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STRATEGIES IN THE FIELD OF ENERGY CONSUMPTION AND ENERGY EFFICIENCY IMPROVEMENT OF THE REPUBLIC OF UZBEKISTAN

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A B S T R A C T

This article analyzes the aspects of systematization and implementation of strategies in the energy sector and improvement of energy efficiency in the republic. Effective energy security is achieved through the implementation of a deliberate strategy in this area, which covers government actions aimed at supporting national economic stability and security in the energy sector. The article also presents statistical data that provide an opportunity for a neutral analysis of the current state of the industry.

K E Y W O R D S

Energy, energy efficiency, strategy, energy security, energy policy, modernization, concept.

Introduction

The XXI century is marked by the intensive development of globalization, covering all corners of the world and affecting the sovereignty of States and their borders, as well as diversity in political and economic relations in the international arena. In this context, guaranteeing national energy security is becoming a priority for countries and regions. Experience shows that the effective provision of energy security largely depends on the implementation of a high-quality energy strategy, which involves a set of government measures aimed at maintaining economic well-being and energy stability. The main goal of such a policy is the optimal use of energy resources and the potential of the industry for dynamic economic development, improving the living standards of citizens and strengthening the international status of the country.

Methodology

The research work was based on scientific publications by Russian and foreign authors concerning the classification of energy policy and energy efficiency, as well as legislative and other regulatory documents. Data from scientific and practical events organized on this topic also played an important role in the formation of the methodological base. A systematic approach and methods of logical, comparative, and statistical analysis were used to analyze and solve research issues.

Result and Discussion

A study of international experience in the field of government regulation confirms that energy conservation and energy efficiency improvement are key strategic directions for many countries. These areas activate the introduction of advanced innovative technologies and equipment in the national economy. The experience of other countries shows that the combination of energy-saving measures with innovative activity leads to much more significant effects than their independent application. This highlights the need to integrate energy efficiency policies with innovative development processes, thereby creating the basis for technological renewal in industry and focusing on the use of efficient energy-saving solutions.

The key documents serve as the basis for the development of the Uzbek energy industry: the "Strategy for the development of the "green" economy of Uzbekistan for 2019-2030" and the "Concept of Uzbekistan's electricity supply for 2020-2030". The goal of the Strategy is to ensure the country's long-term economic growth in accordance with the Paris Climate Agreement, to which Uzbekistan joined in 2018. The objective of the Concept is to respond to the increasing demand for electricity, the deficit of which reached 9.4% in the period from 2012 to 2019, and consumption is projected to grow by 6-7% annually until 2030, while ensuring the sustainable development of the country's energy sector. [1]

The main task of the outlined Roadmap is to support the Government of Uzbekistan in fulfilling the obligations assumed under the Paris Agreement. The document confirms the technical and economic feasibility of Uzbekistan's transition to a completely carbon-free energy sector by 2050. Analytical data indicate the need to invest about $94 billion to transform the energy industry towards the complete elimination of greenhouse gas emissions by 2050. In general, the Roadmap outlines the specific steps required to achieve the set goals by the middle of the century. [4]

The regulatory framework related to energy efficiency is fixed in the Law on the Efficient Use of Energy Resources, which was approved in 1997. The main task of this legislative act is to form the basic legal framework for the protection and rational use of the country's energy reserves, optimize energy consumption and stimulate industrial development. In 2020, the law underwent updates, including the creation of the Ministry of Energy as a body specializing in the implementation of energy efficiency policies.

As of January 1, 2021, the following main energy efficiency programs and initiatives are being implemented in Uzbekistan:

1.The program for promoting renewable Energy and improving Energy efficiency in the economy and social sphere for the period from 2017 to 2021. The main objective of this program is to reduce energy consumption by 8-10% annually.

