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ACHIEVING ENERGY SAVING USING NON-TRADITIONAL ENERGY SOURCES IN ELECTRICAL SUPPLY OF INDUSTRY ENTERPRISES

Aslanova Gulnoz Nasriddinovna

Senior Teacher, Pulpit" Energetics" Of Bukhara Engineering Technological Institute, UZBEKISTAN

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Abstract

The article is devoted to the development of energy saving measures in the power supply of industrial enterprises using non-traditional energy sources.

The development of technical progress leads to the automation and mechanization of technological processes in all areas of production, and naturally, the demand and need for electrical energy is constantly increasing.

The needs of industry, agriculture and non-production sectors for electricity are increasing day by day. However, the reserves of gas, oil and coal, which are natural energy sources of electricity, are decreasing. In addition, the amount of investments required for extraction of these types of fuel and production of electrical energy is also increasing. The global energy crisis of 1973-74 clearly demonstrated the urgency of this problem. In developed countries, government programs were immediately adopted and started to be implemented in order to save organic fuel and electricity.

Scientific studies conducted in industrialized countries have shown that there are great opportunities for saving fuel and energy resources. According to the calculations of the European Economic Cooperation (EEC), the International Energy Agency (IEA) and the Organization for Economic Co-operation and Development (IRT), 70% of the time between the extraction of energy resources and their arrival to consumers as "useful energy" is wasted, and only 30% is wasted. as long as it reaches consumers as "useful energy". If we look at the statistical materials, 5 billion spent in 1978. 1.5 billion tons of conventional fuel. only a ton reached the consumer as "useful energy".

According to the information of the IEA, in 1985, 20 industrialized countries belonging to this organization achieved a 15% reduction in energy consumption as a result of the activities carried out under the energy efficiency program.

After gaining independence, the Republic of Uzbekistan was one of the first among the MD states. In 1997, the Law "On the Rational Use of Energy" and the State Program for its implementation were adopted. This adopted law serves as a legal basis for the use of energy resources and efficient use of all types of energy in all spheres of production, as well as for the training of personnel in this relevant field of energy.

Implementation of efficient use of energy in all areas of production is usually carried out in two directions.

The first direction is to reduce the amount of energy used for the finished product, that is, to save organic and nuclear fuel, electricity and thermal energy . For this purpose, the following measures should be taken:

Raising technological and production discipline to a higher level and economical use of energy resources;

Reduction of energy waste in the production, transmission, transformation, storage and transmission and distribution of heat and electricity to consumers;

Transmitting electricity produced at power stations to a very high voltage within the scope of possibility for transmission to distant consumers;

Use of modern adaptive and software-controlled automated electric drives in the electrical drives of working machines and mechanisms;

Renovation, repair and replacement of the main energy and technological devices and complexes with modern energy-efficient devices and complexes;

Development of low-energy sectors of industry, improvement of the quality and service life of machinery products, reduction of material consumption, improvement of internal management systems of enterprises aimed at energy saving.

The second direction is to achieve economic efficiency in power plants as a result of improving the heat and electricity production systems themselves and the energy balance, increasing work productivity, and replacing expensive and rare materials with relatively cheap and non-rare materials. The use of mini-power stations that work on the basis of wind, solar, biogas energy, which are non-traditional energy sources, as well as on the energy of the natural flow of small rivers and streams, also allows saving organic energy sources. As a result of the use of additional energy resources, the quality, reliability, and service life of the manufactured product will increase, or the production of new products that meet the needs of consumers will be launched, labor protection and working conditions will be improved, people's lives will be improved, and the negative impact on the environment will be achieved, striving for economic efficiency. actions necessary for Only when the economic efficiency is higher than the costs, such efforts will have the character of energy saving or resource saving.

Spending additional energy instead of products that are in use, producing suitable materials instead, and using these new materials in production is part of the energy resource economy and the increase in economic efficiency as a result of the reduction of costs in the production process is higher than the cost of the additional energy consumed, this action is included in energy saving. .

