

Energy management system implementation by UNIDO methodology on SMEs in the city of Naberezhnye Chelny **Magnolia, LLC**

Magnolia Casting and Mechanical plant was founded in 1989; today it employs highly qualified specialists, which enables the company to develop and implement technological processes of various levels of complexity.

Main fields of plant's production include:

- Die-casting of aluminum under high pressure;
- Machining: milling, turning, grinding, drilling;
- Automotive components production;
- Development and production of aluminum radiators;
- Production of LED lights for municipal needs;
- Sewing of tents, production of tent structures.

EnMS implementation results	
Savings in monetary terms	59 745 RUB ≈ USD 1000
Energy savings	17 589 kWh of electricity (-3%), 9 GCal of heat energy (-3%)
Reduction of GHG emissions	16,8 tons of CO2 eqv.
Investments	0 RUB

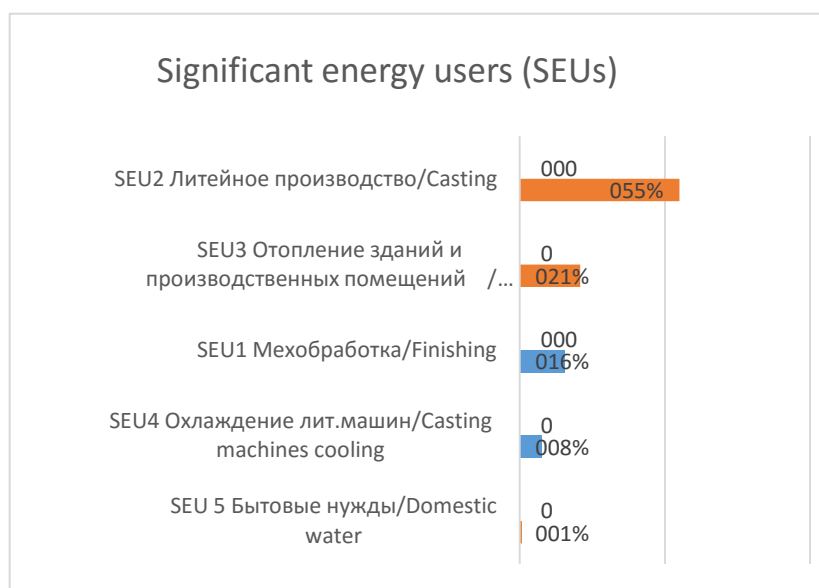
EnMS implementation and achieved results

At first, the company developed its *Energy policy*, working group of employees was formed, which was responsible for EnMS, matrix of *Roles and Responsibilities* was formulated.

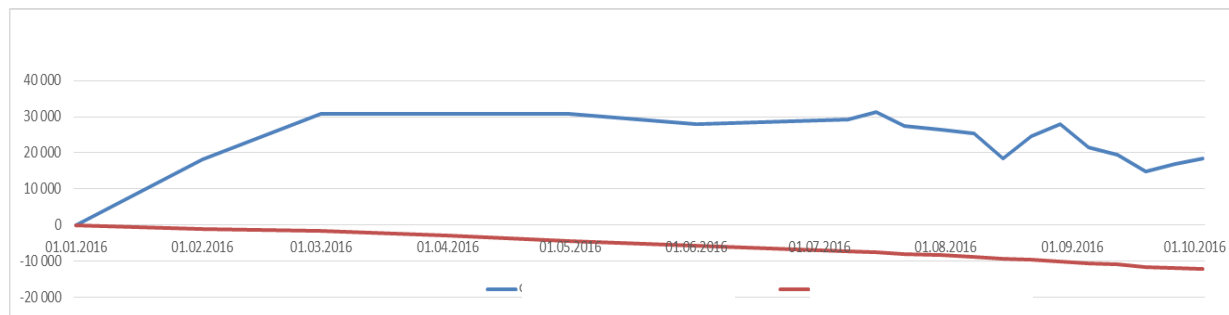
Then the *Scope and Boundaries* of the future EnMS were determined: it was decided to include heat and electricity in the EnMS. On the basis of energy consumption analysis, *Significant Energy Users* (SEUs) were identified.

Magnolia's working group on EnMS and UNIDO national experts made a decision to analyze only Casting - as a SEU accounting for biggest share of energy costs; and built energy consumption models for this SEU.

Regression models for total electricity consumption showed multifactor correlation, where significant variables are the amount of re-melted aluminum, number of aluminum casts, and hot-degree days.



Target energy consumption is built on regression model of base year with consideration of all factors (variables) affecting the production, then the goal is added (decrease in consumption in %). Planned energy saving was defined at the level of 3% against electricity use in the base year.



As the graph of planned and actual energy consumption indicates, target savings were not achieved, however, starting from April 2016, the company has been undertaking measures of operational control. Upon implementation of these actions, *total savings were 17 589 kWh of electricity and 9 GCal of heat energy.*

On the basis of established on Magnolia production practices and influence of variables on energy performance, the List of Opportunities was developed, which focused on zero-cost measures:

Description of EE improvement measure	Energy resource	Investments	Expected savings, kWh
<i>To limit melting temperature range by 50 degrees</i>	Electricity	No investments	28 800
<i>To limit warming up temperature range by 30 degrees</i>	Electricity	No investments	4 800
<i>To ensure equal workload of process equipment</i>	Electricity	No investments	

Main results of EnMS implementation programme on Magnolia:

- A working group was formed on the enterprise for EnMS implementation and maintenance;
- Significant energy users were identified, energy performance indicators (EnPIs) were identified on the basis of regression models for multifactor analysis of energy consumption;
- Monthly analysis of energy performance was established with the use of available system of commercial and technical accounting, and with the application of energy performance analysis;
- Planning for energy efficiency improvement was organized, which included identification of energy saving opportunities by means of organizational measures, operational control, and low-cost technical measures.

