

Analysis of Energy Saving In Enterprises

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Abstract — *The relevance of the topic is determined by the special role of the country's electric power industry in the reform of the Uzbek economy. Due to the fundamental change in the operating conditions of electric power industry enterprises, the development of processes of restructuring energy facilities, increasing the importance of ensuring the reliability and quality of energy supply to consumers and changing the dynamics of interconnections of the energy system with the branches of the national economy at the enterprises of the energy complex, it is advisable to develop taking into account the General scientific system methodology.*

Keywords — Oil pollution; AC, energy resources, Efficiency of energy saving in industrial enterprises, mineral fuel

At all stages of his development, man was closely connected with the surrounding world. But since the emergence of a highly industrial society, dangerous human interference in nature has dramatically increased, the scope of this interference has expanded, it has become more diverse and now threatens to become a global danger for humanity. The consumption of non-renewable raw materials is increasing, and more arable land is leaving the economy, as cities and factories are being built on it. Man has to interfere more and more in the economy of the biosphere – that part of our planet in which life exists. The earth's biosphere is currently undergoing increasing anthropogenic impact. At the same time, we can identify some of the most significant processes, any of which does not improve the ecological situation on the planet. The most widespread and significant is chemical pollution of the environment with substances of a chemical nature that are not characteristic of it. Among them are gaseous and aerosol pollutants of industrial and household origin. The accumulation of carbon dioxide in the atmosphere is also progressing. Further development of this process will increase the undesirable trend towards an increase in the average annual temperature on the planet. Environmentalists are also concerned about the ongoing pollution of the World's oceans with oil and petroleum products, which has already reached almost half of its total surface. Oil pollution of this size can cause significant violations of gas and water exchange between the hydrosphere and the atmosphere. There is no doubt about the importance of chemical contamination of the soil with pesticides and its increased acidity, leading to the collapse of the ecosystem. In General, all the factors considered, which can be attributed to the polluting effect, have a noticeable impact on the processes occurring in the biosphere.

The development of economic entities in our country is significantly negatively affected by the high share of energy costs in production costs, which at industrial enterprises is on average 8-12% and has a steady growth trend due to high moral and physical wear of the main equipment and significant losses in the transportation of energy resources.

One of the defining conditions for reducing costs in industrial enterprises and increasing the economic efficiency of production in General is the rational use of energy resources. At the same time, the energy-saving path of development of the domestic economy is possible only in the formation and subsequent implementation of energy-saving programs at individual enterprises, for which it is necessary to create an appropriate methodological and methodological base. Postponing the implementation of energy-saving measures causes significant economic damage to enterprises and negatively affects the overall environmental and socio-economic situation. In addition, the further growth of costs in industry and other sectors of the national economy is accompanied by a growing shortage of financial resources, which delays the renewal of the production base of enterprises in accordance with the achievements of scientific and technological progress.

To prevent financial losses in the formation of a set of energy-saving measures, it is necessary to develop and improve methods for evaluating the effectiveness of energy-saving programs, taking into account the multiple use of investment sources intended for their implementation. Reducing the energy component in production costs will allow obtaining additional funds to ensure an acceptable level of moral and physical wear of technological equipment [3, p. 1].

Various authors refer to fuel and energy resources (FER) as the totality of all natural and transformed resources used in the economy of a country. Economists refer to TER as "natural fuel resources, natural energy resources, fuel processing products, fuel (fuel) by-products, electricity, compressed air and blast furnace, thermal energy (steam and hot water)" [3, p.5].

There is no doubt that according to the specific classification of TER should be attributed to material resources, although in some production processes at the enterprise TER affects the subject of labor directly. It should also be noted that some of them are used both as fuel and as raw materials for processing (for example, oil).

Summarizing the above, using the terminology of legislative documents, energy resources can be divided into primary renewable, non-renewable and secondary (by-products).

Usually, when using resources, you can choose one resource from several possible ones — for example, use peat, gas, or fuel oil in boiler rooms. In this case, the choice of a specific resource from among the possible ones is determined not only by the specifics of production, but also by the economic situation of the region, its availability of one or another type of resources, and some other factors. It should be noted, however, that such a choice is not always made rationally: for example, regions that lack some resources and do not plan to switch to other energy resources. For example, in the Republic of Tatarstan, the main primary energy resource is natural gas, 97% of which is imported from other regions. At the same time, this region is provided with its own oil resources to a sufficient extent, but there is no transition to this resource. The reasons for this irrational attitude should be found in the country's past, when any region in the entire territory of the USSR could use any energy resource, without caring about the place of its extraction.