2. A roadmap for further increasing energy efficiency in various sectors of the economy and the social sphere, as well as stimulating the development of renewable energy sources. This initiative includes the implementation of 36 activities, of which 21 are aimed at improving energy efficiency.[5]

3. The roadmap for improving energy efficiency and saving fuel and energy resources at large energy-intensive enterprises in various sectors of the economy. Within the framework of this program, 29 measures are being implemented aimed at improving energy efficiency in energy-intensive sectors.

4. A comprehensive program of digitalization of the electric power industry for the period from 2019 to 2021.

There are several interested organizations in the institutional field of energy efficiency. The Ministry of Energy plays an important role in promoting energy efficiency policies, but there is some overlap with other government agencies in the industrial and construction sectors.

In September 2018, the Parliament of Uzbekistan decided to ratify the Paris Agreement and voluntarily committed itself to reducing specific greenhouse gas emissions by 10% by 2030 compared to the level of 2010. To this end, Uzbekistan submitted its first nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change. In October 2021, Uzbekistan updated its initial NDC, increasing commitments to reduce specific greenhouse gas emissions by 35% by 2030. The Center of the Hydrometeorological Service has been appointed the main state body responsible for coordinating the implementation of international obligations under the Paris Agreement. [5]

The Legislative Fund of the Republic of Uzbekistan related to environmental protection needs to be updated, since the main act in this area is the Law “On Nature Protection”, approved in 1992. In response, in 2018, the Uzbek government approved 16 National Sustainable Development Goals and 127 targets,[5] which should be completed by 2030, following the UN Global Agenda for 2030. In the context of climate initiatives, specific initiatives have been identified to combat climate change at the country level.

Renewable energy policy Due to its geographical location and diverse landscapes, Uzbekistan has great potential in the field of renewable energy.

The highest technical potential (conservative values) belongs to solar energy (176.8 GW), but the country also has good potential for biomass energy (2.9 GW), hydropower (0.4 GW), wind energy (0.4 GW) and geothermal energy (0.3 GW). The existing renewable energy targets relate only to the electricity sector and do not affect the heating, cooling or transport sectors in any way.

The strategy of innovative development of the Republic of Uzbekistan for 2019-2021 provides for the achievement of a 20% share of electricity production from renewable sources by 2025, while the Resolution on accelerated measures to improve the energy efficiency of economic and social sectors, the introduction of energy–saving technologies and the development of renewable energy sources provides for the achievement of a 25% share of renewable energy in electricity generation by 2030.[2] The intention is to achieve these goals through the construction of new renewable energy power plants with a total capacity of 10 GW, including solar (5 GW), wind (3 GW) and hydroelectric power plants (1.9 GW).

The legislative base of the Republic of Uzbekistan in the field of renewable energy consists of the Law "On the use of renewable energy sources", adopted in 2019. The Law provides for a number of financial incentives and benefits, including exemption of renewable energy producers from all types of taxes for up to five years, starting from the date of their state registration. In addition, according to the Program of Measures for the further development of Renewable Energy, energy efficiency improvement in economic and social sectors for 2017-2021, all consumers installing generating capacities receive a guaranteed “green” tariff based on official electricity prices for commercial consumers.

In addition to the above, in 2021-2022, tenders and auctions for the development of renewable energy are planned in Uzbekistan in accordance with the build– own–operate model together with international financial organizations (MFOs) and the conclusion of long-term (up to 25 years) contracts for the purchase and sale of electricity.

Thus, the modernization, diversification and improvement of energy efficiency of the industrial sector is one of the priorities of the Government to create jobs and improve living standards in Uzbekistan.

According to the study, the greatest potential for improving energy efficiency in the electric power industry is associated with such measures as:

-replacement of outdated thermal power plants and conventional boilers with high–efficiency combined cycle steam and gas turbines (PGT) - 0.922 million tons of oil per year;

-reduction of electricity losses – 0.165 million tons per year;

-reduction of own use by the energy sector – 0.058 million tons of oil per year.

