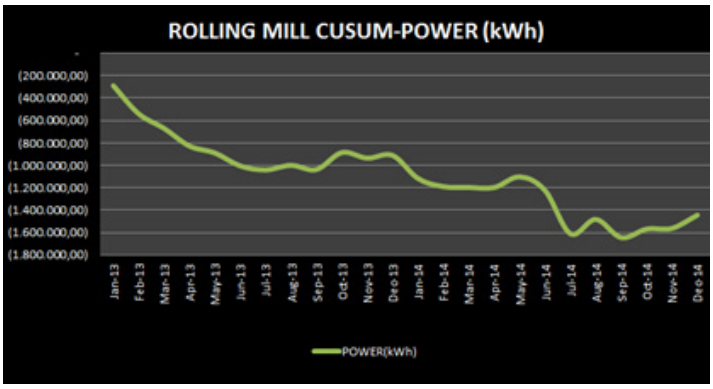
To this end, a number of no-cost and low-cost projects were implemented. For instance, changes to the operational control of the Direct Hot Charge contributed to the reduction of energy consumption onsite and improved production efficiency. Other projects which were carried out included:

- Turning down of the motor when the mill line stoppage reached the duration target
- Maintaining the billet gap to a maximum of 10 seconds
- Optimization of jet burner usage
- Replacement of lighting with high efficiency LEDs

Additional projects for further improvements in energy consumption have been scheduled for 2016. These include:

- Rehabilitation of the Dust Collecting System
- Utilization of exhaust gas for bunker oil preheating
- Provision of onsite gaseous oxygen supply

To monitor energy performance, the results of the implemented projects were presented in graphs to enable management and personnel to better understand the improvements achieved (see below):



Barriers to implementing EnMS

Initially, management support was difficult to obtain due to time constraints and other competing demands placed upon the management team. This barrier was partially overcome through the continued diligence of the team to implement the EnMS program and improved monitoring and reporting mechanisms that better conveyed the potential savings to management.

Sustainable EnMS implementation

Despite some shifts with the energy management team, the energy team remained committed to the project and the implementation of the EnMS. Successful implementation requires a combination of diligence, training and a committed management. In the case of SAMC Calaca, this approach has enabled the energy team to maintain their focus on no-cost and low-cost improvements to reduce energy consumption.

For more information:

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