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Improving the Efficiency of the Use of Renewable Energy in the Energy Sector

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Abstract: This scientific article explores the reforms and their results in improving the efficiency of the use of renewable energy in the electricity sector, the problems that persist in the network, the problems in the regulation and management of the electricity sector, and offers and recommendations on ways to eliminate them.

Keywords: management efficiency, control mechanism, power generation, competitive environment, energy resources, energy facilities, photovoltaic power plant, hydroelectric power plant, AES, renewable energy sources.

Introduction. The development of the country's economy depends on the amount of its natural resources and raw material resource base. Taking gas, oil and coal as natural resources and raw materials-all this is part of non - renewable resources. The role of the power source in the development of the economy is considered important. In the production of electricity in our republic, it is today that gas, oil and coal are mainly used. But the power generated cannot fully supply the sectors of the economy. There is an increasing need to use alternative and renewable energy sources to fully meet the demand for electricity.

In the field of electricity generation, additional electricity is generated in the field through the use of renewable energy sources. Alternatively, the efficient use of energy resources in the future will allow the ecology to reduce the amount of harmful gases being released, while saving underground resources and reserves. Therefore, in developed countries, economic growth is achieved in all sectors of the economy, using alternative and renewable energy sources.

The use of renewable energy sources in the development of the energy sector is becoming a component of the overall strategy of the sector. One of the most important characteristics of renewable energy sources is their energy potential – an indicator that determines the amount of energy that is characteristic of the corresponding type of renewable energy sources.

On the basis of the perspective directions of the development of renewable energy sources (QTEM), the world trends in changes in the structure of energy consumption and the subsequent diversification of sources of energy supply should be taken into account. Long-term trends in global changes in the world energy markets have determined new tasks for the large-scale involvement of the QTEM potential, which will affect the development prospects of national economies and the formation of dominant energy policy prospects in the field of production and consumption of fuel and energy resources.

"The main areas of public policy in the field of renewable energy use are: setting priorities and implementing measures in the field of renewable energy use; development and implementation of state programs and other programs in the field of renewable energy use; development of international cooperation in the field of renewable energy use" [1].

2017 –2021 In order to expand the use of renewable energy in the strategy of action on the five

priority areas of development of the Republic of Uzbekistan , to reduce the energy capacity of production, to realize the established priorities in the field of targeted implementation of national scientific and technical developments and the research of tested International Energy Technologies in the field of, on the program of measures to improve energy efficiency in the sectors of the economy and in the social sphere, the resolution"PQ-3012" was adopted.

Through this decision, High opportunities for the use of renewable energy sources (solar, wind and biogas energy, hydropower of small natural and artificial watercourses) were created in the field of electricity generation. Alternatively, additional energy capacities were generated in the field of electricity generation.

In the production of electricity all over the world, mainly non-renewable resources are used. As a result, this leads to a very high level of air, water and soil damage in many regions of the world. This is causing the environmental imbalance of the world's environment that harms people's health and biodiversity.

The implementation of the proposals of energy distributors in two directions is progressing: the cultivation of coal, oil and natural gas; the development of new technologies that allow access to new resources, such as both renewable and non-traditional sources of oil and gas. The need to further develop the economy of Uzbekistan and maintain a balanced system of production and consumption of fuel and energy resources should be taken into account world trends in the field of development of unconventional energy. The effect of further increases in prices for traditional sources of energy affects the increase and accelerated involvement of non-traditional sources of energy in the balance sheet. That is, the more the economy collides with the pressure exerted through price and, accordingly, with competition, the more visible role the technological changes in the energy sector play in the formation of the qtem balance sheet. The transformation of these trends towards the development of the energy sector of Uzbekistan will determine new tasks that will allow the formation of a more efficient and divesified structure of the national fuel and energy balance in the future.

Analysis of thematic literature. Private business plays an important role in the development and implementation of Qtem in Qatar country. An example of this is the organization of activities in the form of a cooperative, which is common in the world. The problem of energy dependence is solved by the formation of Service cooperatives. In the United Kingdom, for example, close to 5 MNG cooperatives are involved in the solar power and wind power sectors. In the United States, about a thousand cooperatives received $ 75 million. catering to people, Belgiyaningekopower covered about 50 thousand people.

