Energy Management System (EnMS)

Case Study: Petrochemicals Sector

GEF/UNIDO Industrial Energy Efficiency Project, EGYPT (2014)

SIDI KERIR PETROCHEMICALS COMPANY - SIDPEC

About the Company

SIDPEC is an Egyptian joint stock company established in November 1997 under Egyptian investment law. SIDPEC utilizes the latest technologies to produce Ethylene, Polyethylene, and other intermediate products. SIDPEC area is 180.3 acres located in El-Nahda territory – El Amreya - Alexandria in an industrial area.

SIDPEC, having around 1000 employees, has its continuous operation through two shifts per day in seven days per week to produce about 300,000 MTY of ethylene (Start-up July 2000), 225,000 MTY of polyethylene (Start-up October 2000), 50,000 MTY of LPG (Start-up May 2002) and 10,000 MTY of butane-1 (start-up September 2000) in addition to utilities and offsite facilities complex (Start-up January 2000).

Sidpec targets both domestic and international markets with about 50% of Sidpec production for local market and 50% for export.

The Business Case for Energy Management

SIDPEC staff members were motivated to implement an EnMS at their facility by the clear benefits realized from previous management systems (e.g. ISO 14001and ISO 9001) and other techniques and tools for process improvement (e.g. Lean Six Sigma). Under a pressuring energy situation in Egypt with rising energy costs and insecurity in supply, it was clear to the company's top management that a serious commitment to improving their energy performance to reduce its overall costs is the way forward. The company was assured that the economic and technically sound approach is to tackle the issue through energy efficiency improvement following a systemized approach. Thus, concrete steps have been taken to adopt an EnMS that is compliant with ISO 50001.

EnMS Objectives

SIDPEC assigned its EnMS objectives based on a corporate level as nearly impossible to achieve without consistently working outside of a comfort zone and displaying corporate commitment and confidence. In this context, SIDPEC assigned the following long-term objectives to be achieved by the end of 2018:

- Reduce Electrical Consumption by 10 %
- Reduce Imported Fuel Gas Consumption by 10 %
- Energy Awareness Training of 80 % of personnel

CASE STUDY SNAPSHOT

Industry:	Petrochemicals
Location:	Alexandria, Egypt
Total Implementation Cost	2,600,000 EGP
EnMS Scope:	Electricity & Fuel Gas
Annual Energy Savings:	40,000 MWh (est.)
Financial Savings:	8,300,000 EGP
GHG Reduction:	>53,000 tCO2eq
Overall Payback:	4 months
Objectives Period:	3 years
Time to Implement EnMS:	1 year

Energy Management System (EnMS)

Case Study: Petrochemicals Sector

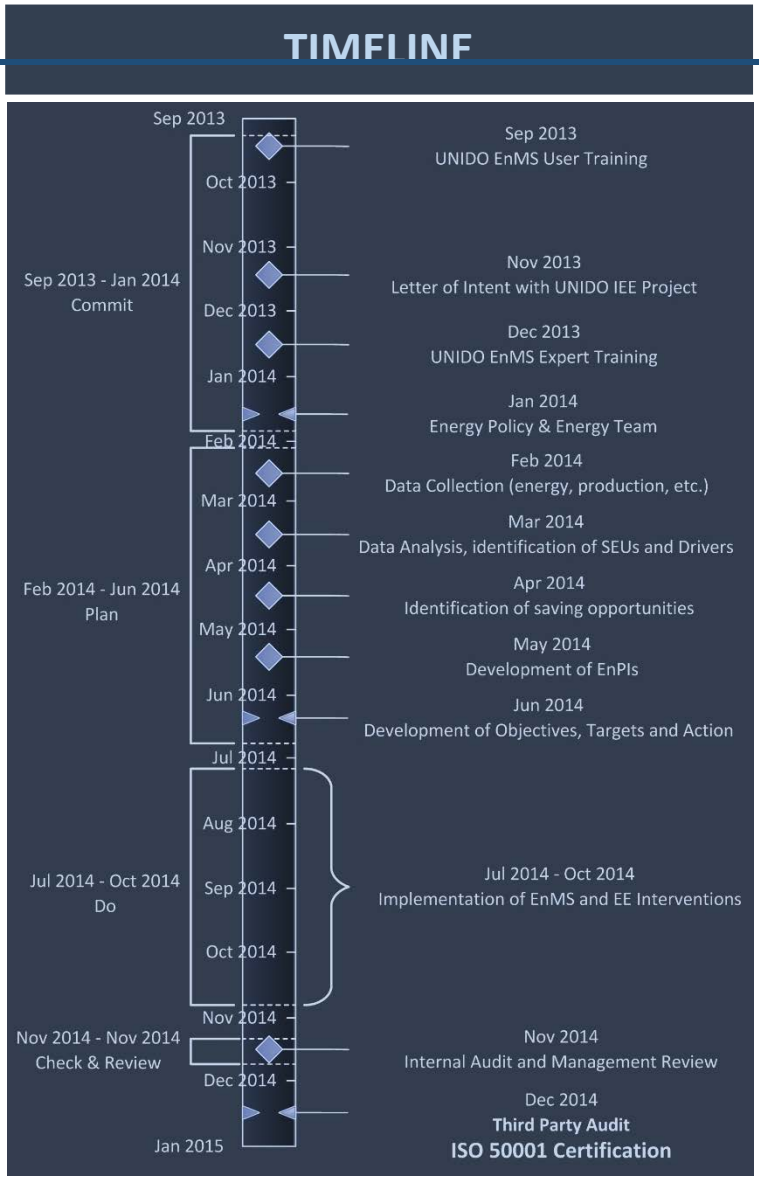
GEF/UNIDO Industrial Energy Efficiency Project, EGYPT (2014)

EnMS Implementation Benefits

SIDPEC staff were engaged in a one year process to implement an EnMS compliant with ISO 50001 starting with securing management commitment until third party auditing and certification.

