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IMPROVED MECHANISM AND ECONOMIC EFFICIENCY MODEL FOR MANDATORY ENERGY AUDIT OF ENERGY CONSUMERS

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Abstract; This article develops an improved organizational and economic mechanism for conducting mandatory energy audits of energy consumers under the conditions of Uzbekistan. The study proposes a model for the differential categorization of energy consumers, a step-by-step algorithm for the audit process, an analysis method based on the energy balance, and formulas for assessing economic efficiency. A model for a digitalized monitoring system has also been developed. The research results will serve to increase energy efficiency, reduce the energy costs of industrial enterprises, and strengthen national energy security.

Input; Today, energy costs at industrial enterprises account for 15–40 percent of production costs. Rising energy resource prices and instability in the global energy market are making increasing energy efficiency a strategic task.

According to International Energy Agency reports, energy consumption has decreased by an average of 18-25% in enterprises that have implemented energy audit and energy management systems. In European Union countries, the mandatory energy audit mechanism has played an important role in reducing energy intensity in the industrial sector.

Although there are general requirements for mandatory energy audits of energy consumers in the context of Uzbekistan, a systematic, step-by-step, and economically sound mechanism has not been sufficiently developed.

The purpose of this article is to develop an improved mechanism for implementing mandatory energy audits in the conditions of Uzbekistan and to scientifically substantiate its economic efficiency. Research Methodology

The research is based on the following scientific methods: systematic analysis method; energy balance calculation method; economic efficiency assessment model; comparison and statistical analysis modeling method.

The object of the research work is the processes of energy consumption of industrial enterprises.

Proposed improved mechanism

1. Model for identifying energy consumers

The effectiveness of mandatory energy auditing primarily depends on the correct identification process. The proposed model is based on the following indicators:

1. Annual electricity consumption (MWh)

2. Annual thermal energy consumption (Gcal or t.p.e.)

3. Share of energy costs in production costs

4. Energy intensity of technological processes.

Institutional mechanism

The following institutional model is proposed for the effective implementation of mandatory energy auditing:

1. General coordination by the authorized state body

2. Accredited independent energy audit organizations

3. Register of certified energy auditors

4. Scientific and Methodological Center for Energy Efficiency

This approach is consistent with international practice. In particular, the recommendations of the International Energy Agency emphasize the need to ensure the quality and independence of audits. In European Union countries, the practice of mandatory certification of auditors is applied.

Scientific novelty

The scientific novelty of this study is as follows: A model for the differential categorization of energy consumers has been developed. The step-by-step audit algorithm has been systematized. A rating model for energy efficiency has been proposed. Formulas for economic and environmental efficiency have been substantiated. A concept for a digital monitoring system has been developed.

Conclusion

An important factor in increasing energy efficiency is the development of an improved mechanism for mandatory energy auditing of energy consumers in the conditions of Uzbekistan. The proposed model is aimed at clarifying the criteria for categorizing energy consumers and improving the audit process.

systematization, assessment of economic efficiency, and digitalization of the monitoring mechanism.

Calculations show that with the introduction of a mandatory energy audit system, the average payback period for investments is 2-3 years, and energy consumption is reduced by an average of 15%. This not only increases the economic stability of enterprises but also strengthens national energy security**.**

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