Energy cooperatives in European countries generate electricity from renewable energy sources to meet their needs or sell to the network. For example, German cooperatives specialize in generating electricity and distributing it among their members, giving consultations, as well as growing synthetic diesel fuel from biological materials. The dynamic development of electric cooperatives is explained by the initiatives of local communities, as well as the state support, which is much more important.

The specificity in the legislative framework for the development of Qtem in foreign countries is the adoption of laws and under – laws, as well as strategies for the development of Qtem at the national level, as well as local and network level programs. Regulatory documents and standards are widely used in the field of QTEM. They can be installed not only in relation to technologies (for example, devices for converting solar energy into electricity) or systems (for example, building norms and rules), but also in relation to the co-availability and quality of information (for example, obligations related to the energy marking of household equipment). Regulatory documents and standards can also cover requirements in relation to monitoring, and in part in accordance with the use of energy for industrial purposes. Regulatory documents and standards may also require utilities to implement management programs on demand or incorporate

renewable energy resources into their fuel balance structure. Regulatory documents and standards can be both mandatory and voluntary.

The main proverb from the use of renewable energy sources is not to reduce the reserve of valuable resources, limit the pollution of the environment with greenhouse gases and the migration of salts around the world, not to adversely affect the absorption of the Earth's surface, and not to produce energy in vain.[3]

All types of energy resources are the result of natural transformation of solar energy. Coal, oil, natural gas, peat, combustible mountainjins and firewood are reserves of radiant energy of the Sun obtained and modified by plants.[4]

There are problems with the extraction, processing and consumption of each energy source. With the problem of energy security all over the world, increased competition in the world market can, as a rule, threaten energy security in certain regions, states.[5]

In the context of increasing demand for global energy in the process of industrialization, sustainable development cannot be achieved without renewable energy sources. According to the U.S. Department of ener-giya, the world's energy consumption was 13.8 billion in 2012. t.n.e.ga in the case of a tie, the rate increased by an average annual rate of 1.4 percent in 2012-2040 to 20.5 billion in 2040. t.n.e.ga it is projected to reach.[6]

The indicated level of electricity consumption corresponds to the industrial development strategy developed by the Center for effective economic policy. According to the experience of leading countries, an increase in the share of industry in Uzbekistan from 20 percent to 35-45 percent is planned.[7]

Renewable energy sources increase rapidly in energy consumption. The consumption of renewable energy in the world has grown very rapidly in 2012-2040, with an annual average of 2.6 percent.[8]

The types of fossil fuels, such as oil, natural gas, coal and uranium, at the same time form the basis of the world energy balance and will remain so in the near future. However, the resources of these fuels are increasingly depleted due to their processing and use. At the level of the current use of energy resources, the world's oil reserves - 45-50, natural gas - 70-75, Tashkent - 165-170, brown coal - reach 450-500 years, and nuclear fuel-relatively more years.[9]

Today, it forms the basis of the country's economy. In the economic development of the Republic of Uzbekistan, effective use of oil and gas resources, application of innovations in the fuel and energy complex, and use of modern technologies in the field are considered necessary. Therefore, it is important to organize innovative management in the activities of enterprises in the oil and gas industry as the main direction of increasing the efficiency of the oil and gas industry in the economy of Uzbekistan. Based on this, it is important and urgent to study the possibilities of using external and internal resources in order to improve the management of enterprises in the oil and gas industry. [10]

The existing problems and shortcomings in the electricity sector or the ongoing economic reforms in this sector will certainly have a negative or positive impact on other sectors. Because without electricity, no industry or network can plan its future. In this regard, a number of resolutions and decrees of the President of the Republic of Uzbekistan have been developed to radically reform the electricity sector. [11]

Therefore, taking into account the existing technical capabilities of renewable energy sources, it is necessary to determine their place in the current and future energy balance of the country. Until now, there is a lack of sufficient theoretical and scientifically based information on renewable energy sources in the production sector, including experiences on the use of solar, wind and organic waste energy. [12]

