



Implementation of Energy Management System

Case Study: “Bekabacement” JSC

About Company

‘Bekabacement’ JSC, established in 1926, is one of the oldest cement producers in Uzbekistan. Current annual production capacity is over 1.5 million tons of cement.

In 2016, the production indicators were noticeably improved. The company produced more than 1100 000 tons of cement only through dry process and created 180 additional jobs.

‘Bekabacement’ JSC is a progressive company that is focused on continual improvement. The plant is taking steps to improve energy efficiency including replacing obsolete and energy intensive equipment with modern equipment.

From June 2016 to March 2017, the company participated in a pilot program of the World Bank to introduce an energy management system (EnMS). At the end of the program, it was successfully certified to ISO 50001.

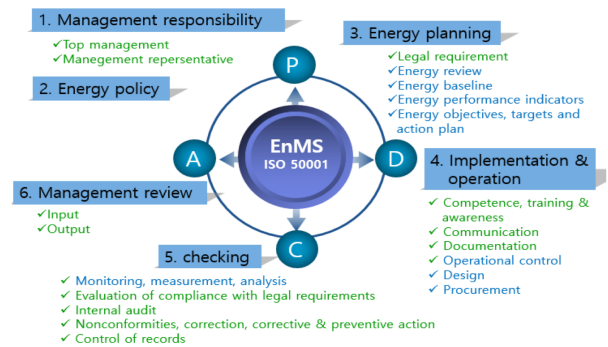
The Business Case for Energy Management

The management at ‘Bekabacement’ JSC have prioritized increased energy efficiency, rational use of

energy, and increased energy savings through continuous improvement of production processes. In order to achieve these tasks more efficiently the company decided to create and implement an EnMS in accordance with the requirements of the ISO 50001 standard. In addition, within the framework of the Presidential Decree No. PP-2343 of 05.05.2015, energy-intensive enterprises of Uzbekistan, including ‘Bekabacement’ JSC, are obliged to ensure the fulfillment of target parameters for reducing the energy intensity of production and implement the EnMS in accordance with ISO 50001 by 2019.

EnMS Implementation

The process of implementing EnMS at ‘Bekabacement’ JSC was carried out in accordance with the requirements of ISO 50001, which requires the fulfilment of activities divided into four stages - PLAN-DO-CHECK-ACT.



The EnMS scope of ‘Bekabacement’ JSC includes two types of energy resources - electricity and natural gas, and is aimed at increasing the energy efficiency of the enterprise associated with the production of clinker, cement and other building materials.

Within 10 months the following tasks were gradually accomplished at the enterprise:

- Management commitment - appointment of management representative and energy management team, defining roles and responsibilities, defining scope and boundaries, publishing and communication of EnMS policy, set objectives, etc.;

CASE STUDY SNAPSHOT	
Industry	Cement
Location	Bekabad city, Uzbekistan
EnMS Scope	Electricity, Natural Gas
Cost of Implementation	UZS389,391,775
Energy Savings	Electricity 2,634,245 kWh, Natural gas 1,905,323 m3
Financial Savings	UZS1,162,419,878
Time of Implementation	10 months

Energy Analysis

- **Plan** – identify significant energy users (SEUs) and variables affecting energy consumption, review past and present energy consumption, identify and prioritize opportunities for improved energy performance, develop baselines and energy performance indicators (EnPIs), develop targets and action plans;

- **Do (Implementation and Operation)** – implement action plans to generate energy savings, review competence and awareness of key staff, implement document control procedures, improve operational control and maintenance;

- **Check and Act** - review energy performance, effectiveness of action plans in achieving targets, review compliance with legal requirements, implement internal audit and address non-conformities raised and carry out management review.

Activities	Trainings provided	Target Date	Actual Date
Management Commitment and Plan	Jun - 16	Aug - 16	Nov - Dec - 16
Do	Aug - 16	Nov - 16	Jan - Feb - 17
Check and Act	Nov - 16	Mar - 17	Mar - 17
Certification	n/a	n/a	Apr - 17

The overall goal of energy analysis was to assess the efficiency of energy consumption, as well as to reduce costs and implement energy-efficient measures by developing an action plan aimed to improve overall energy performance. The energy analysis was carried out on a monthly basis and reported to the top management.

The following activities were conducted as part of the Energy Analysis:

1. Analysis of past and present energy consumption on the site.
2. Identification of significant energy users (SEUs).
3. Determination of factors affecting energy consumption.
4. Review the past and present energy consumption of the SEUs and assess future energy consumption.
5. Identification and prioritization of opportunities to improve energy efficiency.
6. Development of baselines for SEUs and each significant source of energy.
7. Development of energy performance indicators (EPIs) for comparison of current energy consumption with the baseline.
8. The analyses are conducted electronically in the document "Energy Analysis" (Regression Analysis) of "Bekabadcement" JSC.

