



Case-study of UNIDO EnMS implementation on “Elektrostal Tyumen”



Key features

Location: Tyumen, Russia

Industry: iron and steel

Product: carbon, alloy, structural and reinforcing steel grades

Est. production capacity: 550 000 tons of rolled steel

Number of employees: 934

EnMS implementation period: 2015

Savings achieved in this period:

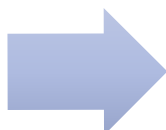
130 500 KWh of electricity, 341 000 m³ of natural gas

Established in 2013, Metallurgical plant “Elektrostal Tyumen” belongs to iron and steel industry and is engaged in production of a wide range of carbon, alloy, structural and reinforcing steel grades for construction industry, oil and gas sector enterprises and machine building. In general, produced rolled metal is supplied to domestic market: Khanty-Mansiysk and Yamal-Nenets Autonomous Districts, Tyumen, Omsk, Kurgan and Sverdlovsk regions.

The plant covers its needs in energy and water from both external and internal sources. Natural gas, electricity and drinking water are bought from third-party resource-providers. Technical water for production needs is taken directly from Tura river 5 km away from the plant. Heating and steam are generated from the plant’s own water-heating boiler, with a capacity of 33.84 GCal/h. Compressed air is supplied to energy users from the plant’s compressor station with air drying installation and production capacity of 6650 nm³/h. The plant’s oxygen station supplies energy users with oxygen, argon and nitrogen.

ACTIONS OF ELEKTROSTAL - TYUMEN TOWARDS ENERGY SAVING PRIOR TO ENMS PROJECT

- The enterprise has implemented quality management system certified by TÜV SÜD;
- It is certified by ISO 9001:2008 in the field of production and supply of continuously cast billets, hot rolled products, peeled and polished rolled products from carbon and alloyed steel grades;
- The plant has adopted programme for energy saving and EE increase for 2015-2017, which includes 13 activities financed from their own sources;
- The programme includes target indicators in physical terms for each energy source, specific indicators by type of produce and the list of energy saving measures



ENMS IMPLEMENTATION IN 2015

- EnMS working group was established;
- roles and responsibilities for EnMS were assigned to personnel;
- data collection was organized;
- multifactor regression analysis of electricity and gas consumption was applied to analyze energy performance;
- variables that affect the consumption the most were identified for significant energy users (SEUs);
- a provision regarding material incentives for energy saving has been developed;

In the framework of Energy saving and EE increase Programme for 2015-2017, and EnMS implementation project in 2015, the following results were achieved:

1. Technology-focused measures were implemented:

- ⑩ improvements in planning of electricity consumption;
- ⑩ share increase of hot charge of blanks of a heating furnace from 10% to 25%;
- ⑩ cable heating system for emergency water supply pipelines for furnaces;
- ⑩ optimization of combustion modes for hot-water boilers, setting up a cascade controller in the range of maximum efficiency;
- ⑩ modification of operating algorithm for nitrogen compressor;
- ⑩ replacement of drinking water with a technological cycle of rolling shop with installation of filters with a sufficient degree of purification.

1. Achieved savings (in comparison with planned consumption) estimated by regression analysis:

- ⑩ Electricity savings – 130 500 KWh;
- ⑩ Natural gas savings – 341 000 m³;
- ⑩ Savings in monetary terms: 1 224 000 RUB. ≈ 20 400 USD
- ⑩ (with total investments of 453 000 RUB. ≈ 7550 USD)

1. CO₂ emissions reduction (on account of energy consumption decrease) – 2 000 tons;

1. Additional benefits were achieved, such as maintenance improvements and growth of personnel's awareness in regards to energy saving;

1. The personnel, including production staff, became more involved in the questions of energy saving;

1. The amount of energy saving measures (especially those with short payback period) has increased, their implementation timeline shortened;

1. Objective factors affecting energy consumption were identified and are now being monitored in online mode.

Additionally, fan system assessment was conducted by UNIDO methodology, upon which the experts have elaborated the following activities:

- heat recovery from removed combustion products - installation of an absorption refrigeration machine, operating from heat energy of the waste gases of the rolling shop heating furnace;
- actual operating mode examination and identification of the optimal performance in various operating modes for technological equipment, followed by the installation of an automatic supply air fan and steam exhaust fans of continuous casting machines;
- additional assessment of actual parameters of separate ventilators followed by fan system optimization with VSD installment;
- optimization of scrap drying fans during commissioning works at the site "Electric arc furnace shop. Scrap drying system".

Conclusions

Example of Elektrostal Tyumen showcases that even modern enterprises with newest technologies, technological equipment, and modern technical account of resources have a potential to improve energy performance solely by low-cost organizational measures.

The enterprise continues to work on building energy management system and, especially, by facilitating relations between production subdivisions, and also by distributing roles and responsibilities among all those involved.