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FUEL-ENERGY NETWORK ECONOMIC DEVELOPMENT OF ACTIVITY

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Abstract
This article presents the system of indicators that describe the innovative potential of the enterprise by functional block, the assessment of the main factors affecting the economic efficiency of the fuel and energy complex,development of the fuel and energy industryfeatures highlighted,fuel and energy network activityTasks for increasing efficiency are indicated.
Keywords: energy security, energy supply, electric energy,fuel and energy, economic efficiency, transmission, sales, market principles, economic mechanism, thermal power plants, thermal power centers, regional energy market, vertical integration, tariffs, regulatory methods, management methods, economic risks.

ЙОНИҒИ-ЕНЕРГИЙА ТАРМОҚИ ФАОЛИЙАТНИНГ ИҚТИСОДИЙ РИВОЖЛАНИСҲИ

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Аннотация
Мазкур мақолада корхона инновацион салоҳиятини функционал блок бўйича тавсифлайдиган кўрсаткичлар тизими, ёқилғи-энергетика комплекси фаолиятининг иқтисодий самарадорлигига таъсир этувчи асосий омиллар баҳоси келтирилган, ёқилғи-энергетика тармоғи фаолиятини ривожлантириш ўзига хос хусусиятлари ёритилган, ёқилғи-энергетика тармоғи фаолияти самарадорлигини ошириш бўйича вазифалар кўрсатиб берилган.
Калит сўзлар: энергия хавфсизлиги, энергия таъминоти, электр энергетика, ёқилғи-энергетика, иқтисодий самарадорлик, узатиш, сотиш, бозор тамойиллари, иқтисодий механизми, иссиқлик электр станциялари, иссиқлик электр марказлари, минтақавий энергия бозори, вертикал интеграция, тарифлар, тартибга солиш усуллари, бошқарув усуллари, иқтисодий хатарлар.

ТОПЛИВО-ЭНЕРГЕТИЧЕСКАЯ СЕТЬ ЭКОНОМИЧЕСКОЕ РАЗВИТИЕ ДЕЯТЕЛЬНОСТИ

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Аннотация
В данной статье система показателей, характеризующая инновационный потенциал предприятия по функциональным блокам, оценка основных факторов, влияющих на экономическую эффективность топливно-энергетического комплекса, особенности развития

топливно-энергетической сети, а также показаны задачи повышения эффективности топливно-энергетической сети.

Калит сўзлар: энергетическая безопасность, энергоснабжение, электроэнергия, топливо и энергия, экономическая эффективность, передача, сбыт, рыночные принципы, экономический механизм, тепловые электростанции, теплоэнергетические центры, региональный энергетический рынок, вертикальная интеграция, тарифы, методы регулирования, методы управления, экономика риски.

Introduction

World experience shows that in the conditions of globalization of the economy, reduction of non-renewable resources, increased competition in the world markets of liquid hydrocarbons and solid fuels, modernization of existing technologies, development and introduction of new technologies, as well as in enterprises of the world fuel and energy complex, to ensure effective innovative development of the economy the use of alternative energy sources is becoming increasingly important. The state of economic efficiency of the fuel and energy complex of the countries of the world shows that today countries such as the PRC, Germany, the USA and Japan are leaders in the development and implementation of various innovative technologies in the energy sector. In China, almost 6.3% of the total volume of capital investments in the YoEK network, Germany – 5.1%, USA – 4.5%,

Wide-ranging scientific research is being conducted in the world regarding the economic development of the fuel and energy sector. In particular, the positive effects of the development of the fuel and energy network have been noted in the studies conducted on the issue of a comprehensive approach to the issues of more effective development of the fuel and energy network, the formation of economic approaches that ensure the effective development of the fuel and energy network, however, a comprehensive opinion on the direction and scope of these effects has not been formed. Based on this, it is determined that it is necessary to carry out additional research on improving the theoretical and methodological bases of increasing the economic efficiency of the fuel and energy industry.

