Formation of power management strategy at the industrial enterprises

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Abstract. The article is dedicated to energy efficiency problems. The main recommendations about the development of the system of strategic power management at the industrial enterprise offered in the research include a number of the principles, aimed at the increase of the importance of human resources in information-and-analytical and innovative functions of power management. According to the results of the current situation analyses, the author suggests using some specific indicators of human resources, as they can contribute to the energy efficiency formation. The system of standardization is considered to be the basis for the implementation of strategic power management at the enterprises.

1. Introduction
Energy efficiency problems along with the increase in ecological safety of production and strengthening of social responsibility become the subject to studying in the modern theory and practice of management at the industrial enterprises. Dynamics of implementation of projects on the increase in energy efficiency in the international companies tends to grow year by year, extending to such areas as design of energy efficient buildings and structures and elements of production infrastructure. Introduction of such projects becomes the priority activity for many Russian companies of different types.

The increase in relevance of energy saving and the use of alternative energy sources in the conditions of global and local resource crises has led to the formation of the developed system of the international standardization in the field of power management which is aimed on the implementation of the principles of energy efficient business processes as well as on the development of some rational policy of the enterprises in the field of power management. The similar system of standardization can be considered as the basis for the implementation of strategic power management at the enterprises.

2. Review of the Existing Approaches
The sphere of the strategic management of energy efficiency and energy saving is the link between national and regional power policy and local systems of power management at the enterprises [1]. That is why the most important criterion of the realization of processes of strategic management in the field of planning and organization of consumption and control of energy resources is the balanced analysis of the internal and external environment. Great importance is played on such a factor of the external environment as the price policy of the regional energy companies and suppliers of electric energy and also on the dynamics of the prices of the main industrial energy carriers, such as oil and its products, gas and coal.
The external environment also forms the best practices of energy saving, which promote the advance of the best available technologies and ensures the maintenance of high standards of energy and ecological security at the industry level [2]. The technologies of energy saving which are included into the best modern practice belong to energy efficiency of buildings (reduction of heat losses, regeneration of heat which is used for heating of buildings), and also to the creation of the effective transport infrastructure, providing decrease in losses, etc.

Strategic management of energy efficiency is characterized by the long-term outlook, as it is considers particular investment priorities of the enterprise. The long-term policy assumes the development of certain types of system actions, aimed on desirable changing of external and internal environment. As a rule, such actions pursue one common, real and measurable goal, which leads the enterprise to success in the field of power management [3, 4].

The process of strategic management start with the development of the principles which are set by the existing conditions of external and internal environment, such as level of technological development of the industry, standards of energy efficiency, state policy at the regional and federal levels, etc. (figure 1).

The principles of strategic management of the energy efficiency rely on the used approaches to power management, the most important of which are technocratic, system and innovative ones.

**Technocratic approach** has been very popular recently. It is characterized by orientation of the system of power management to development, to the organization of work and control of power infrastructure of the enterprise, its technological parameters, its energy consumption cycles taking into account the capital production equipment. Within this approach planning of the energy consumption is the priority, while the energy saving potential entirely belongs to the area of technical solutions [5]. Features of the technocratic approach is the lack of due attention to human resources as to the most important source of professional competences and initiatives in the field of energy efficiency.

**System approach** overcomes a part of disadvantages of the previous approach, in particular, in due to the creation of uniform system of power management. System approach is free of the narrow view at the problem of potential of energy saving, at the problem of the use of energy resources in production. The system approach starts with the development of the power policy representing the official position of the guide to the occasion of power effectiveness of the enterprise. The power policy is the basis at the choice of strategy and statement of the purposes and tasks for separate departments of the enterprise. Thus the policy, defines the structure and contents of the enterprise plans, the order and priorities in the introduction and functioning of elements of the system of power management. The functions of control, monitoring and check still exist at all the stages of the cycle of energy efficiency management, they are characteristic both for technocratic, and of system approach.

**Innovative approach** is characteristic of some enterprises, which refer to the development of problems of energy saving as one of primary activities. Innovative approach is the successor and logical continuation of the system approach, its feature is the formation of technology and administrative innovative solutions in the field of power management at the expense of internal intellectual resources.

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Figure 1. Process of strategic power management at the enterprise
The level of novelty of the proposed solutions can vary, however the general idea is the use of internal creative potential of staff of the enterprise who, perhaps, are allocated in separate production or auxiliary department. The innovative approach allows to find the integrated approach to energy and ecological security at the enterprise, based on internal innovative solutions [6].