The policy of energy saving, as a means of increasing the overall efficiency of production, includes all large-scale actions from the production of heat and electricity to the efficient use of it by consumers. The real needs of society for heat and electricity, its lifestyle, climatic conditions and technical development determined by the level. The degree of use of the modified final energy in the last link of energy resources directly in technological devices and complexes, in everyday life and in transport determines the level of development of the society.

In order to change the energy needs of production, it is necessary to influence the non-energetic production forces of society. Saving energy in the work of consumers means energy saving in the literal sense . The role of science and technology in achieving energy saving in all areas of production is incomparable. Application of new modern energy-efficient technological devices and complexes, as well as energy-efficient technologies in creation and production, must be the result of scientific research. In particular, efficient use of electricity in the electric drives of technological devices, first of

all, the use of energy-saving motors in electric drives, adjustment of loads, adjustment of consumed active and reactive power depending on the load level, reduction of power wastage, control according to energy optimal criteria, and finding solutions to dozens of such urgent issues. definitely related only to scientific research and construction activities.

It is impossible not to take into account the instability of the world market situation, which is rapidly changing. It is also necessary to be able to predict the level of competitiveness and the trends of change in the conditions of the market economy of the technologies developed in the eastern countries, which have found their place in the energy system and are absorbed into our energy and electrical engineering industry due to the investments made in our republic.

The main advantage of the developed KTN automatic control system is the use of a programmable logic controller (DMK) in the control, and since the control circuit consists of low-power electronic devices, including the DMK, unlike electromechanical relays and electronic devices, the automatic control of the KTN Energy saving is achieved in automatic control of KTN using DMK.

In addition, in addition to increasing the reliability of the electricity supply of category 1 and highly responsible consumers, there is an opportunity to provide high energy savings due to the use of an unconventional energy source, more precisely, a solar power plant (ES), especially using ES in parallel with the main inputs of KTN transformers.

To do this, installing ES instead of ADES as a third independent power supply source in the KTN feed scheme presented in Fig. 1, and in turn using ES in parallel with the main inputs from transformers, clearly gives the expected results.

Figure 1 shows the flow chart of KTN below.

