



INCREASING THE ENERGY EFFICIENCY OF BUILDINGS AND STRUCTURES

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Annotatsiya: This article is about improving the energy efficiency of buildings and structures and focusing on the construction of buildings, and its impact on energy efficiency. Thermal-physical properties (IFX) or thermal-physical indicators (IFT) of substances, materials and products - thermal conductivity, temperature conductivity, thermal conductivity, heat transfer coefficients, thermal resistance of heat transfer, specific volume or weight heat capacity, black color. level, saturation temperature. The biggest concern in the construction of buildings is damage to the environment. The article provides information on the development and use of electricity in Uzbekistan, energy analysis in buildings and structures, mainly energy-efficient buildings currently being developed for buildings and structures. Information is given about the impact of modern houses on the environment and measures to prevent environmental damage. About conducting energy analysis.

Key words: energy analysis, insulated buildings, energy audit, environment, inspection, efficiency.

By 1914, the power of the Turkestan power industry had slightly exceeded 20,000, and the total number of electric motors in 51 power stations did not exceed 500. Until 1917, power plants in the territory of present-day Uzbekistan had a capacity of 3,000 kW and produced 3.3 million kWh of electricity in one year. The creation of the plan for the electrification of Turkestan became very important. In 1923, the construction of a hydroelectric power station (GES) began on the Bozsuv Canal on the outskirts of Tashkent. In 1926, the first 2,000 kW Gray water hydroelectric power station, the largest in Central Asia at that time, was put into operation. The basis of the power increase in the republic was the successive construction of hydropower plants with a capacity of 180 thousand kW in the Chirchik-Bozsuv direction when the energy system of Uzbekistan was created (1934). In 1939, a 12 KW condensing turbine unit of the Kuvasoy thermal power



plant (IES) and two 6 KW turbines of the thermal power plant of the Tashkent Textile Combine were put into operation at the base of the Kyzylkia coal basin. The construction of power plants and the development of industrial enterprises created the need for the construction of main power networks. Simultaneously with the commissioning of the Kadir HPP, the first in the Republic, a 35 kV two-system line transmitting electricity from this HPP to Tashkent was put into operation. In recent years, changes aimed at developing the economy and improving the lifestyle of the population are being implemented in our country. Modern free economic zones, technological parks, and clusters are being established in various regions of our republic. On the basis of such strategic programs as "Prosperous village", "Prosperous neighborhood", "Safe city", drastic improvements are being made in cities and villages, they are constantly being developed and completely renewed. Accordingly, tourism is developing rapidly. On the other hand, a lot of attention is being paid to the protection of the environment from harmful atmosphere and ensuring ecological stability.

Such development observed in all spheres of society and state life, economic growth, meeting the needs of the population, first of all, leads to an increase in the need for electricity.

What measures are being taken to eliminate the increasing need for electric power, ensure quality supply of electricity for users of industrial enterprises, and prevent unplanned outages (quick failure of devices in exceptional situations)? According to JSC "Uzbekenergo", which is responsible for the solution of these very important issues, all measures are being taken in this regard and they are being used in practice.

Well, let's go deeper into the topic through numbers and facts, pain points. 90 percent of the electricity in our republic is produced in thermal power plants. The devices used, of course, do not fully meet the requirements of the time. Because their wear and tear every year reduces the amount of electricity production, causes waste, and also causes a large amount of used fuel to be consumed. As a result, the cost of produced electricity is increasing. Ordinary consumers will hardly know about them. It is important for them that the light is on at home, but many people are not interested in how it is made and at what cost it is delivered. However, if the taxpayer reads all the information and draws a reasonable conclusion for himself, he will not be free of benefits. Currently, the length of power lines of energy systems in our country is 254,8 thousand kilometers. Of these, 218,400 kilometers are low-voltage distribution networks with a voltage of 0.4-10 kV. 62.4 percent of them have



been used for more than 30 years. The aging of the distribution networks leads to a significant loss of electricity. That is, at the same time, 20 percent of the total power output from thermal power plants to the electricity grid is lost. Let's put it in front of us: one fifth of the light and heat source produced for us is lost and becomes ultraviolet. What should be done to solve such shortcomings and avoid waste? First of all, the goal is to ensure the reliability and quality of electricity supply to consumers. Of course, it will be necessary to take into account the increase in the demand for electricity in the future.

Another necessary issue that needs to be resolved is that the cost of fuel and energy resources (natural gas, fuel oil, coal) constitutes the main part of the expenses for the production of electricity. This indicator is currently equal to 43%, and considering that their prices are increasing in the world market, how correct is it to maintain the current tariffs for electricity?! Because when you add the costs of use and arrears of payments to the price of resources, a painful picture of the problem is formed. Such problems can negatively affect the reliability and quality of electricity supply.

