ORGANIZATIONAL AND ECONOMIC SITUATION OF ENERGY SYSTEM INFORMATION SECURITY OF ENERGY INDUSTRY ENTERPRISES IN UZBEKISTAN

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ABSTRACT

This manuscript provides an assessment of the organizational and economic status of the cyber security energy system of energy industry enterprises, as well as relevant suggestions and recommendations.

Keywords: *economics of cyber security, cyber hygiene, economic foundations of cyber attack measures.*

The Republic of Uzbekistan is one of the countries with the ability to fully satisfy the needs of the population due to its natural resources and energy resources. It has a significant share of electricity generation and supply capacities in the energy system among the countries of Central Asia. The Ministry of Energy of the Republic of Uzbekistan is considered a state management body in the energy infrastructure and sector1

In order to meet the demand for electricity in the country, the coverage of the set of technological processes of electricity production, its transmission, inter-system local distribution, as well as continuous consumption is "Heat power stations", "Uzbekistan National Power Grids" in the regions and "Regional Power Grids" according to the local geographical location. includes management of joint stock companies.

In recent years, the number of foreign investors seeking to establish cooperative relations with our country in the field of energy is increasing. In the Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis and the people of Uzbekistan on December 12, 2022, "... in the last six years, our population

1 https://minenergy.uz/uz/lists/view/22

has increased by 13%, and industrial enterprises have increased twice, from 45,000 to 100,000. As a result, the demand for electricity has increased by at least 35 percent and is increasing year by year.

For the sustainable development of our economy, we need 25-30 billion dollars of investment in the energy sector. This can only be achieved by attracting private investment.

Therefore, in the last three years, direct investments of 8 billion dollars have been attracted to the sector. Next year, 11 large projects with 4.5 thousand megawatts will be completed. In particular, additional 14 billion kilowatts of electricity will be produced at the expense of solar and wind power plants to be built in Bukhara, Jizzakh, Kashkadarya, Navoi, Samarkand, Fergana and Tashkent regions. This will increase the amount of electricity supplied to households by 50 percent1" - that he emphasized in his speeches, determines the scope of many measures that have been implemented and are required to be implemented in the field of energy.

Summary of investments made in the electric energy industry is faced with drastic changes based on efforts to improve the health of production activities, to ensure quality and efficiency of consumption continuity (Table 2.1).

In 2017, the share of investments in the power industry was very low, even negative, but by 2018, the practical effectiveness of measures aimed at the strategic development of the country's economy was more than 88 percent. Although the implementation of investment activity was not stopped in 2017, due to the reorganization of industry and sector enterprises based on the relevant decisions of the President, a sharp change in their financial account balance showed the passivity of the indicators. In 2018, the efficiency of investment activity is 4.1% of the total share of the industry, and corresponds to 3.4% of the total economic infrastructure. This industry is 80 times more than the oil and gas industry, 40 times more than the chemical industry, and its share in the information and communication sector is 0.3 percent. It represents the share of the investment sector of digital technologies in electric energy and the percentage of directed investment projects (Table 2.1).

1 Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis and the people of Uzbekistan, 20.12.2022

Table 2.1

Changes in the index of investment efficiency (ICOR) in economic sectors 1

T/R	Networks	2017	2018	2019	2020	2021	2022
	TOTAL share	**5,8**	**6,0**	**6,9**	**18,7**	**5,0**	**6,0**
2	**Industry**	**11,2**	**6,5**	**15,1**	**72,8**	**7,3**	**11,4**
2.1	oil and gas industry	5,9	1,8	1,5	-9,3	6,2	3,1
2.4	chemical industry	21,5	2,2	5,3	11,8	3,0	3,1
2.11	electric power	-24,3	88,8	49,0	16,0	15,0	12,0
4.1	the field of information and communication	2,0	1,8	4,9	5,1	3,0	2,1

In 2019, the implementation of investment projects was sharply reduced by 2 times, but it managed to achieve a higher indicator compared to the oil and gas and chemical industries. Also, 1.7 percent of investments in the field of electric power, aimed at digital technological support, were mobilized.

In 2020, it can be shown that the share of investment activity in which electricity is included has decreased by 3 times compared to 2019. This is characterized by the successful achievement of project goals and the impact of the pandemic period as a practical obstacle in establishing mutual relations. However, the main investments in digital technology supply are focused on electricity, with 2.2 percent, which means that significant attention has been given.

In 2021, we observed that the attraction of investments in the electric energy sector decreased by 1%, which did not make significant changes. However, with its main weight falling on reinvestment, it served as the basis for the development of investment independence

Investment mobilization by 2022 is 12 percent in the power sector, which is 3 percent less than in 2021, but four times more than in the chemical and oil and gas industries, which represents billions of investments. It is also worth noting that in 2022, the focus of equipment and equipment based on digital technologies on the power

1 Oqboev Elmuhammad, Iqtisodiy tadqiqotlar va islohotlar markazi “Iqtisodiy sharh” jurnali №9/20232017-2022 yillarda O‘zbekiston iqtisodiyotiga kiritilgan investitsiyalar tahlili [Analysis of investments made in the economy of Uzbekistan in 20232017-2022]

industry will make up 50 percent of the investments mobilized in the information and communication sector.