According To the laws on energy conservation of the Russian Federation, the Republic of Tatarstan and some subjects of the Russian Federation, energy conservation is "the implementation of legal, organizational, scientific, industrial, technical and economic measures aimed at the effective use of energy resources and the involvement of renewable energy sources in economic turnover."

However, this definition does not specify what is meant by "efficient use of energy resources". For this, it was justly criticized. While agreeing with them, the author accepts the following definition: energy saving is the implementation of industrial, scientific, technical, organizational, economic and legal measures aimed at achieving an economically justified value of the efficiency of using energy resources.

At the same time, it should be noted that various criteria can be used as a reference point for energy saving. The most common reference point for control actions is the potential for energy saving, which means reserves that can be used in time. When conducting an analysis and assessment of the economic energy resource potential, it is necessary to consider not only the quantitative and qualitative characteristics of its characteristics, but also the possibility of rational use of energy resources.

Efficiency of energy saving in industrial enterprises. Mechanical engineering is an energy-intensive field of industrial production, where, as a result of moral and physical aging of fixed assets, there is a constant and continuous increase in energy consumption. The increase in energy costs and the resulting increase in the cost of machine-building products means that there is a need to reduce the energy component in production costs. At the same time, machine-building enterprises are not interested in developing and implementing energy-saving programs, which is caused by relatively low energy prices (for example, the price of electric energy is 0.86 rubles, while the economically justified tariff is -1.6 rubles), the lack of economic incentives to save energy, and limited financial resources. As a result, energy saving programs at machine-building enterprises are either not developed at all, or the implementation of existing programs is practically not carried out. In order to get the maximum effect from the implementation of the energy saving program at machine-building enterprises, it should represent the optimal set of energy-saving measures for it. To do this, it is necessary, on the one hand, to classify energy-saving objects and their socio-economic results, and, on the other, to form and justify a system of indicators of energy-saving efficiency. At the same time, the greatest importance is the assessment of the economic efficiency of a set of energy-saving measures, which in each particular case is determined by the specifics of the technological process at various stages of production of the final product. On this basis it is necessary to consider features of an estimation of economic efficiency of activities in accordance with the results of energy saving at an engineering company: the main production, in the process of primary production, secondary production, storing products, modernization of main and service industries [4, c. 192].

These features should be taken into account in the relevant calculations by making changes in determining the company's profits and losses, which, in turn, are caused by various socio-economic results of energy-saving measures included in the energy saving program. Today, energy saving programs are usually developed by experts in the technology sector who are not familiar with the economic mechanism of energy saving. In this regard, most of the available programs do not contain estimates of the economic effect and do not create incentives for energy conservation.

It can be concluded that the rational use of energy resources at the enterprise is an important component of reducing production costs, and, consequently, obtaining additional profits, gaining a greater market share and solving social problems based on:

- implementation of the pre-production process in accordance with the optimal modes of putting fixed assets into operation;
- using the most cost-effective production technologies;
- development, development and implementation of new equipment and technologies that use energy resources more efficiently;
- improve social areas for the staff of the engineering enterprise and social climate of the population living in the territory assigned to the entity.

As a result, energy saving is considered not as an aimless saving of energy resources, often carried out by reducing production, but as a factor of economic growth, improving the well-being of the population, ensuring appropriate environmental

and social conditions. Thus, energy saving should be one of the priority directions of an industrial enterprise's economic policy. At the same time, the assessment of the efficiency of energy saving and its components deserves close attention today, which should be taken into account in the subsequent development of targeted energy saving programs and scenarios for their implementation.

One of the characteristic features of the current stage of scientific and technological progress is the increasing demand for all types of energy. An important fuel and energy resource is natural gas. Its production and transportation costs are lower than for solid fuels. Being an excellent fuel (its calorific value is 10% higher than fuel oil, 1.5 times higher than coal and 2.5 times higher than artificial gas), it also has a high heat output in various installations. Gas is used in furnaces that require precise temperature control; it produces little waste and smoke that pollutes the air. The widespread use of natural gas in metallurgy, cement production and other industries has allowed us to raise the work of industrial enterprises to a higher technical level and increase the volume of products obtained from the unit area of technological installations, as well as improve the ecology of the region.