In recent years, special attention has been paid to the economic development of the fuel and energy complex. According to the decision of the President of March 27, 2019 "On the strategy of further development and reform of the electric energy network in the Republic of Uzbekistan" [2], on the basis of JSC "Uzbekenergo", JSC "Issiqlik elektr stansiyali", JSC "National Electric Networks of Uzbekistan" were independent from each other. JSC and "Local Electric Networks" JSC were established. In addition, in order to organize an effective management system in the energy sector of the republic and to rapidly develop the sector, to increase its competitiveness and investment attractiveness, Decree No. PF5646 of the President of the Republic of Uzbekistan dated February 1, 2019 "On measures to fundamentally improve the management system of the fuel and energy network of the Republic of Uzbekistan" was adopted. In this decree, the following are defined as the priority directions of further development of the fuel and energy sector of the Republic of Uzbekistan [2].

Analysis of literature on the topic

Several economists are conducting scientific research on the concept of "energy security". Energy security is one of the most discussed topics today. But there is no

universally accepted definition of "Energy security". Therefore, the concepts of "Energy security" or "Energy supply security" are often used in practice. [3].

The impact of the innovative development of the fuel and energy complex enterprises on the national economy, the characteristics of economic growth and the rapid driving factor of increasing the employment of the population were studied in the study. Summarizing the research carried out in this direction, methodological approaches in assessing the level of development of fuel and energy complex enterprises, including innovative, technological, and systematic approaches were analyzed in the study, the possibilities of using them in the effective development of industrial enterprises were theoretically analyzed, and relevant conclusions were formed. At the same time, there is no specific international standard for energy affordability, it is studied among countries according to gross domestic product (GDP), inflation rate and per capita[4].

For energy exporting countries, security of demand can be as important as ensuring reliability and security of supply. In these countries, the economy and the state budget are highly dependent on income from energy exports. For example, the oil industry accounts for 42% of Saudi Arabia's GDP, 87% of budget revenues, and 90% of exports [5].

However, there may be conflicting views between producers and consumers regarding the optimal rate and rate of discovery. The International Energy Agency, which unites energy-consuming countries, considers the concept of energy security to be the availability and continuity of energy sources at a low price [6].

Research methodology

The results of the scientific research of national and foreign scientists, who were engaged in the analysis of the problems of increasing the economic efficiency of the fuel and energy industry, served as the theoretical and methodological basis of this study. In the preparation of the article, abstract and analytical observation, comparative and factor analysis, indicative, selective observation, comparison, economic-statistical and other methods were used.

Analysis and results

Today, oil, gas and coal are the main mining products of the fuel industry. Coal, which is mined as a solid fuel in YoEM, is a sought-after and industrially stocked fuel resource, and in many countries it determines national energy security. Until now, the coal reserves found in Uzbekistan are several hundred years old. In many countries, the price of coal is much lower than that of oil and gas, and the share of electricity generated by coal is 52% in the United States, 53% in Germany, and 78% in China. Analyzing the state of the world's mining industry complex, it can be noted that the annual production volume is 0.8-0.9 trillion. 70% of which corresponds to fuel and energy resources.

In the conditions of modernization of the national economy in the Republic of Uzbekistan, one of the main leading problems is the rational approach to the use of nature, the development of the base of fuel and mineral raw materials, and the improvement of the efficiency of the use of underground resources. In determining this situation, the following factors occur [7]: the presence of demand for fuel and energy resources in the domestic market, economic and social problems, state management of YoEM and the level of proper management of mechanisms supporting its development. Among the factors that hinder the development of the fuel-mineral raw material base, the following can be included: a decrease in the volume of reserves in connection with the reduction of geological

exploration, the difficulty and complexity of the conditions for the extraction of oil, gas and coal, as well as global price conjuncture of energy carriers and increased transportation costs. All this requires a review of the country's YoEM development strategy [8].

From the information given above, it is known that in the development of our economy, YoEM takes a leading position, and it is desirable to develop optimal options for economic and ecological development so that it occupies the same position in the future. In this case, the implementation of measures for the greening of the economic activity of the coal industry, which operates in direct harmony with the natural environment in the complex, will allow to achieve a number of positive results. In the development of technical and technological measures to increase the environmental level of fuel resource extraction, it is necessary to approach 2 main principles:

1. The main requirement for any newly created or used mining technique and technology is its absolute environmental safety.

2. Preservation of the natural environment surrounding a person has an undoubted priority over any technocratic decision in economic activity during the extraction of mineral resources [9].

