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# **Conceptual Issues of Increasing the Energy Efficiency of Industrial Enterprises**

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**ABSTRACT:** The relevance of energy saving at industrial enterprises, the issues of minimizing the rational use of energy resources are considered. The introduction of innovative, energy-saving devices into the industry and the efficient use of secondary energy generated in the production process are analyzed in detail. As a result, a decrease in the dependence of enterprises on energy resources is highlighted.

**KEY WORDS:** energy, innovations, modernization, "method", the locomotive of the economy, "green corridor", energy dependence, secondary energy, energy prospects.

## **I. INTRODUCTION**

The Decree of the President of the Republic of Uzbekistan dated February 1, 2019 "On the organization of the Ministry of Energy of the Republic of Uzbekistan" brought the energy policy of our country to a new level. It would not be an exaggeration to say that the energy industry is the locomotive of the economy, the backbone of social and cultural life, and places a great responsibility on the energy system [1].

In particular, "... an increase in the share of industry in the economy, the development of high-tech industries and the use of secondary energy in the production process, further modernization of industry, ensuring the effective use of the industrial potential of each region" [2].

The introduction of modern energy-saving new technologies at industrial enterprises has proven in practice that this is the closest, safest and "green corridor" for entering the world market.

Law of the Republic of Uzbekistan "On the rational use of energy" to increase energy efficiency and minimize the rational use of energy resources "... The law is aimed at preventing heat losses and reducing energy consumption, the use of secondary energy resources for heating, renewable energy sources, local fuels and industrial waste additional subsidies from the fund energy saving for legal entities and individuals who carry out additional activities"[3].

## **II. METODOLOGY**

Subsidies provided by the state are a good motivation for the efficient use of secondary energy resources at enterprises, improvement of the processing mechanism and, most importantly, reducing the dependence of enterprises on energy resources.

One of the important factors is the study of foreign experience in achieving energy efficiency and saving energy resources. Many scientists conducted their research on these issues in foreign countries.

The Swedish scientist Louise Trygg [4] studied the specific energy consumption in the EU countries and analyzed the factors affecting energy efficiency in industrial sectors.

In addition, foreign experience shows that it is expedient for industrial enterprises and other industries to conduct analyzes for individual industries when assessing energy efficiency.

In most countries, sectoral energy efficiency policies are classified as follows:

- A) intersectoral policy[5] (including industrial sectors);
- B) transport, housing[6];
- C) utilities and business[7].

The cross-sectoral energy efficiency policy includes strategies, plans and various programs in the field of energy efficiency.



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In [8], an accurate analysis of the installation of frequency converters on fan drives and the resulting savings was made. In addition, this article clearly explains how long frequency converters will cover themselves and for what resources. The results are analyzed by applying energy saving modes to network pumps and units in industrial enterprises [9].

It is important to widely introduce energy-saving devices and frequency converters not only in heavy and medium industry, but also in energy-saving electric drives in light industry, and it is necessary to cover all production links [10]. “..In automatic mode  $U_y$  is fed to the input of the control system of the CS of the frequency converter of the asynchronous adjustable electric drive for controlling the speed of rotation of the motor of the IM of winding mechanisms. In the manual mode of operation of the SUTR,  $U_z$  is fed directly to the input of the CS. The engine speed becomes dependent only on the reference signal  $U_z$ . The  $U_i$  signal is not analyzed, but can be used for visual control of the CMA technological mode..”[11],[12].

“..Calculations show that if the average load of an induction motor is less than 45% of its rated power, it is advisable to change to a smaller induction motor, and if the load of an induction motor is more than 70%, it is not advisable to replace it. If the load of an asynchronous motor is between 45 and 70%, the feasibility of its replacement should be confirmed by additional feasibility studies..”[13].

Together with JSC "KVARTS" [14],[15],[16] for comparative analysis, monthly reports of the Main Energy Department on the energy performance of the enterprise for the last month were used as material. These materials showed that the comparative analysis is expressed in exact numbers.