One of the most important components of the problem of effective use of energy (resource) wealth in specific areas of the republic's agriculture and water economy is the training of specialists with knowledge in the field of energy saving. Therefore, the purpose of the presented work is to form a general methodological approach to the problem of effective use of energy resources in the future energy industry based on the world experience in the field of energy saving and the state policy of the Republic of Uzbekistan. Issues of energy consumption management and the most important directions of state policy in the field of energy saving are highlighted. The possibilities and prospects of reducing energy consumption of technologies in the field of water management are shown. Carrying out energy analyzes in buildings and structures.

The sale of electricity to consumers of the republic is carried out by 14 regional distribution and sales enterprises operating as joint-stock companies in each regional structure. The total length of the enterprises is more than 226.2 thousand kilometers and the voltage is up to 110 kV. there are small stations. The most widespread are the 0.4-6-10 kV power lines with a total length of more than 196 thousand kilometers, through which most of the electricity is delivered to the consumers of the republic.

JSC "Uzbekenergo" is the only production complex that carries out design, construction, assembly and adjustment works, as well as repair and use of the main and auxiliary equipment of power plants and networks. The production base and the



presence of highly qualified employees allow to carry out construction works in the field of energy at a high level. In accordance with the decree of the President of the Republic of Uzbekistan on structural changes, modernization and diversification of production at Uzbekenergo JSC from 2018 to 2021, the total cost is 11 billion. It is envisaged to implement 52 investment projects worth US dollars, including 25 in thermal energy. With the implementation of activities in the field of thermal energy, the efficiency of energy blocks reaches 60%, allowing the introduction of modern energy production technologies based on highly efficient steam-gas and gas-turbine devices. Currently, Uzbekistan is one of the countries that fully meets its own energy needs. Almost 50% of the power generation capacity in the United Energy System of Central Asia belongs to the republic.

The conclusion is as follows: energy is important for the development of Uzbekistan. An energy-efficient house is a building that consumes very little energy to maintain a comfortable microclimate inside the building. Energy savings in such buildings reach up to 90%. Annual energy consumption in this type of buildings can be less than 15kWh per 1m². As an example, most of the private houses built today (reinforced concrete foundation, "warm floor" system without additional heating, walls 1.5 bricks thick with cement plaster, conventional plastic windows, roof thermal insulation 150 mm and without an air handling device in the ventilation system) the amount of energy used for heating is 110-130kWh per year per 1 m². The following classification of houses has been adopted in the European Union. In the field of energy efficiency, enough experiments and tests have been carried out in the world, and it is necessary to consider them in accordance with the climatic conditions of our Central Asia. The suggestions and solutions of Uzbek scientists should be taken into account in the implementation of the measures mentioned above. Based on world experience, it is necessary to study their achievements and shortcomings and adapt them to our conditions. Of course, taking into account all the above points, it is necessary to comply with the requirements of the QMQ and regulatory documents. When conducting energy analyzes in buildings and structures, we go to the enterprise, familiarize ourselves with the documents, make calculations, calculate the daily and monthly capacities and give suggestions depending on the situation. I went to "Keyvan textil Rivoj" JSC gray production enterprise, which belongs to Andijan district ETK, and analyzed daily and monthly energy consumption as a practical experiment. Energy audit organizations for conducting energy audits are determined on the basis of rating indicators. Analysis of energy balances plays an important role in determining energy saving



opportunities. The energy balance is an important description that determines the state of the enterprise's energy economy, and determines the relationship between the energy supplied to the enterprise and the energy used and waste. When developing energy saving measures or conducting an energy audit, the parameters of all elements of heating, ventilation and air purification systems and their design features are determined from the building project. It is also necessary to specify the annual operation mode of the control systems and the measurement of air parameters. The design load of ventilation and air conditioning devices is determined from the project of the enterprise or organization. In the absence of such data, it can be determined by analytical methods, taking into account the external and internal volume of buildings, specific ventilation characteristics and air temperature inside and outside the building. The main characteristics that should be determined when checking ventilation systems are: actual load moments, operating time of units during the day, indoor air load and average circulation temperature, air exchange in te Energy saving measures in heating, ventilation and air cleaning systems consists of the following.

1. Use of the economically feasible heat transfer resistance of external walls during the construction of external walls and additional insulation during the reconstruction of buildings. The event is aimed at increasing the thermal conductivity of the walls and improving the thermal protection properties of the building and reducing heat loss through the use of effective heat-insulating materials.

2. Plastering of ventilated external walls. The event is aimed at increasing the level of thermal protection of external walls.

3. Thermal protection of the outer wall at the place of installation of the heater. The event is designed to reduce heat loss from external barriers (walls) adjacent to heating devices.

4. Ventilated windows. The measurement is designed to reduce air permeability and increase thermal conductivity of window units.

5. Winding additional (triple) windows. The measurement is designed to reduce air permeability and increase thermal conductivity of window units.

6. Use of heat-absorbing and heat-reflecting windows. The measure is designed to reduce heat loss from solar radiation to buildings, which leads to comfort in buildings.

7. The device of shiny loggias. The event is designed to reduce the flow of external cold air entering the room in winter and increase the temperature in the loggia (behind the outer wall of the room).



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