By regulating and effectively managing the energy sector, it is possible to ensure the growth of

the entire national economy and the development of the rest of the sectors. To do this, it is necessary to widely use the experiences of advanced foreign countries in the adoption of laws and decisions on the development of the energy sector. [13]

In the sustainable development of the country's economy, there is always a need for uninterrupted (regular) and quality electricity supply. In particular, the simultaneous supply of electricity to the production, service and infrastructure sectors is a complex technological process. Because the demand and supply of electricity occurs at the same time. There is always an increasing demand for electricity from all sectors and sectors, but the possibility of regularly supplying all sectors and sectors with electricity at the same time creates complications. The growing demand for electricity in countries around the world is causing global problems in the economies of countries. [14]

The formation of competitive relations in the field of natural monopolies combines more complex and multifaceted problems. Many experts and scholars who study the problems of competition and monopoly express different views on the problem of competition, but they do not give a clear definition of the term, there is no fixed model of defining the relationship between enterprises or organizations as competitive, clear formulas affecting efficiency also not developed. [15]

The problem of energy security is determined by the uneven distribution of natural fuel and energy resources on earth and the regional disparities between energy-consuming and energy producing countries in the socio-economic development of countries. Within the framework of energy security, countries are divided into two groups. In the first group - energy-exporting countries, that is energy-producing countries, in the second group - energy-importing countries, that is energy-buying countries. Countries in both groups strive for economic development. [16]

Energy security and energy efficiency are the main strategic goals of any state energy policy. In increasing the energy security level, it is necessary to include in the main components of the state energy policy: the introduction of an effective management mechanism in the use of resources extracted from the subsoil in the country's territory; constant conduct of structural changes in the energy sector; organization of the fuel and energy market on market principles; formation of a rational fuel; development of modern scientific and technical policy in the energy sector; formation of a competitive environment in the regional energy market and a regulatory framework in which international standards are compatible. [17]

Companies operating in the electric energy sector of developed countries are constantly improving their traditional management mechanisms in order to have their own consumers in the electric market. In particular, long-term strategies for the development of the industry are being developed, incentive mechanisms for electricity prepayment are being introduced, programs based on effective innovation ideas are being developed in the field to improve the Access System of capital investments and customer service. [18]

Ensuring high rates of qtem potential recruitment is forecasted in electricity with the greatest technological potential. The structure of fuel consumption in electricity changes: over the next 15 years, 50% of the total growth will be provided at the expense of non-fossil types of fuel. Renewable energy sources contribute the most to the growth of electricity production.

In the successful development of the QTEM sector, it is important to carry out measures to establish mechanisms and institutional framework that regulate these processes.

The experience of developed countries of the renewable energy sector shows that for the effective management of this sector, the role of the state is primarily important. State bodies carry out the policy of its development at a strategic level, introducing the most important mechanisms for the development of QTEM. The next important ring implementing the qtem development policy is the local level or the level of local authorities of management. Local authorities play an important role in the implementation of the policy of development of Qtem,

zero this level is maximally close to the latest consumers.

Research methodology. The paper made extensive use of scientific studies, comparative comparisons, statistical studies, and economic comparison and analysis of aspects of renewable energy use in the electric power sector, logical reasoning, scientific abstraction, analysis and synthesis, induction, and deduction.

Analysis and results. Global consumption of fuel and energy resources (YoEr) over the past twenty years has been estimated at 12.7 billion.t.n.e. growing to, the average annual rate of growth was 24%. For example, the consumption of Yoer in China in 1990-2011years - increased by more than 3 times, and the electricity demand – by 7.6 times, in India – by 2.4 and 3.6 times, respectively.

Consumption of QTEM – wind energy adds the most share to the global volume, which is 5-6%, then geothermal energy and biomass energy – 36%, followed by solar energy – 14%. In terms of growth rates, in the last 10-15 years, a trend of qtem consumption is achieved that leaves excellent taasurot. The use of solar energy increased by 180 times, the use of wind energy – by 24 times, the use of geothermal energy and biomass – by 2.5 times. Thus, in recent years, solar energy has become more developed, which assumes that in the future its share in the composition of QTEM will grow even more.