The activities of the enterprises of the fuel and energy complex are complex and consist of various production processes, which require a comprehensive solution to the issues of economic and ecological development. The main attention should be focused on further increasing the positive effect obtained by implementing the economic, organizational, management and environmental programs of enterprises on the basis of a joint systematic approach. For this reason, it is an important scientific issue to justify the directions for ensuring the integration of the economic-ecological development of the coal industry of the fuel-energy complex and to develop its methodology.

Analysis of the internal environment and assessment of its innovation potential can be carried out in a detailed and diagnostic manner. A detailed analysis of the internal environment and an assessment of the innovative potential of the enterprise is carried out at the stage of the justification of the innovative project. A diagnostic approach is used in cases where access to information about the system is limited, that is, the diagnosis is carried out in the framework of open indicators for activity models and development issues in determining the directions of the innovative project and assessing the potential of resources.

The following aggregates of evaluation indicators can be distinguished for evaluation: product-related; functional; resource-related; management; organizational indicators. The basic assessment for the innovation potential of the internal environment is a functional aggregate that determines the innovation potential of the system. Indicators for this aggregate are presented in Table 1.

Table 1

Indicators describing the innovative potential of the enterprise by functional block [10]

Groups	Indicators
Cost indicators	The scientific volume of the manufactured product (the weight of ITTKI costs in the sales volume)
	Costs of purchasing patents, licenses, know-how
	Purchasing costs of innovative firms
	The structure of costs at the stage of innovation cycles according to the practice that has arisen in the world or in the network
	Availability and volume of funds for the development of innovative developments
Indicators describing the dynamics of the innovation process	The period from the time of realizing the demand or need for a new product to the time of its delivery to the market or to the consumer in large quantities
	The duration of the new product or technology development process
	The duration of the preparation process for the production of a new product
	Duration of the new product production cycle
	The weight of the developments carried out on the basis of marketing research
	The weight of commercially successful projects in the total amount of developments
	The weight of innovative developments of ITTKI divisions, which have achieved success in the market due to a successful marketing policy
Update rates	Indicators of the dynamics of product renewal (weight of products released in the total volume from two to ten years)
	Amount of new technologies purchased (sold).
	Volume of export of science and technology products
	The equipment renewal rate is based on completely new equipment, including

The energy potential of alternative energy sources is high. But their widespread use is associated with certain difficulties - the experimental-industrial description of technical decisions on the use of non-conventional energy sources and economic limitations [11]. There are many effective and low-cost examples of the use of such technologies in the world, but their use is evaluated by the fact that scientific and technical decisions in this field are expensive (Table 2).

Table 2

The cost of electricity generation based on different technologies[12]

Generate electricity way to do it	Cost of electricity, cents/kWh
Coal-fired thermal power plants	2.0
Wind energy	6.4
Geothermal energy	5.8
Biomass energy	6.3
Steam-powered gas turbines	4.8-6.3
Nuclear power plants	12.5
Photoelectric solar cells	28.4

Therefore, based on the above considerations, it can be concluded that it is of practical importance to form economic-ecological development options for the coal industry

of the YoEM and implement it based on the economic-mathematical model, which is created through the target function of minimizing the social-ecological costs of production capacity and reproduction. Therefore, it is desirable to develop methods for evaluating the effectiveness of the implementation and use of integrated economic-ecological systems in coal mining [13].

