

Energy management system implementation by UNIDO methodology on ChelnyVodokanal LLC

ChelnyVodokanal (ChVK) is a modern complex of engineering structures in the area of water supply and wastewater of the city of Naberezhnye Chelny and its industrial zone. The enterprise is one of the leading in its sphere in Tatarstan Republic and in Russia, and performs the following functions:

- Supply of cold drinking and technical water to the population and enterprises of Naberezhnye Chelny;
- Wastewater management and treatment of domestic, industrial, sludge, and other drains;
- Design, repairs, assembling, start-up works and maintenance of equipment and utility systems.

It is a medium-sized company (more than 1500 employees), and to the moment of EnMS implementation it utilized more than 430 mln.m³ of water per year by water intake and consumed 125 775 MWh of electricity annually.

Prior to EnMS implementation by UNIDO methodology "ChelnyVodokanal" has been constantly working towards EE improvement. At the same time, the company lacked concrete system for efficiency evaluation of implemented measures and for calculating the impact of separate implemented measures. It is difficult to determine if reduction in energy consumption was caused by implemented actions or lower production volumes.



Energy management system implementation

Throughout the whole time of EnMS implementation on ChelnyVodokanal, the group of Russian and international UNIDO experts closely collaborated with the working group of ChVK specialists, responsible for EnMS implementation on the enterprise. During site visits, and remotely as well, the areas for improvement were identified, some barriers were found, which were further overcome. By the completion of trainings aligned with EnMS implementation stages, the working group of ChVK reached a high level of competence. EnMS programme was implemented with all its key elements and components.

Growth in energy volumes since August 2015 is explained by launching of new energy-intensive equipment:

- Technological process for disinfection of drinking water has changed: sodium hypochlorite station was constructed and commissioned (sodium hypochlorite is obtained by electrolysis from salt);
- Shop for mechanical dewatering of sludge in sewage treatment facilities was repaired and commissioned;
- The volume of provided services for KAMAZ (major industrial enterprise of the city) increased in 2016 as well.

Annual electricity consumption dynamics
(2011 – 2015 r.r.)

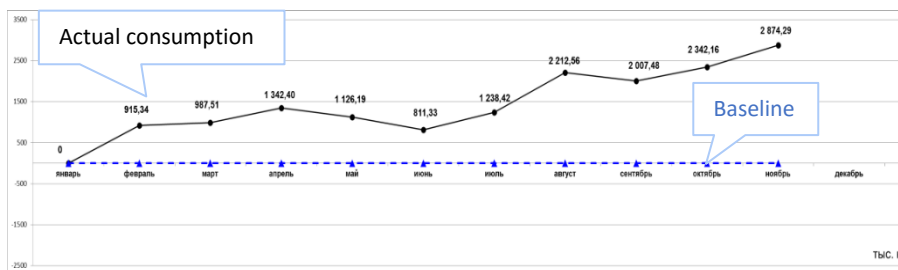


In line with UNIDO methodology, significant energy users (SEUs) for electricity were identified. More than 80% of total consumption fall onto 12 objects.

For 5 most energy-intensive SEUs Energy Performance Indicators (EnPIs) were developed, based on model of expected consumption. EnPI model for the whole enterprise in general was developed as well. EnMS working group invested a lot of efforts into troubleshooting the working models.

Achieved results

Since the company introduced two new energy-intensive processes, it didn't set the goal of reducing energy use. The objective was to stay within limits of the baseline established on 2015 data and conditions. As the graphs of actual and base consumption with cumulative difference indicate, from June to November 2016 there was a stable tendency of exceeding the baseline.



It means that additional energy consuming equipment was launched and static factors affecting the consumption have changed. This analysis of monthly energy performance indicates the potential for saving of 2.8 MW of energy in the next year by means of improvements in operational activities.



Encountered barriers to EnMS implementation

- First insignificant and subsequently resolved challenge was in the necessity to convince the management that the methodology for EE verification proposed by UNIDO is at the moment the most reliable in comparison with commonly established practice of specific indicators (kWh/production unit). In general estimation of economic results both – commonly used specific indicators and UNIDO EnPIs – can be used. But for evaluation of energy performance of the enterprise – the latter are the most acceptable. In the end, this barrier was successfully resolved.
- Important barrier that is still not fully resolved - is insufficient level of communication between subdivisions in terms of searching for saving opportunities based on low-cost organizational measures and measures of operational control. Along with search and analysis of such measures, it is necessary to establish a mechanism for their cost estimation and implementation. The management of the company should be involved in this process.
- Energy performance analysis indicates that some SEU operators are not fully aware that their daily work impacts the overall energy performance of the enterprise. To overcome this barrier, one should add into education plans the trainings on efficiency on all the production lines of the SEUs.

The case of ChelnyVodokanal shows that EnMS by UNIDO methodology makes it possible to fully verify its results in both energy and technology spheres. With EnMS implementation the company gained large potential for implementation, monitoring, analysis and verification of all organizational, technical and event technological measures. The company just needs to maintain it and keep it up-to-date.