According to an assessment carried out within the framework of the UNDP and the Ministry of Economy project "Support for Uzbekistan in the transition to the path of low-carbon development of the national economy", potential savings in the electricity sector will amount to 8.3 million tons of n.e., or 11 billion m3 of natural gas per year. The study emphasizes that only the commissioning of high-efficiency PGTS can reduce the specific energy consumption from 0.275 to 0.175 tons n.e./MWh. Additional savings of 2.63 million tons. E., or 3.23 billion m3 of natural gas per year, can be achieved through the construction of cogeneration plants at energy-intensive industrial enterprises

In the CAREC study on the energy sector financing roadmap, the potential energy savings in the electric power sector by 2030 are estimated at 6.85 million tons n.e. The calculation takes into account an increase in the average efficiency of gas-fired thermal power plants, which was about 33% in 2013, and a reduction in technical and commercial losses, which accounted for 23% of net admission to the network in the same year. The study also suggests that total energy savings could reach 25% in the next 15 years, although the analysis did not specify an exact baseline for such a forecast.

The latest report on the results of a comparative analysis of electricity losses published by the Council of European Energy Regulators (CEER) in 2020 also explains the lack of a consistent definition of electricity losses, especially with regard to non-technical losses, and the lack of consistency in the representation of losses as a percentage of energy entering or leaving the grid. For example, while the CEER report compares electricity losses in 35 countries as a percentage of revenue, the World Bank estimates this figure as a percentage of useful output.

Thus, only reducing electricity losses to the global average could be the most cost-effective measure to eliminate the shortage of electricity supply, which the government estimated at an average of 9.4% of demand in 2012-2019. The main reason for such a high level of electricity losses is the outdated elements of the main and distribution networks. According to the Ministry of Energy, 66% of the main networks and 74% of substations have a service life of more than 30 years. The service life of 62% of distribution networks and more than 50% of transformer stations has also exceeded 30 years.

Taking into account data on own consumption at thermal power plants and CHP plants, in 2019 the net efficiency of coal–fired power plants was 24.7%, and gas-fired power plants - 31.9%. The European Bank for Reconstruction and Development indicates that the net electrical efficiency of the new 1.56 GW power plant, which will be built by Siemens in Surkhandarya region by 2024, will be above 60%. Presidential Decree No. PP-4779 dated 07/10/2020 provides for planned fuel and energy saving in the amount of 1.859 million tons of energy efficiency, which is a mandatory energy efficiency target to be achieved in the electricity generation subsector by January 1, 2023. In accordance with the approved target parameters of fuel and energy saving, the relevant ministries and departments in the context of enterprises have developed and approved organizational and technical measures to save fuel and energy resources for 2020-2022 with justifying calculations of savings for each event.

Within the framework of the strategy of the Republic of Uzbekistan to provide the population and industry with electricity for the period 2020-2030, which was officially approved by the decision of

the Ministry of Energy No. 70 dated April 28, 2020, specific tasks have been identified to reduce electricity losses. This includes reducing losses in high-voltage transmission lines from 2.72% to 2.35% and in distribution networks from 12.47% to 6.7% of the total energy supply by 2030. However, there are no similar regulations in the existing legislation of Uzbekistan regarding the reduction of natural gas losses for operators of transmission systems (TSO) and gas distribution (DSO).

In Uzbekistan, the problems of climate change and environmental conservation are particularly acute, which is largely due to the environmental tragedy of the gradual disappearance of the Aral Sea. According to the information provided by the UN, the main factor contributing to this process is the active development of the agricultural sector and the creation of extensive irrigation systems on the rivers feeding the sea.

In September 2018, the Uzbek parliament approved the Paris Climate Agreement, committing to reduce the intensity of greenhouse gas emissions by 10% by 2030 compared to 2010, relative to gross domestic product. As part of these efforts, Uzbekistan has made its first nationally determined contribution (NDC) to the UN Framework Convention on Climate Change.

