



ENERGY MANAGEMENT SYSTEM IMPLEMENTATION BY UNIDO METHODOLOGY BUINSKY ELEVATOR

Buinsky elevator is a part of Ak Bars Holding and provides services for grain receiving, drying, conditioning, and storage, as well as seed multiplication and its further calibration and packaging. Elevator powers for simultaneous storage of grains and seeds amount for 128.3 thousand tonnes.



In 2014 Buinsky elevator among other 4 companies of Ak Bars Holding joined the Industrial Energy Efficiency (IEE) Programme implemented by the United Nations Industrial Development Organization (UNIDO) and with financial support from the Global Environment Facility (GEF). Within the scope of the partnership with UNIDO, Buinsky has started implementing energy management system (EnMS). The EnMS was designed to be aligned with the requirements of ISO 50001 and also with the UNIDO Energy Management Capacity Building and Implementation programme.

| Energy Efficiency Improvements and Benefits | |
|---|-----------------------------|
| Energy savings | 2 310 418 kWh |
| GHG Emissions reduction | 1386 tonnes CO ₂ |
| Gross monetary savings | 1 263 275 RUB (=28 075 USD) |
| Other non-energy benefits | Increased staff awareness |
| Total investment | 265 050 RUB (=5 890 USD) |
| Internal rate of return (preferred) or Payback Period | 0.2 years |

In the framework of EnMS implementation, the responsible group of the enterprise developed energy policy, and action plans; a large amount of work has been done with identification of significant energy users (SEUs), testing variables, building models and establishing the baseline and performance indicators. In fact, the EnMS team has tested more than 80 models, before building the correct ones to measure and verify energy performance.

Achieved results

Due to the features of elevator's production site, it was decided to include **electricity, gas** and **water** in the scope of energy resources for EnMS implementation. Despite 21% increase in production output, the company managed to decrease its gas and water consumption by 65% and 20% respectively.

Overall, within a year of EnMS implementation, after identifying low- and zero-cost saving opportunities, executing them and verifying achieved results, Buinsky elevator has managed to save **109 418 kWh** of electricity and **203182 m³** of gas, which in monetary terms equals to **28075 USD**.

| Years | Electricity [t.kWh] | Gas [t.cub.m] | Water [cub.m] | Production output [ton] |
|-------|---------------------|---------------|----------------|-------------------------|
| 2012 | 3026 | 624 | 2700 | 96080 |
| 2013 | 2650 | 713 | 1936 | 78846 |
| 2014 | 2879 (+8%) | 469 (-65%) | 1556 (-20%) | 96151 (+21%) |

Energy consumption and production dynamics at Buinsky elevator

Main implemented measures

| Description of measure/project/action | Estimated/Actual (Annual) Savings | | Total Cost (Currency) | Payback (years) |
|--|--|----------------|-----------------------|-----------------|
| | Electricity [kWh], gas [m ³] | Economy [Rub.] | | |
| Synchronization drying process (burner, fan, conveyor) | 27000 kWh, 23000 m ³ | 173000 | 0 | 0 |
| Replacement of the two electric motors in a working elevator tower from 40 kW to 37 kW | 15600 kWh | 48360 | 30000 | 0.62 |
| Scheduling and automation of the drying process | 45000 kWh | 135000 | 235000 | 1.74 |
| Conduct trainings to engineers and operators of SEUs | 55000 kWh, 30000 m ³ | 285000 | 0 | 0 |

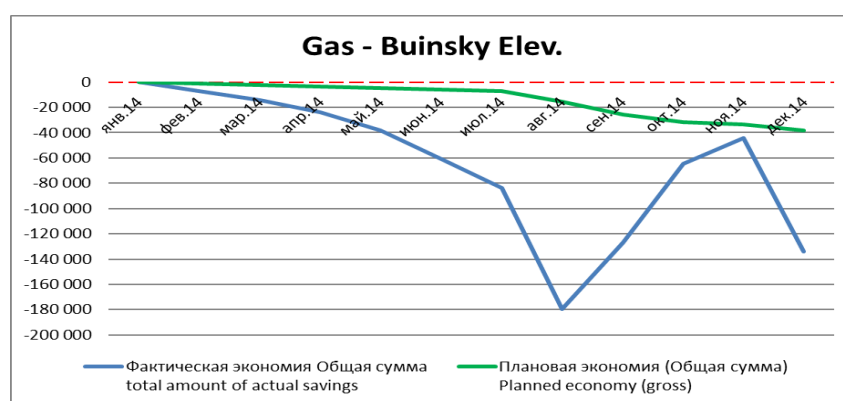
➤ Buinsky elevator uses gas and electricity for grain drying. Transporter uses electricity to supply grain to the dryer, where the fuel burner (running on gas) and the fan consume gas and electricity to dry the grain.

➤ When assessing critical operating parameters within EnMS implementation process, the EnMS

team discovered that all the processes were desynchronized: transporter, burner and fan – all used to be turned on by an operator in advance and sometimes were running idle and consuming excessive amount of energy.

➤ The team has also replaced electric transportation on dryers with ones that are less powerful, as there was some excessive power present. After the process of grain supply to transporter was synchronized and the drying process optimized, the consumption of gas and electricity has decreased considerably.

➤ Additionally, training of SEUs' operators and engineers has highly positively affected energy performance and resulted in savings.



Barriers

- Lack of commitment and involvement in the EnMS implementation process from the management side;
- High level of personnel rotation;
- Initial disproportion in distribution of roles and responsibilities within EnMS team

These barriers were successfully resolved after UNIDO national experts conducted additional meeting with the management to emphasize the importance of EnMS and to reinforce their involvement in the process of EnMS

Conclusions

In general, after participation in EnMS project, the understanding of importance of energy performance measurement has increased; adoption of the UNIDO methodological approach has simultaneously improved the reliability and productivity of energy performance models at the enterprise.

Achieved savings have demonstrated that energy saving goals can be reached without large financial investments or reducing output, but only by applying systematic approach to energy performance through constant improvements in operation and maintenance.