Saving of fuel and energy resources is currently becoming one of the most important directions of transferring the economy to the path of intensive development and rational use of natural resources. However, there are significant opportunities for saving mineral fuel and energy resources when using energy resources. Thus, at the stage of enrichment and conversion of energy resources, up to 3% of energy is lost. Currently, almost all electricity in the country is produced by thermal power plants. Therefore, the use of non-traditional energy sources is increasingly being put on the agenda.

At a TPP, only 30-40% of the heat energy is used usefully in generating electricity, the rest is dispersed in the environment with flue gases and heated water. An important role in saving mineral fuel and energy resources is played by reducing the specific fuel consumption for electricity production.

Thus, the main directions of energy saving are: improving technological processes, improving equipment, reducing direct losses of fuel and energy resources, structural changes in production technology, structural changes in manufactured products, improving the quality of fuel and energy, organizational and technical measures. These measures are being implemented not only because of the need to save energy resources, but also because of the importance of taking environmental issues into account when solving energy problems.

The main stages of development of the energy saving program

Energy audit. An energy survey (energy audit) is conducted in order to identify ways to quickly and effectively reduce energy costs, reduce and eliminate unproductive costs (losses), optimize or replace production technology. It can become a solid base, a springboard for a qualitative breakthrough in the competitive struggle on the market of goods and services.

- There are three ways to reduce energy consumption:
- Exclusion of irrational use of energy resources;
- Elimination of energy losses;
- Increasing the efficiency of using energy resources.

The energy audit can be divided into four main stages:

1. Familiarization with the enterprise, collection and analysis of necessary information, drawing up a survey program. At this stage, we specify the scope and timing of the work.
2. Business survey. Including: development of detailed balances for all energy resources, identification of the main consumers and "hotbeds" of irrational losses of energy resources; carrying out the necessary tests and instrumental measurements.
3. Development of energy-saving projects and activities. Determining the technical and economic impact of their implementation. Formation of the company's energy saving program;
4. Registration of the energy survey report and energy passport of the enterprise. Presentation of the results of the work.

Structurally, the energy saving program consists of the following sections: a General part, a regulatory framework, a list of the main directions of energy saving, a program block, an information and educational block, and applications.

In the first section, the goals and objectives of the program, expected results, basic principles of construction and management, as well as a scheme for managing energy saving of the enterprise are formulated.

Special attention is paid to the principle of repayment of funds for financing energy saving measures, stimulating energy producers, consumers and suppliers, as well as companies engaged in solving practical issues of energy conservation.

The legal framework contains a list of priority legal acts that should be taken into account when developing the program.

The main part of the energy saving program is a program block that includes organizational and technical measures, a list of design and research activities in the field of energy saving, as well as a list of priority objects for creating high energy efficiency demonstration zones.

The main feature of the software block construction is the possibility of developing detailed annual energy saving programs and optimizing the company's energy saving directions on its basis.

The information and educational block contains two main types of this activity: training and retraining of specialists at all levels on energy saving, and promotion of energy saving ideas.

The main principles of the energy saving program are:

- the priority of increase of efficiency of use of fuel and energy on increasing production volumes and production;

- combining the interests of consumers, suppliers and producers of fuel and energy;
- priority of ensuring compliance with environmental requirements for the extraction, production, processing, transportation and use of fuel and energy;
- mandatory accounting by legal entities of energy resources produced or consumed by them, as well as accounting by individuals of energy resources received;
- certification of fuel -, energy-consuming, energy-saving and diagnostic equipment, materials, structures, vehicles, as well as energy resources;
- interest of producers and suppliers of energy resources in the application of effective technologies;
- implementation of the program's activities at the expense of its own funds or on a reimbursable basis.

The main goals of the enterprise's energy saving program are:

- increasing the efficiency of using energy resources per unit of the enterprise's product;
- reducing the financial burden by reducing payments for fuel, heat and electricity;
- improving the financial condition of the enterprise by reducing payments for energy resources and, accordingly, additional replenishment of the regional budget at the expense of tax revenues.