In the program of the development strategy for 2022-2026, the importance of economic development of the digital economy was shown. The process of digitalization of the economy will ultimately include complex processes at the expense of increasing the efficiency of the country's industries and sectors based on digital technologies, increasing labor productivity, and reducing the steps of the management system.

To date, the consistent development of the digital economy in our country has a significant impact on the increase of added value in the fields of information economy and electronic commerce. Alternatively, the largest digital economy corresponds to the value-added creation of the electric power sector and sectors of the industry.

Table 2.2

The volume of gross added value created in the fields of information economy and electronic commerce (2018-2022, billion soums)1

	2018	2019	2020	2021	2022	2020
Economics and e-commerce in the field of information	7,934.0	8,701.4	11,220.5	12,109	12, 998	13,461
From this						
Electric energy	1,099	2,471	3,729	5,583	5,990	6,780

The increase in the indicators of the efficiency of digital technologies characterized by participating in the field of electric energy, the ability to create added value in the form of value, in addition to improving the consumption of consumers, the fact that advanced technologies related to its production, distribution, routing and transmission are completely occupying the innovative infrastructure, the number of modern and smart stations is increasing.

The yearly increase of funds mobilized to the digital economy, in addition to increasing the supply of digital technologies in the electric power industry, also influenced the significant development of its digitization. No matter how effective digital technology is in creating added value, its inability to limit the activities of its mobilization may become the main problem of digitization.

1 Statistics Agency under the Office of the President of Uzbekistan

The management of electricity consumption on the electronic government platform, the simplified payment system, and the ability to perform various services online have further expanded. The payment system made through the mobile application has become convenient for the consumption of electricity, and the indicator of its use has shown a proportional increase (Figure 2.1).

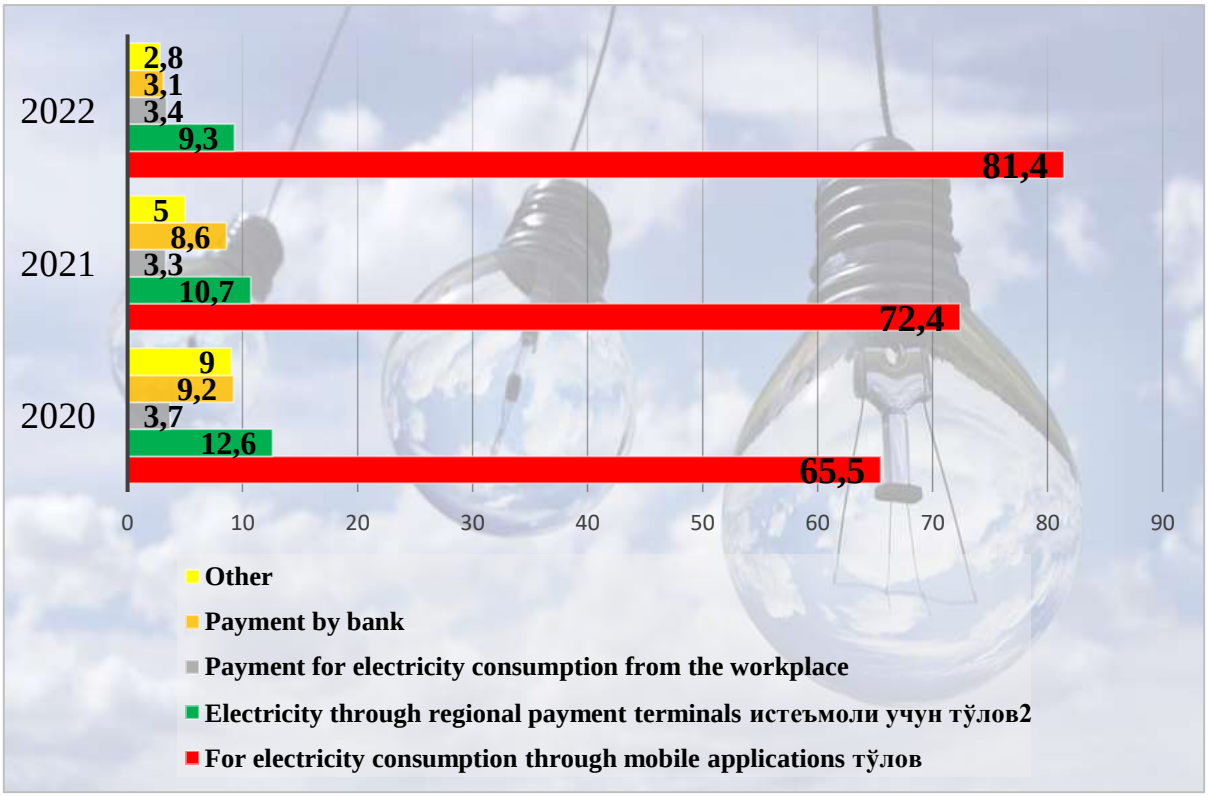

Figure 2.1. Dynamics of forms of payment for electricity consumption, (2019-2022, in percent)1

Based on the data presented in the figure above, the convenience of paying for electricity through mobile communications is growing significantly. But when using these applications, most consumers who do not have bank payment cards pay for their consumption through payment terminals, while consumers who pay directly from the workplace have a stable interest rate. There is also a large percentage of consumers who make payments through the bank, and most of them are citizens of Uzbekistan working abroad. Also, the consumers who do not use the above possibilities effectively are those who pay by going to the electricity authorities themselves.