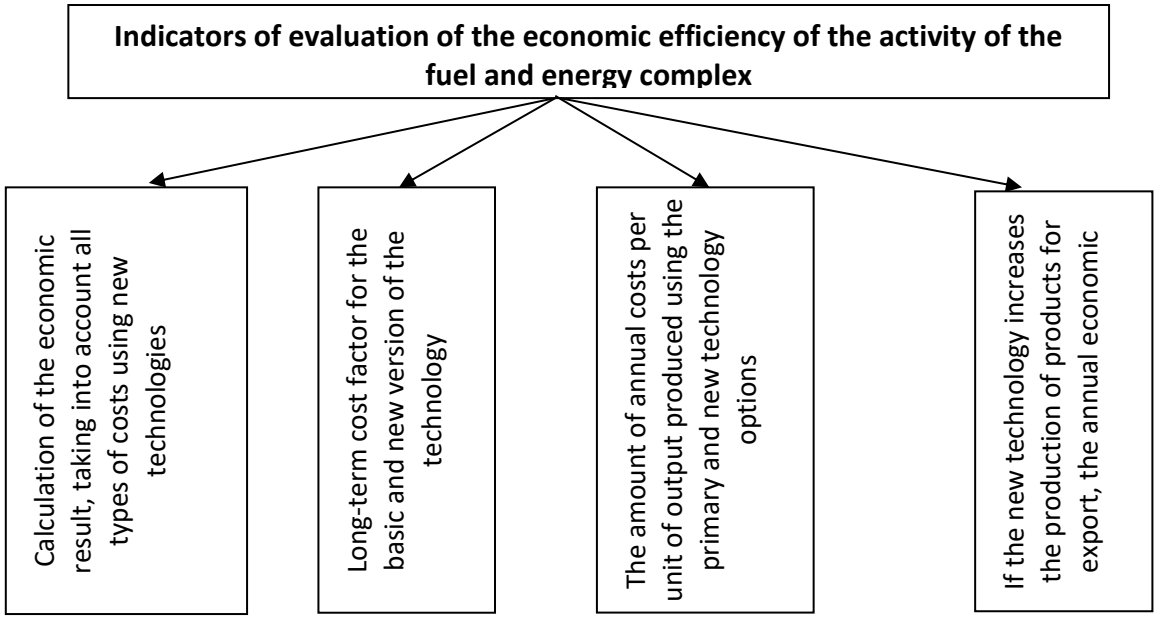

Figure 1. Indicators of evaluation of the economic efficiency of the activity of the fuel and energy complex

Source: systematized by the author.

The improvement is based on the principle of calculating the annual economic effect, which is equal to the saved amount of production costs, obtained from the introduction of technical and technological innovations. On the basis of this principle, indicators of the economic efficiency of the fuel and energy complex, which use a multifactorial approach to the objects of the internal environment of these enterprises and take into account the use of differentiated indicators of subsoil use, were proposed (Fig. 1).

During 2015-2022, it can be observed that the rate of gas extraction in the fuel and energy complex has increased. It was noted that the rate of oil production and, accordingly, its processing decreased, and the rate of coal mining and, accordingly, the production of electricity increased from year to year (Table 3).

Table 3

Total product of fuel and energy industries volume growth rates (in percentage terms compared to the previous year)[14]

Network	2015	2016	2017	2018	2019	2020	2021	2022	2015-2022
Electric power industry	102.7	101.1	103.0	101.3	102.2	105.8	110.3	103, 0	133.1
Coal	98.2	108.5	95.3	109.2	110.0	90.4	111.3	104.4	128.1
Oil production	101.3	102.9	104.5	97.7	91.9	112.9	96.2	93.7	99.5
Oil processing	90.7	100.9	94.1	105.4	99.9	93.0	97.2	98.9	81.1

Gas	110.3	100.3	109.7	99.8	96.9	112.5	101.5	100.5	134.7

The feasibility of replacing natural gas and oil products used in the production of electricity, increasing the share of coal in the structure of the republic's fuel and energy balance serves as the main factor for the priority development of the coal industry.

There is no doubt that innovation and investment processes are one of the factors driving the future economic and ecological development of YoEM. The study of the characteristics of innovative-investment processes in the fuel and energy sector of the industry determines the compliance of the main directions of increasing the efficiency of the fuel industry with the policy of modernization of the economy of Uzbekistan. In 2010-2017, the analysis of the study of the dynamics of the production of products in the fuel and energy industry showed that the development of the complex is stagnant (Table 4), and the increase in the capacity of extraction of fuel resources creates an opportunity for the increase in environmental damage. Therefore, it is appropriate to carry out innovative-investment processes integrated with economic-ecological measures in the activity of the complex. Today, the market conditions of fuel resources are changing. The reason for this is not only the sharp changes in oil prices, but also the decrease in energy carriers.