The article discusses some aspects of the rational use of secondary energy resources generated in the production process. It is a fact that most industrial enterprises have outdated and inefficient equipment (K.P.D)

The energy efficiency of small industrial enterprises is analyzed, the possibility of achieving the energy prospects of enterprises through the phased introduction of modern, innovative and energy-saving devices, using the example of the largest enterprises for the production of glass and glass products in the country. JSC "KVARTS"

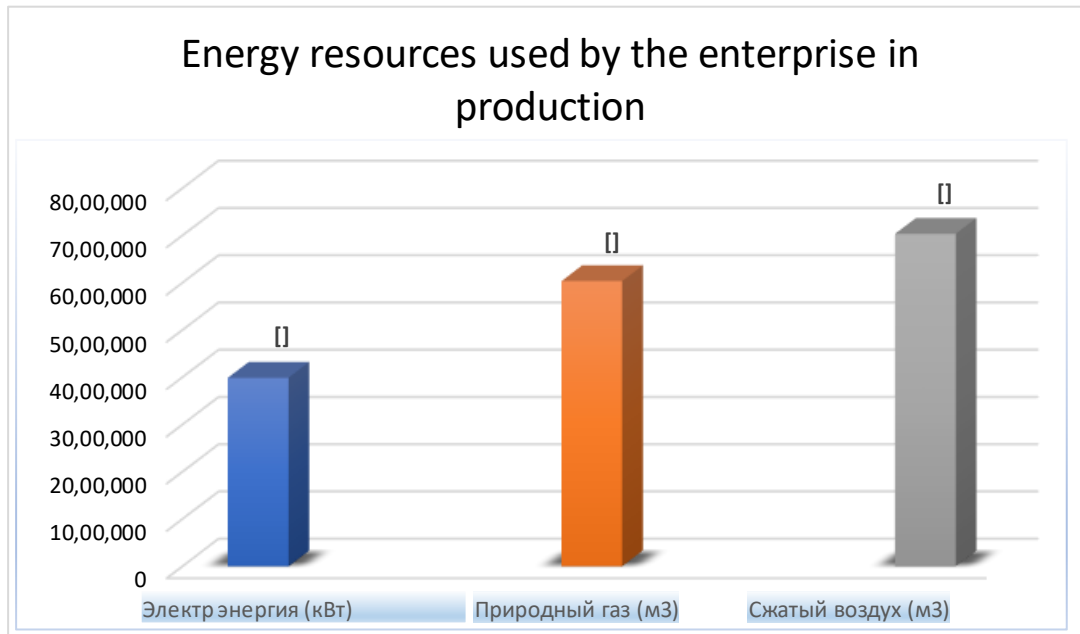
JSC "KVARTS" is one of the largest and largest industrial capacities in this area not only in the Republic, but also in Central Asia.

Recently Shanghai Pony Technology Co., Ltd. People's Republic of China The cost of the project, which was commissioned in cooperation with the company, is about 80 million dollars and 400 tons per day. float line with polished glass production facilities is one of the latest technology glass production projects.

