UNIVERSAL PROBLEMS AND FACTORS IN ENERGY PRODUCTION AND ELECTRICAL SUPPLY SYSTEMS

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Abstract:

The article highlights universal problems in the energy sector and ways to address them. The main focus is on the current state of Uzbekistan's energy system, its challenges and their impact on human activity, as well as the importance of alternative energy sources. The study presents statistical analyses, modern technological solutions, and examines the relationship between human psychology and the energy system. As a result, the necessity for rational use of energy resources is substantiated. The article is intended for energy engineers, specialists, and young people interested in the field.

Keywords:

Energy, alternative sources, electricity, human factor, energy conservation, problems.

Introduction:

"A person armed with knowledge is the possessor of the greatest power," said Abu Nasr al-Farabi. In today's modern society, this idea is becoming increasingly relevant, especially in the fields of technology and energy. Energy systems are considered one of the primary means determining the economic and social progress of every nation. In his works, Islam Karimov particularly emphasized that the rational use and conservation of energy resources are crucial for economic stability. This article sheds light on the universal problems encountered in energy systems, their causes and consequences, and their impact on human life. The necessity of solving these problems is of great importance, especially for energy engineers, production specialists, ecologists, and young scientists.

Main part

34 years ago, our people, having taken their destiny into their own hands and gained the freedom and independence that they had longed for centuries, set themselves such great and noble goals as building an independent democratic state and civil society where no one will be humiliated, building a peaceful and prosperous life in our country, and taking a worthy place in the international arena. First of all, relying on our own resources and capabilities, rationally using our underground and surface resources, natural reserves in the interests of our people and future generations, from the very first days of independence, paying special attention to the upbringing of the younger generation, raising this issue to the level of state policy, in accordance with the National Program for Personnel Training, preparing a new workforce for our country, that is, knowledgeable, qualified specialists, developing the country's energy sector, rational use of natural resources, From the very first days of our independence, special attention was given to the upbringing of the younger generation, elevating this issue to the level of state policy. In accordance with the national program for personnel training, preparing a new workforce for our country - namely, knowledgeable and skilled professionals - has become one of the pressing issues of today. This includes developing the country's

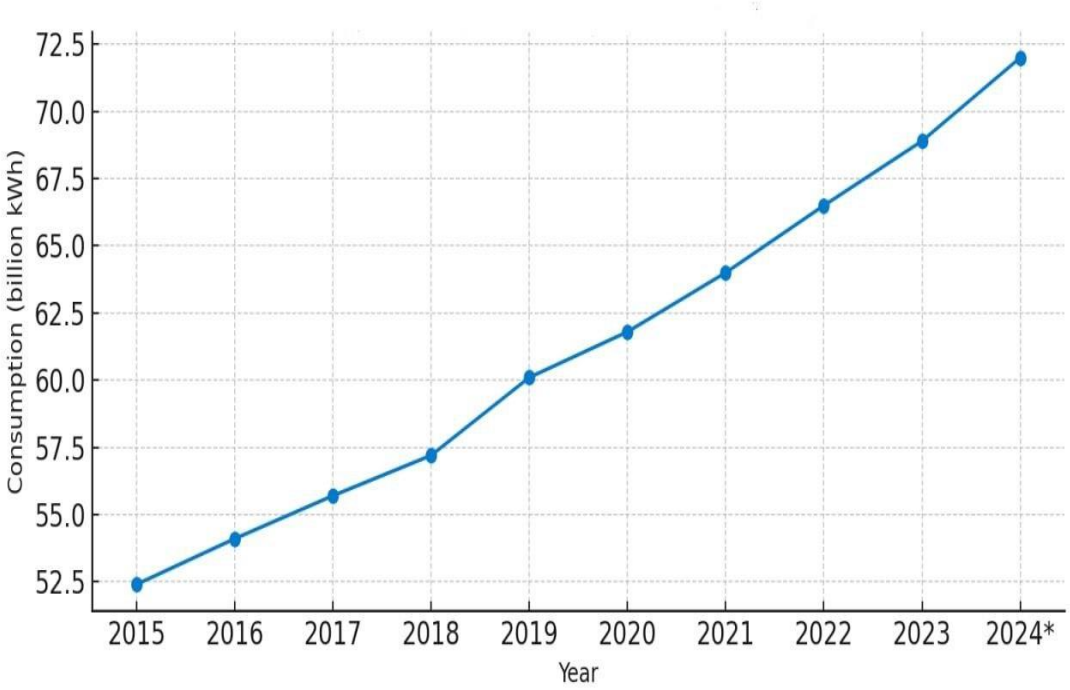
energy sector, ensuring rational use of natural resources, solving problems related to obtaining standard energy sources, creating autonomous power sources, and generating electricity using solar, steam, water, and wind energy. Additionally, training engineering and energy specialists to manage hydroelectric power plants, thermal power centers, and thermal power stations is of utmost importance. This is because currently, providing electricity is a vital necessity for people. Today, the rational use and conservation of energy resources have become critically important.

Table 1. Primary Energy Sources in Uzbekistan's Power System (as of 2024)

Energy sourse	Total share (%)	Advantages	Disadvantages
Gas fuel	45	Existing, capacity available	Not economical, environmentally harmful
HPP (hydroelectric)	15	Environmentally friendly, inexpensive	Dependent on water resources
NPP (nuclear power)	5	Stable production	Expensive and dangerous
Solar energy	20	Unlimited source, environmentally friendly	Expensive technologies, weather-dependent
Wind energy	10	Environmentally friendly, easy to use	Location-dependent, variable
Others (bio, etc.)	5	Renewable, independence	Technological complexity

In his book "Ways and Measures to Overcome the Global Financial and Economic Crisis in the Context of Uzbekistan," Islam Karimov outlines specific sections of the anti-crisis program as one of the main tasks of comprehensive measures. He emphasizes that implementing measures to reduce energy consumption and introduce an effective energy-saving system is crucial. Karimov states that further strengthening the competitiveness of our economy and improving the well-being of the population largely depend on how efficiently and rationally we can use our available resources, primarily electrical energy resources.

1st diagram . Annual energy consumption



The global economic crisis is making the need for continuous renewal and modernization of production even more pressing, requiring us to mobilize all our strength, capabilities, and resources. Currently, work is underway on projects to replace the existing low-efficiency gas units at three thermal power plants in Tashkent, Navoi, and Talimarjan with modern combined cycle gas turbine units. This is because the aforementioned gas installations for thermal energy production were built and commissioned in the 1970s and 1980s, and today they are not only physically but also morally obsolete, with an efficiency not exceeding 30%. A modern combined cycle gas turbine unit, however, can generate up to 60% electricity for power production, and this can be increased to 85% when both electricity and heat energy are produced.

2nd diagram. Technology efficiency

Currently, energy shortages are considered one of the factors that negatively and positively affect people. In these cases, various factors influencing humanity play an important

role in the use of energy resources, such as the human psyche in energy supply, the improvement of human activity with technology in the process of the operator-machine-mechanism system, psychological changes in human activity in the processes of reconstruction of energy systems, the use of anthropogenic methods, small autonomous power sources in energy consumption, alternative energy sources (thermal energy, hydroelectric power, bioenergy, wind energy, space energy).

For a full understanding of universal problems in energy supply, the theoretical and practical concepts of all energy problems, the impact of technology on humans, and the knowledge of engineers and workers during their work activities in energy supply are considered the most necessary factors.

Energy is a vital necessity for all living beings and plants on our planet, and it is an important factor in improving production.

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