In October 2021, Uzbekistan revised its initial targets set in the NDC and raised the bar for reducing greenhouse gas emissions per unit of GDP from 10% in 2010 to 35% by 2030. In order to fulfill the Paris Agreement and international obligations in the field of climate, Uzbekistan has identified a national coordinator - the Center of the Hydrometeorological Service, a key state body in this area. The country's current legislative framework for environmental protection, based on the 1992 Law on Nature Protection, needs to be updated.

In 2018, within the framework of the UN global initiatives on sustainable development, the Government set 16 national goals and 127 related tasks aimed at achieving sustainable development by 2030. These goals include specific measures to combat climate change at the country level. To support these initiatives, Uzbekistan is actively working with international financial institutions and foreign state financial organizations, aiming to improve the legislative framework and obtain financing for projects that increase energy efficiency and develop renewable energy sources.

International financial institutions, including the World Bank Group, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank, as well as the Asian Development Bank (ADB), play a key role in attracting capital to the energy sector. The World Bank acts as the main reform officer in the energy sector, providing support in financing both public and private energy projects. For example, in 2019, significant reforms were carried out in the electricity sector with the support of the World Bank.

At the beginning of October 2020, with the support of the World Bank, 23 projects worth 4.44 billion US dollars were implemented in Uzbekistan. At the same time, the investment portfolio of the European Bank for Reconstruction and Development (EBRD) in the country reaches 1.1 billion US dollars, with 66% of this amount directed to the development of the energy sector and sustainable development. The EBRD not only finances projects, but also offers technical support for the formation of an independent regulatory institution and the development of renewable energy sources in Uzbekistan.

A detailed analysis of energy efficiency policy in the Republic of Uzbekistan | 2022 Partnership with the Asian Development Bank (ADB) in the energy sector covers six significant projects with a total value of 1.6 billion US dollars. ADB also provides expert support to the Ministry of Energy in developing a strategy for financial strengthening of the electricity industry.

Since 2020, the Government of Uzbekistan has introduced an innovative method of attracting foreign direct investment in the energy sector, focusing on cooperation between the private and public sectors. This strategy is aimed at increasing private capital inflows and at the same time reducing dependence on international financial institutions through the use of government guarantees.

Conclusion

Now the central and local authorities face a critical task — reformatting the fuel and energy structure in combination with improving the living standards of citizens. Achieving this goal is possible through the comprehensive application of measures to save energy and increase its efficiency, including the active introduction of renewable energy sources (RES). However, for the successful development of the renewable energy sector, it is critically important to create and approve an appropriate legislative framework, which has not yet been developed.

In the process of analyzing the key outcomes and conclusions of this section, the following obstacles were identified:

-The absence of an autonomous energy regulatory body in Uzbekistan;

-Strategic planning for the development of energy infrastructure focuses on approaches related to increasing energy supply, while not taking into account the need for demand management;

-The use of outdated, inefficient equipment and technologies in the electric power industry, which makes the power system extremely vulnerable and leads to frequent power outages;

-there is no transparent methodology for calculating, monitoring and verifying

planned savings. The existing legislative framework includes planned energy saving indicators for the electric power sector, but does not provide any targets for the transportation and distribution of natural gas;

- there is no policy that promotes highly efficient cogeneration;

- state-owned energy companies have no incentive to reduce their operating costs.

Energy supply is a key aspect of the nation's geopolitical strategy, requiring coordination of actions in the field of international politics and economics, which must be coordinated with domestic efforts. When forming a strategic approach in this area, economic interests and goals are determined by political priorities, emphasizing the close relationship between national domestic and foreign energy policies. This includes not only effective management of our own energy resources and their import, but also the development of strategies to minimize risks and introduce advanced technologies in the energy sector.

Therefore, improving energy efficiency and saving energy is a multidimensional task, since energy consumption affects all aspects of economic activity and social life. Studying the experience of European countries in enhancing energy efficiency demonstrates that the key element of progress in this direction is the active participation of both economically active groups and the majority of the population.

To address this task, it is critically important to implement a comprehensive energy strategy at the national level, which will include the efforts of the Government, the business sector and citizens. This will require a holistic approach combining economic, technical and managerial measures.

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