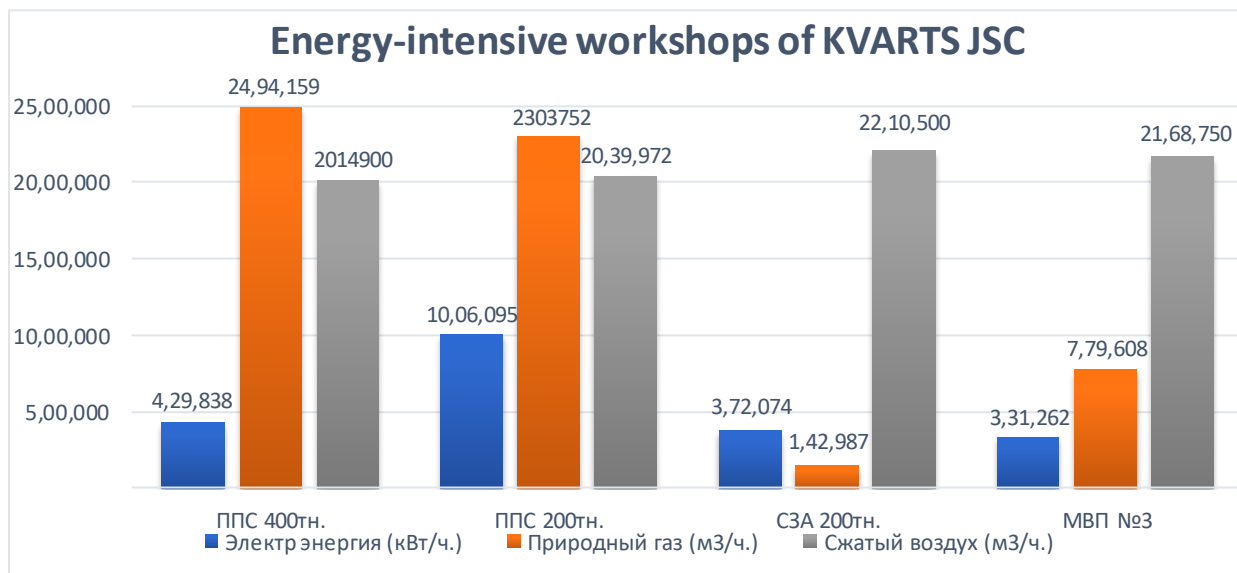
The distribution of energy resources used in the production process of the enterprise is shown in Fig. 1 [17].

From the above figures, it can be seen that JSC "KVARTS" is one of the largest energy companies in the country. The effectiveness of any measures to save energy resources at the enterprise will have a significant positive effect not only for society, but for the whole country.

Energy-intensive workshops in production have a great potential for saving energy resources of the enterprise. Any innovative innovations and developments used in energy-intensive workshops automatically give a greater result in energy saving. Energy-intensive workshops of JSC "KVARTS" Fig.2.



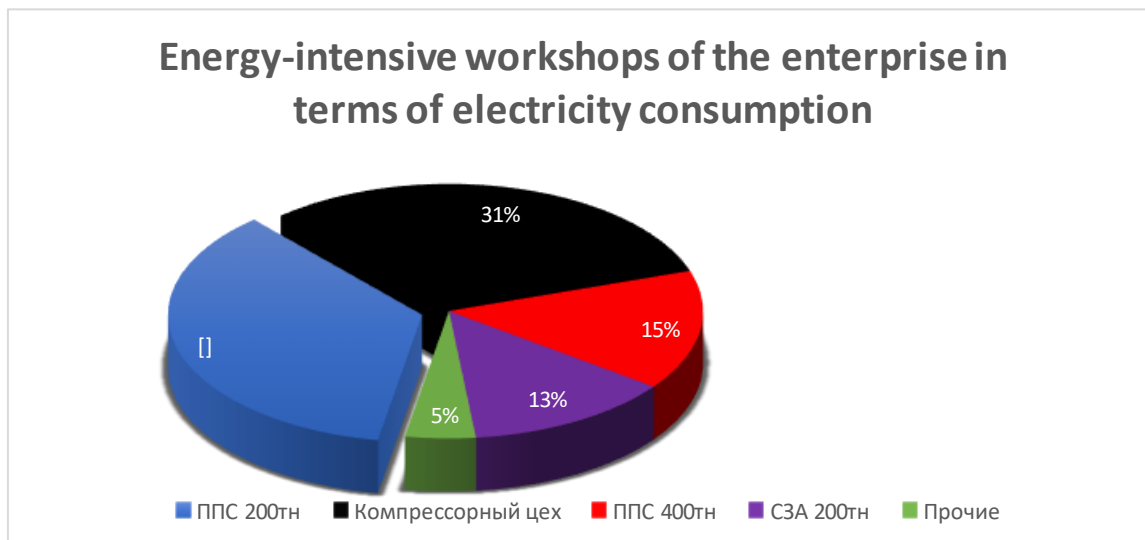
**Fig.1. Distribution of energy resources used in the production process of JSC "KVARTS" (as of December 2021)**