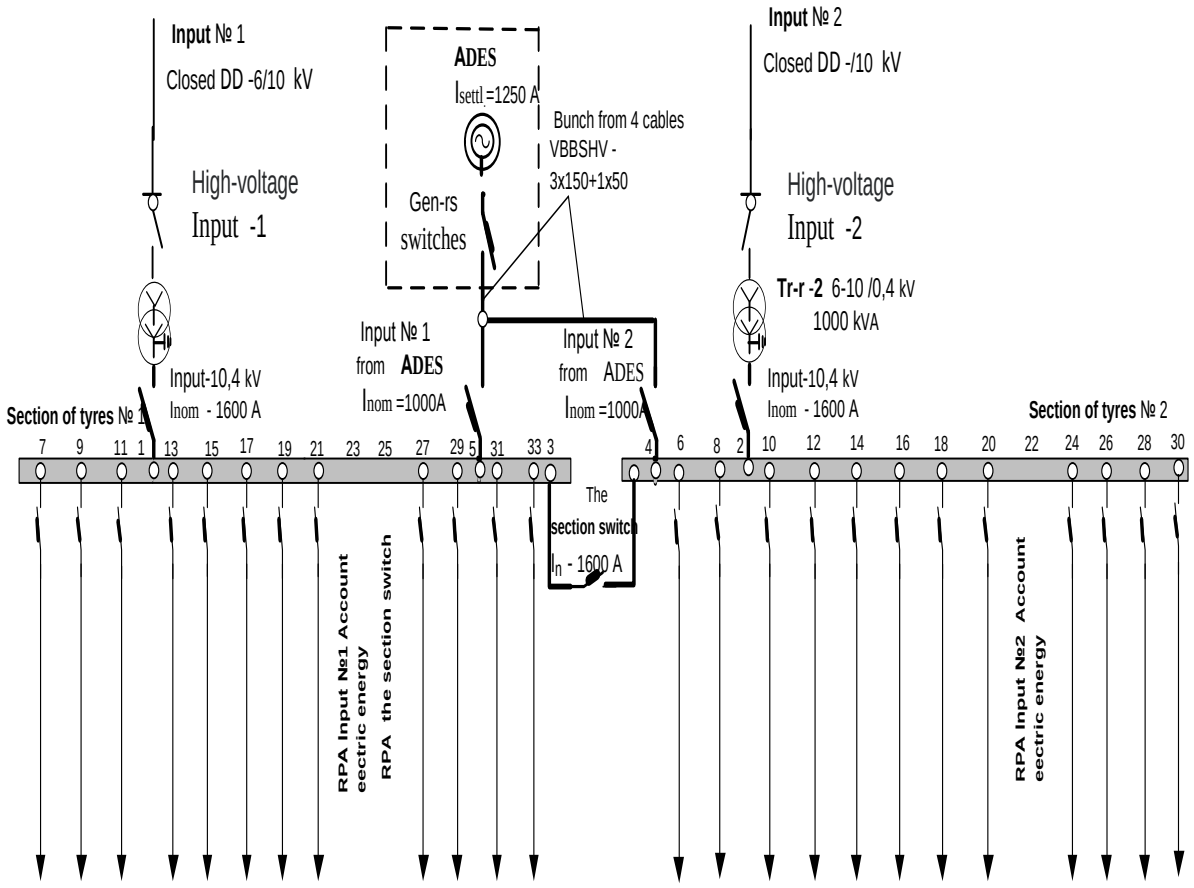


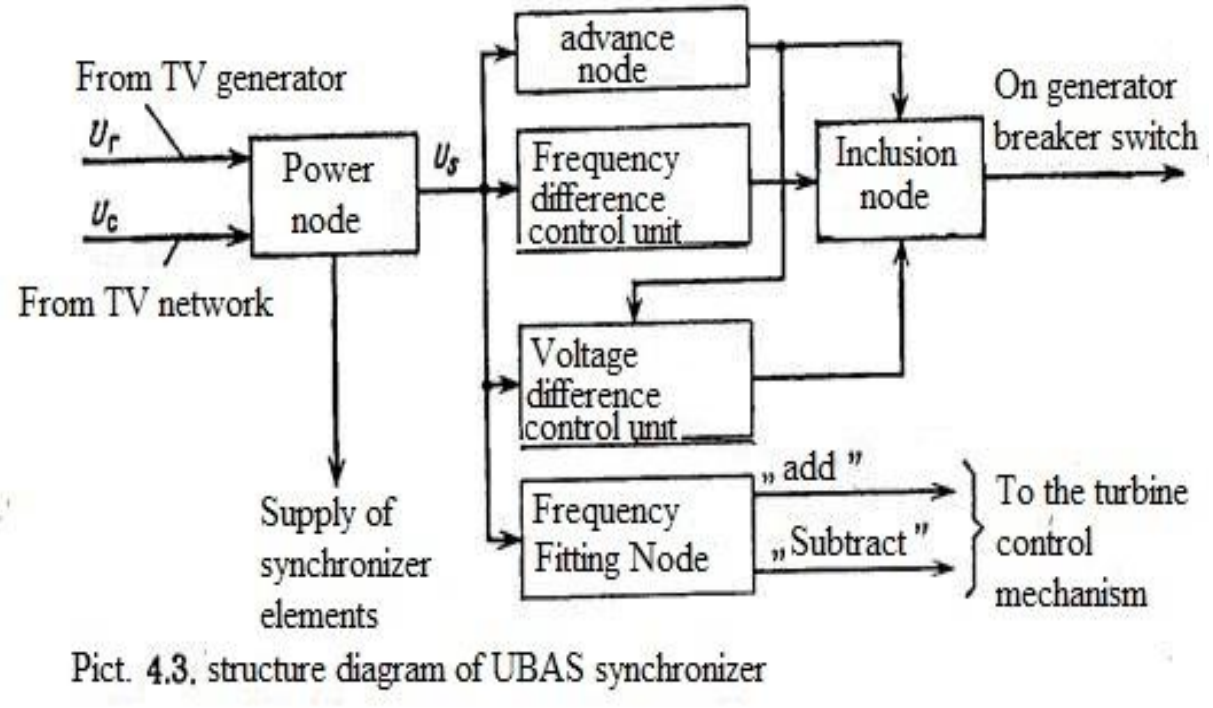
Figure 1. shows the schematic diagram of KTN.