The EnMS system had added benefits to the Company due to the following:

- Management became committed to introduction of the EnMS system in their company and allocated resources for implementation of system in terms of manpower, purchase of energy meters, training etc.
- The energy team that was formulated allowed for orderly planning and application of the EnMS. Definition of the roles and responsibilities of the team encouraged timely and effective collection and analysis of baseline data.
- Definition of the opportunity lists encouraged formulation of teams to identify EnMS action plans based on their specific expertise.
- The training that was provided by UNIDO to selected members of the energy team lead to better appreciation of the EnMS process and deepened their understanding of the process.
- Sidpec management appreciates that no cost/low cost measures can reduce energy rather than having only medium to high cost investments.
- Raising awareness and training all levels of employees in the factory to energy management and efficiency is planned and appreciated. This will lead to sustainable energy management as calibre is being built inside the factory.



Other benefits gained from EnMS implementation include:

- Elimination of the barriers between the production plants staff (Ethylene , Polyethylene, and Utilities) as a result of the cross-functional team building.
- Identify the areas that have surplus of utilities, such as plant air and Nitrogen, against the other areas that can use that surplus instead of producing more utilities.

Energy Management System (EnMS)

Case Study: Petrochemicals Sector

GEF/UNIDO Industrial Energy Efficiency Project, EGYPT (2014)

Saving Opportunities Achieved

Measure	Savings MWh	Savings EGP	Investment EGP	Payback Month
Excessive air utilization	1,700	850,000	0	immediate
HS vents waste optimization	24,000	4,000,000	0	immediate
Optimization of Nitrogen Unit	2,300	1,150,000	0	immediate
Rationalization of Extruder energy consumption	2,000	1,000,000	0	immediate
Minimizing steam leakages	9,000	1,000,000	130,000	<2
Reduce Electricity Consumption of Cooling Towers	600	30,000	50,000	20
Totals	**39,600**	**8,030,000**	**180,000**	**<1 mons**

Notes:

- Savings and Investments are should be fully achieved by EOY 2016

Excessive Air Utilization: Excessive air from the utility plant was observed. A project was completed which re-directs this excessive air from the utility plant to the Ethylene cracking heaters decreasing the operating hours of decoking compressor.

HS Vents Waste Optimization: Operation conditions for main HS network were closely monitored. By adjusting the operation conditions, steam waste was prevented from the ethylene boiler vent.

Optimization of Nitrogen Unit: Excessive Nitrogen from Polyethylene Nitrogen Unit was observed. A project is in-progress which based on using the surplus of Nitrogen of Polyethylene plant in the Ethylene plant instead of that produced by the smaller Nitrogen unit located in the Ethylene plan. The preliminary result indicates that my lead to decrease the operating hours of the smaller Nitrogen unit at least 60% of the current situation.

Rationalization of Extruder energy consumption: Applying Six Sigma methodology for improving the operational parameters of the extruders in Polyethylene plant that was investigated to decrease the electricity consumption of the extruder main motor.

Minimizing Steam Leakages: Minimizing Steam leakages especially those from steam traps was addressed. A study started to replace the existing type of steam traps in Polyethylene plant by a new one which is more reliable and less exposed for deterioration. Once this is achieved, the new type will be used in other plants.

Reduce Electricity Consumption of Cooling Towers: Reducing the electricity consumption of cooling water circulation pumps was targeted. A plan for installing some smaller pumps from existing inventory was set in the next turnaround in addition to adjusting some operating parameters.

Energy Management System (EnMS)

Case Study: Petrochemicals Sector

GEF/UNIDO Industrial Energy Efficiency Project, EGYPT (2014)

Barriers

Although the implementation of EnMS at SIDPEC was, smooth due to the strong management commitment. The company's energy team has faced some challenges and barriers along the way. Barriers faced during implementation of the EnMS were mainly related to:

- Resistance to change
- Motivation as it was believed that there are low monetary benefits from EnMS when compared to company annual profit

These were overcome through:

- Conducting awareness sessions
- Linking the EnMS with the environmental performance and sustainabilty requirements
- Linking the EnMS with the continuous improvement activities already achieved by Lean Six Sigma methodology

"Lorem ipsum dolor sit amet, corpora percipit mediocrem no eam, pro everti tincidunt"

Company Staff

Lessons Learned

The implementation of the EnMS in SIDPEC has proven to both easy and cost effective giving a strong management commitment and the availability of adequate technical resources. No/Low cost measures have proven to be as strong tool in convincing all company staff of the potential benefits that could be achieved if a commitment to continuous improvement becomes an integrated part of the company's culture and day-to-day behavior.

UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

gef
GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

EOS

مركز تحديث الصناعة
INDUSTRIAL MODERNISATION CENTRE

IDA
Industrial Development Authority
الهيئة العامة للتنمية الصناعية

اتحاد الصناعات المصرية
FEDERATION OF EGYPTIAN INDUSTRIES