**Fig. 2. Energy-intensive production workshops of JSC "KVARTS". (as of December 2021)**

When analyzing systematic work to save energy resources in energy-intensive workshops of the enterprise, in most production processes, constantly running electric motors had to work at a lower power depending on the need. In such cases, we can see the same problems in the power supply of electric motors at full capacity, distrust in the operation of

electric motors, and at the same time in the power supply of the vertical water pumps of the enterprise. Such problems also have a direct impact on the excessive consumption of electricity and the rise in the cost of the company's products. 400 tons per day at a newly opened enterprise. a float line for the production of windows and an available capacity of 200 tons per day, a comparative analysis was carried out using the example of glass production workshops. We see that the new float line is equipped with the latest modern energy-saving devices and that all electrical devices are equipped with frequency converters, while in our existing workshop the above devices are not installed. Energy-intensive workshops of the electricity consumption enterprise JSC "KVARTS"[18].



**Fig 3. Report on the use of electricity by the production shops of JSC "KVARTS". (As of December 2021.)**

In lines 1 and 2 of the table above 200 tons per day. and 400 tons. The volumes of electricity consumption by workshops for the production of windows for 1 month are given. The results of the analysis of these indicators show that 400 tons per day. the new float line consumes 2 times less electricity and allows you to get 2 times more product. In doing so, we can once again see evidence of the usefulness of energy-saving and innovative technologies. True, the modernization of industrial power networks is a rather complicated and expensive matter. For a phased solution of the above problems, the following can be proposed to improve the energy efficiency of industrial enterprises:

- A) Faster and wider introduction of new modern energy-saving devices into the industrial power grid;
- B) Installation of frequency converters for all types and capacities of electric motors in terms of energy consumption;
- C) Creation of a mechanism for obtaining primary energy sources, i.e. source of heat, steam and electricity for the heating system, using secondary energy sources. No matter how expensive and complicated, new modern energy-saving devices are the locomotive of industrial power networks, the demand of today!

#### REFERENCES

- [1]. Aripov N. M., Usmonov Sh. Yu. Development of an energy-saving frequency-controlled asynchronous electric drive with a fan load Electricity. – 2011. – №. 4. - S. 26-28.
- [2]. Aripov N.M., Usmonov Sh Yu., Kuchkarova D.T. Basic technical requirements for the range and accuracy of regulation of the speed of raw silk rewinding with the use of an intelligent electric drive. - Kazan State Power Engineering University, 2021. - №. 1. - P. 218–225.
- [3]. Aripov N.M., Usmonov Sh.Yu., Kuchkarova D.T. Influence of changing the speed regimes of semi-finished product processing on the energy intensity of silk-winding Textile journal of Uzbekistan. - Tashkent, 2021. - №. 2.
- [4]. Aripov N.M., Usmonov Sh.Yu., Kuchkarova D.T. Determination of the maximum allowable value and range of speed control in the process of rewinding raw silk using an intelligent electric drive Problems of Informatics and Energy. - Tashkent, 2020. - №. 2. - P. 59–65
- [5]. Sultanov R. A. U. Recommendations for the generation of electricity and compensation for lost energy with the help of a cooling system for electric motors Bulletin of Science and Education. – 2019. – №. 19-3(73).