The following algorithm of KTN automation was implemented at QT-0.4 kV (Fig. 1) . Automatic backup connection (ZA U) is implemented in the cross-sectional circuit breaker (SO') - in normal mode, input circuit breakers from both transformers are turned on, SO' is turned off. When the voltage is lost at one of the inputs (voltage control is performed directly on the KTN QT-0.4 kV buses) - the corresponding input circuit breaker is turned off by the patience time.

Two types of synchronizers are distinguished: with a constant angle of departure, the impulse to the connection is given when - ϭ reaches a certain constant value; with a constant opening angle, which is given when the impulse to the connection reaches a value equal to - ϭ the connection time of the circuit breaker. Higher accuracy, fixed yaw angle synchronizers are common. Synchronizers AST-4, UBAS, SA-1 belong to this type.

Below we will look at the UBAS type synchronizer.

The automatic synchronizer of the UBAS type with a fixed angle of departure (in Russian ustroystvo beskontaktnoe avtomaticheskoy skhronizatsii - contactless automatic synchronization device) is composed of six main parts (Fig. 2).



Picture 2. Structure diagram of UBAS type synchronizer.

supply node - which ensures the consumption of semiconductor elements included in the synchronizer and simultaneously generates the oscillating voltage U_s;

overshooting node - which produces an impulse to overshoot the generator in relation to the phase matching of U_g and $U_{t\ vectors}$;

node for controlling the difference in generator and network frequencies - which ensures the transmission of the angle of rotation signal that ensures the connection of the generator;