Shops	Measures	Electricity savings (kWh)	Natural gas savings (m3)	Financial savings (UZS)	Investments (UZS)
Raw materials shop	1. Do not allow the use of limestone fraction more than 25 mm. 2. Conduct loading and reloading of milling bodies in accordance with the schedule	674,755	-	99,830,002	-
Kiln shop	1. Eliminate the heat loss and suction of the off-gas from the rotary kiln №1,2,3 2. Control of compliance with: technological and heat engineering modes of operation of rotary kilns. 3. Timely and high-quality implementation of maintenance of rotating furnaces.	11,264	942,461	270,020,840	-
Compressor shop	1. Timely and qualitatively carry out current and overhaul repairs of compressors K250-61-5 and auxiliary equipment. 2. Strengthening of control over air pressure, reduction of excess pressure of compressed air and leaks.	1,687,779	-	249,706,903	-
Clinker production (dry method)	1. Do not allow unplanned and extraordinary situations in the production (crashes, breakdowns). 2. Replacement of the flow metering feeder of the rotary kiln 3. The adjustment of the process mode to increase the productivity of the rotary kiln	2,634,245	1,905,323	932,253,908	389,391,774.86

Opportunities and Energy Savings achieved

"Bekabacement" JSC have two cement manufacturing process types - Wet process and Dry process. The Wet process consumes a lot more gas and a little less electricity than the dry process so if you produce more using the dry process you expect electricity consumption to increase a little and gas consumption to decrease a lot.

"Bekabacement" JSC went from 50% dry process in 2016 to 68% dry process in Jan-July 2017.

Their electricity consumption - normalized for output level - fell 1.6%. All of their major processes are showing electricity savings - mining, raw mills, cement mills, kilns.

Their gas consumption - normalized for output level and external temperature - fell 26%. This is mainly due to a higher share of production going through the dry process but also due to gas savings in the wet process kilns.

The introduction of EnMS at 'Bekabacement' JSC allowed the company to efficiently and systematically manage energy consumption. The EnMS has also enabled behavioral changes, for instance energy consumption is being reviewed daily. Moreover, it helped to introduce and apply legislative, regulatory, contractual and other requirements and obligations in the daily activities of the organization.

The list of detailed measures implemented and savings achieved during the EnMS implementation period of ten months at 'Bekabacement' JSC are given in the table above.

Barriers and lessons learned

During the implementation process the energy specialists faced certain barriers as lack of management commitment, lack of necessary resources - time, motivation, laptops -, which caused delays in 'on-site' implementation compared to the initial program plan.

Lessons learned:

- conduct EnMS trainings at the premises of the company, which is believed to be more efficient. These will eliminate the limitations in the number of trainees and accessing the right people when

needed. Moreover, control of top management will be ensured and better access to the technological process will be provided;

- develop an implementation plan with detailed tasks and specific deadlines, which will ensure the timely 'on-site' implementation. Moreover, implemented tasks should be backed up by evidence. For example, signed by management or energy team and registered within the company.

Further objectives in the field of EnMS

ISO 50001 requires continues improvement in energy management. 'Bekabacement' JSC identified set of EnMS objectives to be implemented by 2020. These objectives are also included in the Presidential Decree of the Republic of Uzbekistan No. PP-2343 dated 05.05.2015, and mainly targeted to reduce energy intensity and production cost:

- step-by-step transfer kilns No. 1, 2, 3 from wet to dry process of clinker production;
- modernization of the grinding shop with the installation of a closed cement mill;
- introduction of solar collectors for the hot water supply of the "Baliklitau" quarry, installation of a tank with capacity of 400 liters;
- modernization of the component dosing system for cement grinding in cement mills No. 2,3,4,5,6, with installation of automated tape weighing devices MULTIDOS-E 1015 in the amount of 15 pcs.

Following EnMS tasks are planned to be carried out at 'Bekabacement' JSC in 2017:

Tasks	2016	2017
Reduce gas consumption by 0.5% (wet process)	221.27 kg/per ton clinker	220.17 kg/per ton clinker
Reduce electricity consumption for 1,5 kWh	110.67 kWh/per ton clinker	109.17 kWh/per ton clinker
Increase the average hourly capacity of raw mills for 0.8 ton/h	36.20 ton/h	37 ton/h
Increase the average hourly capacity of rotary kilns	28.75 ton/h	28.8 ton/h
Increase the average hourly productivity of cement mills	27.90 ton/h	27.95 ton/h
Reduce the cost of cement by 5%	124,778 UZS/ton	118,539.1 UZS/ton
Increase the production of clinker (dry process)	89.80 ton/h	104.2 ton/h



Korea
Green Growth
Trust Fund

June 2016- April 2017