The high results of the growth in the use of renewable energy at the level of both global and separately obtained countries were helped by the strong political will of a number of countries, as well as the complex use of various mechanisms in the development of this sector.

In the field of electricity generation, the types of energy resources that can be used, non-renewable and renewable. There are more types of renewable energy resources than non-renewable energy resources. But today in our country, mainly in the field of electricity production, non-renewable energy resources are used (Figure 1).

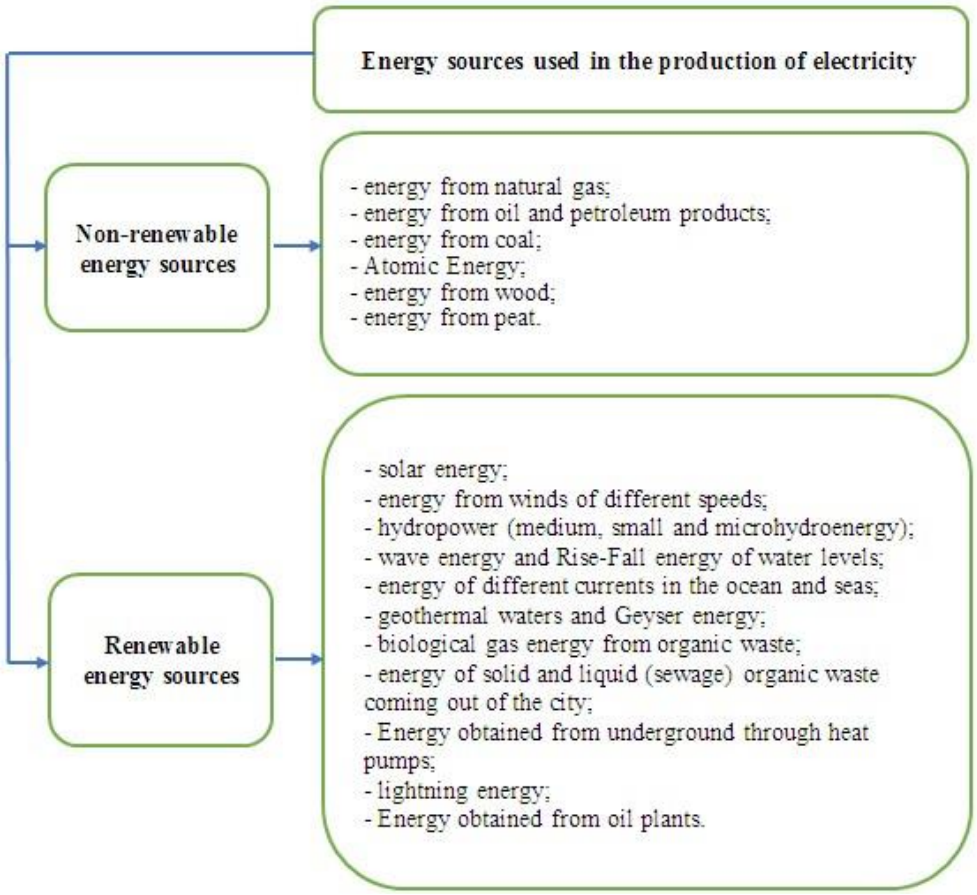

Figure 1. Energy sources used in the production of electricity

When using renewable energy sources in the production of electricity, it has some disadvantages, namely the fact that for most types of renewable energy sources, the energy flow is not dense and variable, and the comparative value in its technological properties in production is high. But in the future, it is possible to have high economic efficiency opportunities through the use of modern innovative technologies in the use of renewable energy sources.

In the soahas of electricity generation in the Republic of Uzbekistan, a forecast of how much power will be produced in which regions using renewable energy (QTEMS) in the period up to 2030 is given. How much gas can be saved per year when using renewable energy sources is shown in Table 1.