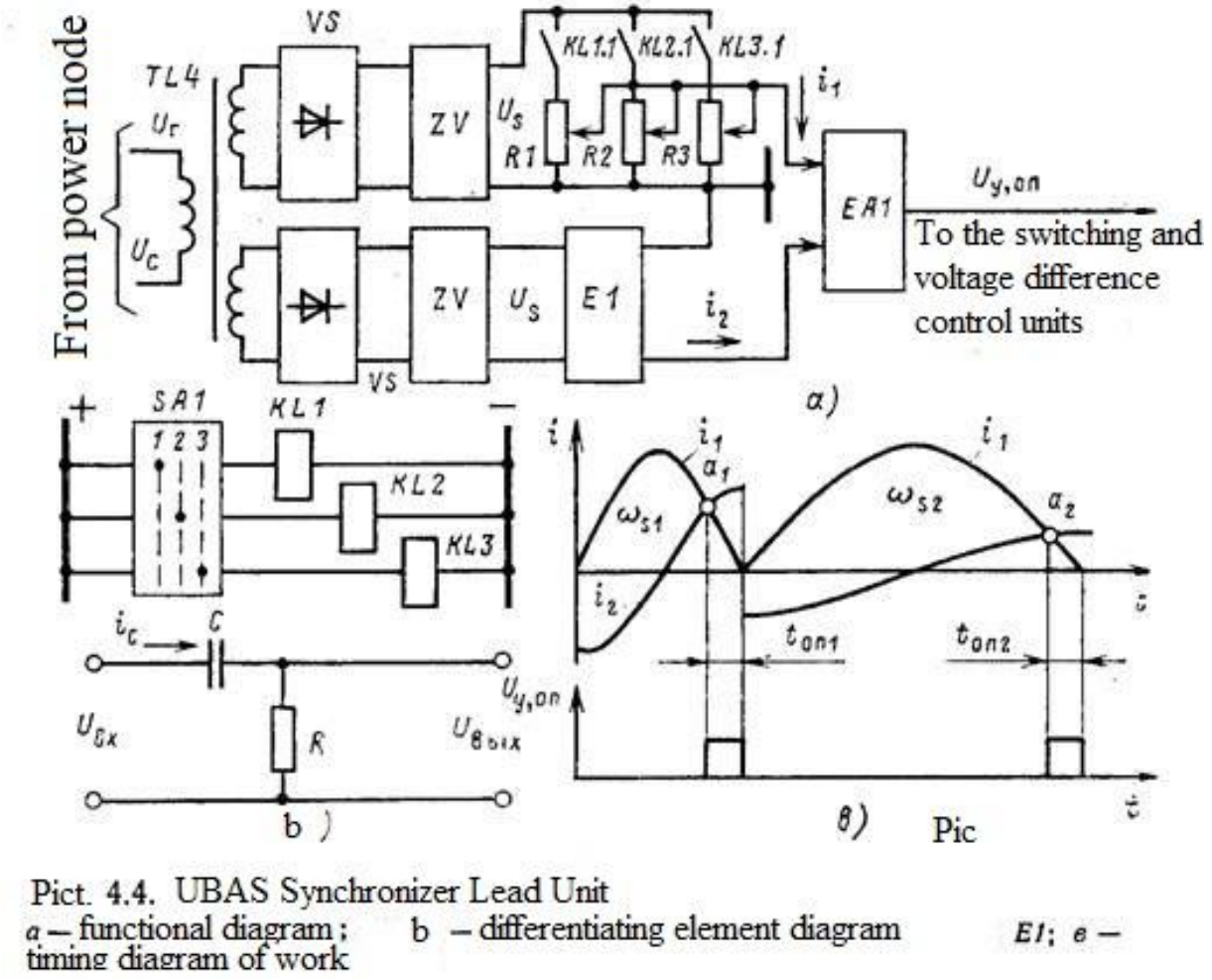
generator and mains voltage failure control node - which allows a signal to connect the circuit breaker when the voltage difference does not exceed the permissible level;

frequency approximation node - brings the frequency of the connected generator closer to the frequency of the working generators by influencing the turbine control mechanism;

connecting node - produces a pulse of a certain duration to connect the circuit breaker;

Transformer *TL4* , rectifying elements *VS* , filters through the output node (Fig. 3) *ZV,* differentiating element *EL,* nul -organa *EA1* and relays for switching off time settings *It is composed of KL1-KL3* .

The generator voltage U $_{t}$ to the input of the node and the voltage of the oscillations generated by the difference between the mains voltage U $_{s}$ is given. In order to produce a voltage equal to the difference of the two voltages, these two systems of voltages must have a common point in the circuit. Therefore, in the synchronizing schemes, the phases *V* of the common point of the secondary circuits of the voltage transformers of the generator and the network are interconnected.



Pict. 4.4. UBAS Synchronizer Lead Unit
a — functional diagram; b — differentiating element diagram E1; e — timing diagram of work

3 - picture. The UBAS type synchronizer output (forward) node:

a - functional scheme; *b* -E $_{1}$ differentiating element scheme; *v*- time diagram.

In order to ensure high efficiency in transformer substations of industrial enterprises through the analysis of existing non-traditional energy sources in Uzbekistan, a method of applying automation with the help of modern programmable logic controllers with the best energy indicators, which are the latest achievements of scientific and technical development, has been developed. Practical recommendations were developed for installing ES instead of ADES as a third independent energy supply source in the KTN food scheme and, in turn, using ES in parallel with the main inputs from transformers.

The results of the study _ scientific and practical purpose. _ Development of the cotton ginning industry, equipping electrical mechanisms with electrical equipment and technologies with high energy performance are among the important tasks facing the enterprises. Developments carried out to solve these tasks were used to introduce new electrotechnical complexes, which are the latest achievements of

scientific and technical development, which are widely used in foreign production enterprises.

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