The program's goals are achieved through the introduction of efficient technologies and the development of effective financial and economic mechanisms for the production, transportation and consumption of energy resources, energy conservation measures, and the introduction of accounting systems.

Main directions of energy saving:

- Energy audit. Conducting energy surveys of organizations;
- Energy accounting. Introduction of centralized energy accounting systems in industrial enterprises.
- Regulation of energy consumption. Introduction of systems for regulating the consumption of energy resources from the source of their production to final consumption;
- Reconstruction of industrial ventilation units;
- Modernization of fuel and electric furnaces;
- Modernization of power equipment.

For successful implementation and further development of the program, the most appropriate tool is the project management system, widely used in world practice.

The program should create conditions that allow combining the interests of its participants in the direction of the planned priorities. It is a multi-project environment with different status of issues and projects: major issues requiring urgent action; problems needing further study; issues addressed during the regular planning; regional, district, city, industrial projects, individual enterprises, etc. Therefore, in order to achieve these goals, a management system is needed, the structure of which will be developed and optimized when forming the regulatory framework for energy saving of the enterprise.

Conclusion

In the last decade, the mutual influence of a healthy environment and sustainable economic development has become increasingly recognized. At the same time, the world was undergoing major political, social and economic changes as many countries began implementing radical structural adjustment programs for their economies. Thus, the study of the environmental impact of General economic measures has become a problem of serious importance and requires an early solution.

It should also be said that General economic reforms sometimes lead to unforeseen damage to the environment. The existence of outdated policies, imperfect markets and organizational structures elsewhere in the economy can inadvertently interact with more General economic reforms and create incentives for excessive use of natural resources and environmental degradation. Correcting this situation usually does not require abandoning the original economic policy. Instead, certain additional measures are needed to address market imperfections, organizational structures, or outdated policies. Such measures are usually not only good for the environment, but also a crucial component of the success of General economic reforms.

Although General economic measures are not aimed at purposefully affecting the state of nature and the environment, they can affect it, both for better and for worse. Such measures include: changing exchange rates or interest rates, reducing public budget deficits, freeing markets, liberalizing trade, strengthening the role of the private sector and strengthening the institutional framework.

References

- [1] G. Liuzzi, S. Lucidi, F. Parasiliti, M. Villani, "Multiobjective optimization techniques for the design of induction motors," IEEE Trans. on Magnetics, vol. 39, no. 3, May 2003.
- [2] I. Vlad, A. Campeanu, S. Enache, Monica Enache, "Aspects regarding design of squirrel cage asynchronous motors for mining excavators", Anals of the University of Craiova, Series Electrical Engineering, Year 36, No. 36, 2012, ISSN 1842-4805, pp. 57-62.

- [3] Mirzaev U, Tulakov J. The modern methods of using alternative energy sources. Electronic journal of actual problems of modern science, education and trainin 2019-I. 19-28 Pages
- [4] Mirzaev U, Tulakov J. The Research of the V-I Characteristics of a Solar Panel Using a Computerized Measuring Bench “EPH 2 Advanced Photovoltaics Trainer”. International Journal of Academic and Applied Research (IJAAR)ISSN: 2000-005X Vol. 3 Issue 4, April – 2019, Pages: 27-31
- [5] K.Khouzam, C.Khoon ly,C.Koh and P.Y.Ng, “simulation and real time modeling of space photovoltaic systems” in Proc.IEEE photovoltaic spec.conf 1994.
- [6] Mirzaev, Uchkun, Mathematical Description of Asynchronous Motors (April 15, 2020). International Journal of Academic and Applied Research (IJAAR), 2020, Available at SSRN: <https://ssrn.com/abstract=3593185> or <http://dx.doi.org/10.2139/ssrn.3593185>
- [7] Mirzaev, Uchkun, Study of the Electrical Characteristics of a Solar Panel for Multi-Residential Apartments Using a Computerized Measuring Stand ‘Eph 2 Advanced Photovoltaic Trainer’ (2020). International Journal of Academic Engineering Research (IAER) ISSN: 2643-9085 Vol. 4, Issue 4, April – 2020, Pages: 59-61 , Available at SSRN: <https://ssrn.com/abstract=3622045>