Table 1. Assessment of the potential for the introduction of renewable energy (QTEMS) for electricity generation until 2030

Types of QTE	Proposed provinces of implementation	Plan resurrected power, MVt	Plan the production of the resurrection amounted to billion, kWh. s	In saved gas, billion m3
Sun	Republic Of Karakalpakstan, Navoi	2000	5	1,517
Wind	Republic Of Karakalpakstan, Navoi	40	0,08	0,024
Hydro	Tashkent, Surkhandarya, Namangan and Fergana	938	2,60	0,788
Obtaining biogas from animal and poultry waste	All	450	3,60	1,092
Biogas from wastewater treatment facilities	in the gods	15	0,12	0,0036
Total		**3443**	**11,40**	**3,457**

Table 1 aims to effectively use renewable energy sources such as solar power, wind power, hydroelectric power stations in electricity generation for the period up to 2030.

The interdependence between all peoples of management and the implementation of the Qtem development policy is an important condition for the successful development of the "green" energy sector.

The UK Government has been one of the most active advocates of the use of renewable energy, and this has played an important role in increasing sector capacity. Financial and law-issuing mechanisms will be introduced so that companies engaged in renewable energy resources can not only survive, but also prosper. To help businesses create technologies, a number of measures are developed that provide financial and political support. This sector is provided by the government with the necessary performance conditions so that investors can support it in the long term and make sure it is sustainable.

Energy conservation is playing an important role in the development of Qtem in the UK. The Energy Conservation Trust is providing independent and empirically based analysis on issues related to energy efficiency, small renewable energy sources and low carbon clean vehicles.

The policy for the development of Qtem in Norway is considered an independent state enterprise

under the Ministry of oil and energy, implemented by the agency for energy efficiency and QTEM ENOVA issues.Its main objective is to promote the optimal and rational (rational) use and production of energy from an environmental point of view, relying on financial instruments and incentives that market participants and market mechanics can encourage to achieve the goals of national energy policy.

If the role of Enova is to work it at a strategic level, at the operational level, it will be coordinated from a number of regional centers and other subcontractors for the effectiveness of energy and the development of Qtem for the purposes of coordination and implementation of their programs. Enova manages the Energy Fund, which funds programs and initiatives to help the implementation of sustainable goals.Enova works in the field of Special Applications: Development and distribution of thermal energy; modernization of the final consumption of energy and street lighting in industrial, commercial and residential buildings; wind energy; renewable enenrgian sources (in addition to wind energy). The Enova agency also works in some intersecting areas such as reporting, consulting and company transfer, skill development and education.

Sustainable energy of Ireland is Ireland's National Energy Agency. The agency helps and provides opportunities for the environmentally and economically sustainable production, supply and use of energy, in accordance with government policies in all sectors of the economy.

Its area of competence mainly concerns the improvement of energy efficiency, the development and competitive use of QTEM and thermal electro stations and the reduction of environmental impact on processes related to the production and use of energy, in particular, the elimination of greenhouse gases.

The agency is responsible for implementing important aspects of the green document on sustainable energy as well as the national strategy in the field of climate change, to the extent that it is envisaged in the National Development Plan.

The German Energy Agency (Detutsche Energie Agentur GmbH, abbreviated "DENA"), is a centre of expert knowledge on issues concerning energy efficiency, renewable energy sources as well as intellectual energy systems. Dena's mission statement is to promote economic growth and promote well-being while reducing energy consumption. DENA develops the market for energy- saving technologies and renewable energy sources in cooperation with stakeholders from political and business circles, as well as society in general.

China alternative energy development in accordance with the energy security concept in China, all sectors are under state control. For example, the coordinating role in this direction is played by the Energy Committee (National Development and Reform Commission, NDRC), which implements the Qtem development policy together with the State Center for renewable energy sources of the National Commission for Chinese development and reform. Decisions on the principles and directions of the development of qtem are made at the level of the Supreme state. The core of policy decision making in the renewable energy sector is the National Center for renewable energy research (China National Renewable Energy Center (CNRES). The purpose of this center is to develop a road map for the development of alternative energy.

Thus, foreign experience shows that the more efficient development of "green" energy is achieved in the conditions of liberalization of energy markets, where opportunities are created for the work of a maximum number of people (including the private sector), as well as for the wide involvement of investments (including foreign ones). Market liberalization assumes the transition from managing it on the principle of" top-to-bottom "(a specially created body distributes power among a limited circle of companies) to a" bottom-to-Top " system (first from manufacturers, with the addition of not too many QTEM manufacturers, applications are collected, and after that it is decided to support them in one way or another).