Table 4

Types of products in fuel and energy industries production dynamics [15]

Product types	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
coal, thousand tons	3629.4	3844.8	3753.0	4090.0	4396.8	3488.0	3867.3	4038.6
Electricity, mln. kWh	51976.3	52806.2	52999.6	54618.6	55766.0	57658.1	59100.5	60092,3
oil, thousand tons	2017.9	1901.6	1571.7	1279.8	1031.3	1000.1	867.9	806.0
Gas condensate, thousand tons	2019.5	1835.6	1765.4	1887.4	1835.8	1728.0	1747.5	1961.7
Automobile gasoline, thousand tons	1413.8	1323.2	1237.2	1164.3	1068.1	1064.0	1134.3	1106.2
Diesel fuel, thousand tons	1127.9	1052.0	1009.3	1125.3	982.1	1286.4	1008.3	962.9
Fuel oil, thousand tons	321.7	278.3	255.2	202.3	143.7	89.8	93.4	111.4
Liquefied gas, thousand tons	369.8	365.4	382.1	559.6	606.8	836.3	654.9	692.9

Activation of investment processes, increasing the level of use of its reserves should be the reason to get out of the current tension in the economy. Only in this way, during the period of economic reforms, new directions of formation of investment reserves will serve as a basis for the growth of the processing base in a specific sector of the economy.

Taking into account the aforementioned, as well as the fact that the fuel and energy complex is considered a system-forming structure of the national economy, it can be noted that it can stimulate economic growth and thereby increase the well-being of the population. and the interrelationship between the development of the fuel and energy complex (based on VEF data for 2007-2017) was studied. Studies show that positive growth of the EAPI (Energy Architecture Performance Index) index is very important for the economy of the country and for the stable growth of GDP.

The analysis of statistical data on the extraction of fuel and energy resources and energy consumption in the world showed that coal remains the leading place among energy sources (Table 5). Therefore, it is natural that along with coal mined as the main raw material, the amount of secondary resources and man-made resources resulting from coal processing will increase.

Table 5

Forecast of energy consumption in the world[16]

Energy source	Years				
	2020	**2025**	**2030**	**2035**	**2040**
Oil, mln. t	4377	4531	4650	4738	4820
Natural gas, mln.t n.e.	3650	4010	4360	4745	5050
Coal, mln.t n.e.	4317	4480	4648	4851	5027
atomic energy, mln.t n.e.	680	752	840	901	940
Hydropower, mln.t n.e.	995	1087	1180	1256	1288
Renewable energy sources, mln.t n.e.	507	685	871	1085	1310
Total, million tons n.e.	14526	15545	16549	17576	18435

Rational and integrated use of minerals, expansion of their processing and extensive use of secondary raw materials, reduction of losses in the extraction and processing of mineral raw materials, full processing of mines, use of "useful" wastes are the main and constantly recognized direction in the development of mines. In general, the coefficient of extraction of mineral raw materials from mines in coal and natural gas extraction is 80-85%. 60-70% of the oil reserves found in the mining process remain in the mines [17]. For construction materials, this figure is 30-40%. In all cases, experts emphasize that it is possible to increase the coefficient of mineral extraction.

Conclusions and suggestions

In short,A comprehensive analysis of the problems of the effective development of the activities of enterprises of the YoEK sector shows that resource taxes put great pressure on the level of profitability of organizations of the energy complex. Taking into account the availability of sufficient financial resources as one of the important factors that ensure the effective development of enterprises, a mechanism for reducing the tax burden aimed at allocating additional funds for the activation and acceleration of the activities of energy complex enterprises is proposed as one of the solutions to this problem.

alsoThe following measures should be implemented in order to develop the activity of the fuel and energy sector:

- formation of an effective legal framework for the entire energy sector, management, coordination and monitoring of the activities of natural monopolies;

- guarantee and control of all sectors of the economy and population with fully reliable energy by relevant state bodies;

- ensuring effective management of strategic reserves of energy resources in the energy sector, development of renewable energy sources;

- modernization of the outdated technological base of the energy sector, effective implementation of the investment policy in the scientific-technical and energy sector;

- development of modern safety standards in the field of energy, development of a state control mechanism for reducing environmental risks and preventing natural disasters.

Thus, as a result of the implementation of the specified measures, the efficiency of the fuel and energy industry, the saving of production and material resources, the acceleration of service provision and the reduction of costs will lead to the development of economic sectors.

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