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# International Journal of Advanced Research in Science, Engineering and Technology

Vol. 9, Issue 2 , February 2022

- [6]. Usmonov Sh. Yu. Frequency-controlled electric drive for fan load Electronic periodical peer-reviewed scientific journal "SCI-ARTICLE. RU". - 2018.-P. 15.
- [7]. Mukaramovich A. N., Yulbarsovich U. S. CALCULATION OF THE SPEED CONTROL RANGE OF AN INTELLIGENT ASYNCHRONOUS ELECTRIC DRIVE DURING REWINDING RAW SILK ELECTRIC. – 2011. – №. 4. - S. 26-28.
- [8]. Jaloliddinova N. D., Sultonov R. A. Renewable sources of energy: advantages and disadvantages Achievements of science and education. – 2019. – №. 8-3. - S. 49.
- [9]. Usmonov Sh. Yu., Kuchkarova D. T. SYNTHESIS OF ALGORITHMS OF INTELLIGENT CONTROL SYSTEM OF MULTI-COUPLED ELECTRIC ACTUATORS Editor-in-Chief: Akhmetov Sairanbek Makhmutovich, Doctor of Engineering. sciences; Deputy Editor-in-Chief: Akhmednabiev Rasul Magomedovich, Ph.D. tech. sciences; Members of the editorial board. - 2022. - S. 50.
- [10]. Aripov N. M. et al. OPTIMIZATION OF TECHNOLOGICAL MODES OF A COCONOMOTAL AUTOMATIC MACHINE WITH A CONTROLLED ASYNCHRONOUS ELECTRIC DRIVE Editor-in-Chief: Akhmetov Sairanbek Makhmutovich, Doctor of Engineering. sciences; Deputy Editor-in-Chief: Akhmednabiev Rasul Magomedovich, Ph.D. tech. sciences; Members of the editorial board. - 2021. - P. 11.
- [11]. Sultonov R. A. U., Kodirov Kh. M. U., Mirzaliev B. B. The choice of mechanical electric motors used in the electric drive system Problems of modern science and education. – 2019. – №. 11-2 (144). - S. 26-29.
- [12]. Aripov N.M., Usmonov Sh.Yu., Kuchkarova D.T. Influence of changing the speed regimes of semi-finished product processing on the energy intensity of silk-weaving "Textile Journal of Uzbekistan" Tashkent. – 2021. – №. 2.
- [13]. Aripov N. M. et al. BASIC TECHNICAL REQUIREMENTS FOR THE RANGE AND ACCURACY OF RAW SILK REWINDING SPEED CONTROL Bulletin of the Kazan State Power Engineering University. - 2021. - T. 13. - №. 1. - S. 218-231.
- [14]. Sultonov R. A. U., Kodirov Kh. M. U., Mirzaliev B. B. The choice of mechanical electric motors used in the electric drive system Problems of modern science and education. – 2019. – №. 11-2 (144). - S. 26-29.
- [15]. Jollands N., Gacs E., Pasquier S. B. Innovations in multi-level governance for energy N.Jollands, E.Gacs, S.B. Pasquier International Energy Agency. 2009. URL:[https://iea.org/publications/freepublications/publication/mlg\\_final\\_web.pdf](https://iea.org/publications/freepublications/publication/mlg_final_web.pdf)
- [16]. Anisimova T.Yu. Methodology for conducting an energy-economic analysis of an enterprise's activities in the energy management system. Economic analysis: theory and practice, 2014.- №. 2 (353), pp. 37-44.
- [17]. Energy efficiency governance [Электрон ресурс] International Energy Agency.URL:  
[http://iea.org/publications/freepublications/publication/gov\\_handbook.pdf](http://iea.org/publications/freepublications/publication/gov_handbook.pdf)
- [18]. Jollands N., Gacs E., Pasquier S. B. Innovations in multi-level governance for energy N. Jollands, E.Gacs, S.B. Pasquier International Energy Agency. 2009. URL: [https://iea.org/publications/freepublications/publication/mlg\\_final\\_web.pdf](https://iea.org/publications/freepublications/publication/mlg_final_web.pdf)