Industrial Energy Efficiency Project
Islamic Republic of Iran

Kermanshah Petrochemical Industries Co. (KPIC) has joined hands with the United Nations Industrial Development Organization (UNIDO) and Iranian Fuel Conservation Company (IFCO) to implement a structured approach to energy management in their operations, under the Global Environment Facility (GEF) funded project, "Industrial Energy Efficiency in Key Sectors".

Through this cooperation, the KPIC has already achieved significant savings through the implementation of an Energy Management System (EnMS) in alignment with ISO 50001:2011.

A Case Study of Kermanshah Petrochemical Industries Co.

EnMS background in KPIC

Before starting EnMS in KPIC, although they have done some activities for energy conservation, there was no systematic approach on this issue.

In fact, the main problem was that there was no proper structure and communication between the energy department and main effective users. After implementing EnMS, the level of communication between key personnel have been improved and energy analysis becomes a day to day practice.

UNIDO program and development of the methodology within KPIC

UNIDO's developed methodology within KPIC consists of the below steps:

- Management commitment
- Planning
- Implementing
- Checking

Kermanshah ammonia and urea producing complex has been founded to provide chemical fertilizers. The complex with the total area of 295 hectares including 62 hectares industrial zone and 114 hectares green space, is located in Kermanshah city, in the western part of Iran. The Ammonia unit is designed to produce 1200 tons per day of Ammonia and is based on the low energy natural gas reforming process licensed by the M. W. Kellogg company.

About 1132 tons per day of the ammonia product is sent as feed at approximately 37.5°C to the urea unit and the rest of it is sent to the offsite ammonia storage tank.

KPIC is certified based on ISO 9001, ISO 14001 and OHSAS 18001. The company has also achieved EnMS certificate based on ISO 50001 after joining to UNIDO's program.

Establishing a baseline for energy saving targets

According to the analysis, the following energy model has been developed for the whole complex:

Total Energy Demand (GJ/month) = 29.8 monthly Urea product – 16.21 monthly Ammonia product + 79.4 HDD + 220686.64

After brain storming of the factors which can affect the energy demand, it has been understood changes in below three factors make significant variation on energy consumption:
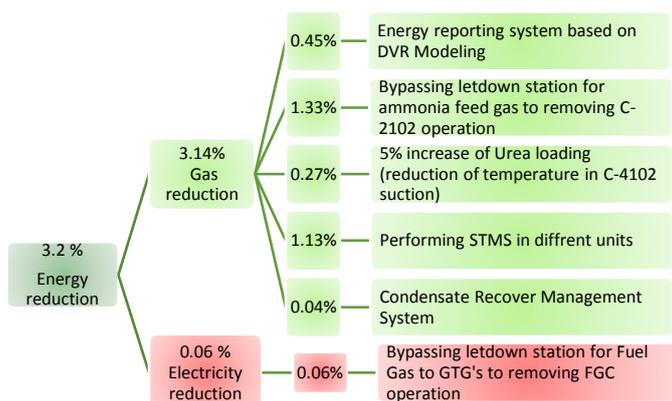
- Urea production volume;
- Ammonia production volume;
- Heating degree days.

Identification of conservation opportunities and implementing action plans

During implementation of EnMS, six energy conservation opportunities have identified and most of them were implemented at plant.

In the blow graph, the bottom-up approach which is used to define energy objective is illustrated. In the bottom-up approach the idea consists of the below steps:

- Identifying significant energy users;
- Defining energy baselines;
- Identifying ECOs (energy conservation opportunities);
- Setting energy targets;
- Aggregating total savings of energy targets and defining energy objective.

3.2 % Energy reduction	3.14% Gas reduction	0.45% — Energy reporting system based on DVR Modeling
		1.33% — Bypassing letdown station for ammonia feed gas to removing C-2102 operation
		0.27% — 5% increase of Urea loading (reduction of temperature in C-4102 suction)
		1.13% — Performing STMS in diffrent units
		0.04% — Condensate Recover Management System
	0.06 % Electricity reduction	0.06% — Bypassing letdown station for Fuel Gas to GTG's to removing FGC operation

Pictures corresponding to two set of implemented project (installation of CO_2 recovery unit and steam trap management system) are represented below.

Main achievements

- Changing the culture of operation;
- Raising personnel awareness;
- Implementing new systematic approach in energy management;
- Preparing KPIC for ISO 50001 certificate;
- Achieving 3.2% energy consumption reduction by implementing identified ECOs;
- Training energy team members;
- Improving plant operation due to proper maintenance linked to EnMS.

For more information

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