

# 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

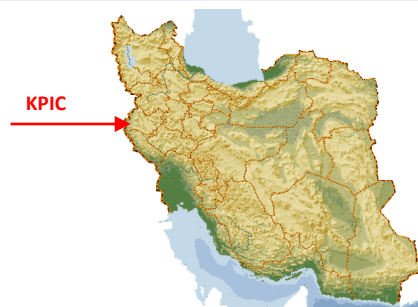
Before starting EnMS in KPIC although they done some activities for energy conservation, there was no systematic approach to this issue. In fact, the main problem was that there was no proper structure and communication between the energy department and main affective users. After implementing EnMS, the level of communication between key personnel have been improved and energy analysis become a day to day function.



#### 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 manufacturing 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, 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 with the balance of 68 tons per day being sent, at -35°C, to the offsite Ammonia storage tank.

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

## Establishing a baseline for energy saving targets

According to 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 the factors which can affect the energy demand, changes in three factors shows significant relation to variate the energy demand which are as following:

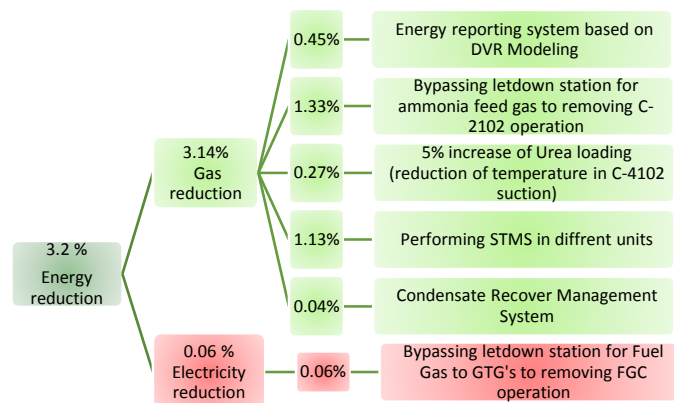
- Urea production volume;
- Ammonia production volume;
- Heating degree days.

## Identification of conservation opportunities and implementing action plans

During implementation of EnMS, six energy conservation opportunities identified and most of them implemented within the plant.

In the blow graph the bottom-up approach which is used to define energy objective is shown. In the bottom-up approach the idea consist the below steps:

- Identification of significant energy users;
- Defining energy baseline;
- Identification of energy conservation opportunities (ECOs);
- Defining energy targets;
- Aggregating total savings for whole targets and defining energy objective.



In the below, photos from installation of CO<sub>2</sub> recovery unit and steam trap management system (STMS) which were implemented during the project are shown.



## Main achievements

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

## For more information

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