The Climate Change Act (), adopted in the UK in 2008, demonstrated the UK government's

leadership role in the world's fight against global warming and demonstrated its unparalleled willingness to respond for greenhouse gases being emitted. With the commitment to meet the 2020s and 2050s projected indicators for the implementation of renewable energy production and the reduction of gases emitted by greenhouses, the government has firmly prepared the UK to create a renewable energy sector in the country, which it once clearly states.

In the world experience, it is also common to have the support of a state in the form of so-called special purchase tariffs or "green" tariffs, in which the state guarantees the purchase of energy produced on the basis of QTEM at a certain price over the years, regardless of market changes. The purchase price of electricity produced on the basis of QTEM, the market will be higher than network tariffs. The" green " tariff format has been used in Germany, Italy, Denmark and a number of other countries, mainly in Europe.

The designation of special purchase prices implies the implementation of the following scheme. The state sets special tariffs on generalised energy from Qtem and imposes on energy networks the obligation to purchase it from producers at fixed prices. That is, the state is a guarantor for energy producers from QTEM. Energy networks, that is, network electricity suppliers, in turn increase the total tariff of electricity, thereby compensating for the difference in prices between them, conventional and alternative energy, at the expense of foreign consumers.

Conclusion. The experience of foreign countries in the development of renewable energy indicates that it is important for the development of this direction to create state support and conditions. This support is especially important in the early stages of the development of the QTEM sector.

For Uzbekistan, at the present stage of the development of the QTEM and the energy sector as a whole, it is important to support the state in the form of creating macroeconomic conditions, institutional and legislative foundations, forming an innovative environment.

In later years, one of the important priorities in the development of the world economy is the transition of growing economies to policies aimed at the development of renewable energy sources. This is the relevance of research on the assessment of decisive factors affecting the development of Qtemin, and in general, predetermined the need for improvement of energy sector management models. The process of re-appropriations in foreign countries is carried out according to various schemes, and their experience is very important for the selection of further directions for improving the management system of the renewable energy sector in Uzbekistan.

The results of an empirical study of factors affecting the development of qtem made it possible to determine the most significant of them. According to expert assessments, the price growth factor for traditional types of energy sources has a strong positive effect on various environmentally friendly technologies based on QTEM. Meanwhile, the prices of energy sources (fossil fuels) usually generalize more environmental norms, such as taxes and policies in the field of combating pollution, which stimulate the development of new technologies in the energy sector.

The growth factor of investments has a positive effect on economic growth and the use of new technologies. A favorable business environment is formed in the development of investments, and economic agents hope (believe) that they will prosper in the future. Therefore, renewable energy will remain dependent on this space. Secondly, investments will need an increase in the energy consumed, which will lead to an expansion in the use of renewable energy sources.

The growth factor of human capital quality affects the consumption of renewable energy in three directions. First, the growth of human capital (and the currents that affect the increase in the knowledge of people) contributes to the transition to the principle of the development of a "green economy" to a social trend. Secondly, the accumulation of personal human capital leads to an increase in individual economic growth. The growth of human capital within the framework of the general production function will be a consequence of both conditions and conditions of

economic growth at one time or another. Thirdly, as long as the quality of growth of human capital allows the use and use of new technologies. While the use of high-tech equipment in renewable energy is taken into account, skilled labor is a prerequisite for progress.

Studies have been conducted that rely on the analysis and evaluation of the effects of factors such as high-level industrialization of interactions between energy-capacitive and low-energy-capacitive networks affecting qtem. In these works, a higher level of industrialization requires a large amount of energy to produce vabu that can be replenished at the expense of renewable energy is justified.

In our opinion, it is necessary to take into account the importance of a comprehensive approach to solving the problem in the formation of a policy for the rapid development of the renewable energy sources sector. To accelerate the progress of QTEM, it is necessary to create a macroeconomic environment. The factors of the energy market in Uzbekistan, in particular the level of its liberalization, energy prices and the institutional model of management, have the most influence on the development of QTEM at the national level. It is also important to take into account technological factors as well as their variables such as science and innovation.

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