Identification of approach to power management at the enterprise is the most important stage of strategic management. It is impossible to tell precisely that under equal conditions any of approaches only positive or negative value, the main thing is that each of them is to make a contribution to the increase in the general competitiveness of the enterprise has.

The process of management of energy consumption is not a one-stage process therefore he cannot be considered in a separation from the extent in time. In this regard the approach to management of energy consumption has to consider the property of extent. Thus, there is a concept of strategy of power management.

3. Results

The analyses of the current situation proves that the general development strategy of the company should include the long-term strategy of power management.

The creation of the strategy of energy consumption might allow the enterprise to avoid risks and to get competitive advantage [7].

For example, the introduction of system of monitoring of energy efficiency (with a payback period no more than 3-5 years), can become the priority direction of investment strategy in the short-term period. It will allow to reflect and fix the current level of energy efficiency, and also to plan some strategic actions for improvement of the system of power management.

The author suggest that strategic actions should include several aspects, which are presented in the figure 2 [8, 9].

![Figure 2. Strategic actions within the energy efficiency management](image)

4. Discussion

Many domestic and foreign researchers select the standard strategy of energy consumption which can be applied to strategic simulation. These strategy are considered in the article in order to see whether they can be used in the modern practice.

In the conditions of the passive strategy there is no systematic planning, and energy management isn't considered as separate object of influence. Tasks of framing of an energetic policy and application of the international standards of energetic management are not urgent for the enterprise, and are auxiliary by search of ways of survival of the enterprise in the conditions of the increased competition rather.
The strategy of maximizing arrived in the short-term period. The manual addresses only measures with rather small payback period and high return [10,24,26]. It is guided by the decisions, which already proved their efficiency, which are more standardized and checked, and their implementation in the organization does not bring additional difficulties from additional training of employees, increase in the efficiency of implementation of new technologies, etc. Measures with low profitability are not considered.

The strategy of maximizing arrived in the long-term period. This strategy assumes serious understanding of the market of energy costs and development of technologies, the manual takes projects with big payback periods of investments into account. The appropriate measures (for example, implementation of new power plants or heat exchangers) can have periods of implementation in several decades. Besides, they can promote improving of image of the company within the concept of social responsibility and to increase in motivation of the staff.

Strategy of implementation of all investment attractive measures. Application of all the possible measures in the sphere of optimization of energy consumption having the positive economic effect both in short-term and in the long term supposes the purpose.

Maximum strategy assumes that even the purposes of the company can undergo changes in interests of a protection of climate. The companies using similar strategy actively join as the applied researches in the field of energy efficiency having a big payback period and basic researches, for example, in the field of alternative power engineering.

Besides the general strategy of power management it is also possible to distinguish the functional strategy which belong to concrete stages of the strategic power management cycle. Among such strategies we can name the strategy of acquisition of energy resources, the investment strategy and the strategy of stimulation and training of personnel [11-13, 22, 25]. The strategy of acquisition assumes the development of decisions in the field of purchase of resources from the outside: an assessment of possible alternatives of acquisition, optimization of the price and terms of delivery according to the set criterion function. Investment strategy is closely accompanied by the strategy of stimulation and training as investments into technical solutions on energy saving demand additional training of personnel [14, 15]. The purpose of training is formation of professional and cultural competences in power management, it is based on the recommendations and councils for optimization of energy consumption urgent for all the levels and divisions of the organization [16-18, 23].

The investment strategy of power management reflects investment priorities, structure and balance of a portfolio of investment decisions in the technical sphere. The balance is reached at the expense of the optimum accounting of indicators of economic efficiency of each of the planned actions: level of capital investments, profitability and profitability, payback period, etc. Investment strategy is originally developed on the basis of the available financial resources, power infrastructure and level of technological development of production. Investment strategy are implemented during implementation of long-term development plans for power economy, they develop their annual actions for economy of thermal, electric energy, and also all types of technological fuel [19-21]

5. Conclusions
The introduction and development of system of strategic power management is one of the most important factors of competitiveness of the industrial enterprise, providing savings of fuel and energy resources, of the increase in ecological indicators of production, systemacity in scheduling of production systems of the enterprise, of formation of positive image of the company as the leader in the field of energy saving.

Considerable part of reserves of energy saving at the industrial enterprise belongs to the sphere of management of human resources: efficiency of the solution of problems of energy saving increases with use of technologies of training and motivation of personnel on the basis of power management. Thus, the attraction of investments into technological innovations on energy saving have to be followed by the adequate level of investments into the human capital. The key problems of power management are
overcoming low level of energy efficiency and increase in priorities of investments in various programmes of energy saving due to rational justification of administrative investment decisions.

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