Mobile app payments have grown by 40% in 2015 over the past 3 years, and the fact that they are increasingly taking over other payment methods further increases

1 Data from the Ministry of Digital Technologies, 2023

the cyber risk. Individual paying users are not exempt from information security. But their accounts, through its territorial division, create many cyber-economic attack opportunities. Accordingly, it is recommended to develop an organizational-economic mechanism of cyber-economic protection in the country, regardless of the type of payment.

Investors' orders for expert groups are currently in low demand. The main reason for this is the development of indexical management in the global economic environment, and the research of various consulting and research companies shows the individual views of investors based on indices and related reports. Investors can mobilize public funds depending on the country's position and rating on the index of the indicator of interest. On the basis of indicative ratings, the majority of investors follow the social, economic, financial, technological, defense and similar important indicators of countries, and the tradition of making decisions is becoming popular.

The experts of the International Telecommunication Union of the UN annually evaluate the "Global Cybersecurity Rating" by the countries of the world. According to them, the Republic of Uzbekistan is among the young cyber-safe countries. (Figure 2.2)

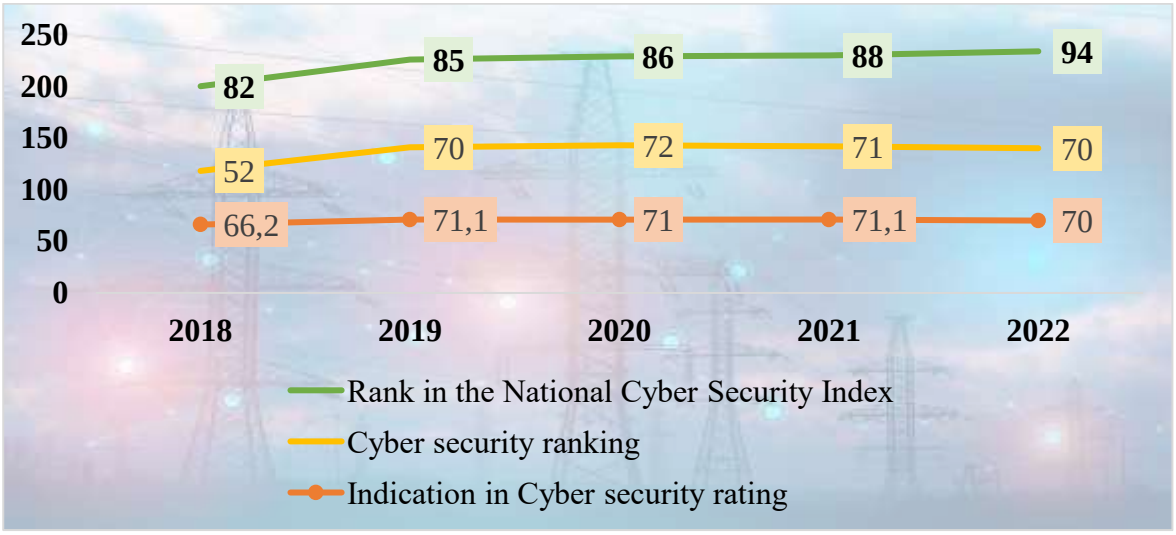

Figure 2.2. Evaluation of Uzbekistan according to the global cyber security index1

In addition to the development of the economic infrastructure, the digital technologies of our country have increased the demand for the protection system. As

1 https://ncsi.ega.ee/country/uz/

shown in Figure 2.2, according to the global cyber security rating of our country, although the percentage indicators are stable, the position in it has been decreasing. That is, as the technological supply grows, its protection system weakens and new problems are added to the problem that has not yet been solved.

In addition to the establishment of external cooperation and relations, the financial flow may slow down in the improvement of innovative and investment activities when the attitude to the economic infrastructure of the countries according to the index of cyber security is reported. This leads to a decrease in the investment attractiveness of our country, as a result of which our innovation market forms a position where it is undervalued and does not inspire confidence.

None of the investors who want to invest in the investment market will risk their funds due to the low protection system against cyberattacks, and may not want to conduct reliable cooperation in the development of science with representatives of countries that do not have the ability to ensure cyber security in their country. In order to solve such problems, it is necessary to consider the cyber protection system of digital technologies introduced into the country at the level of organizational and economic management. Accordingly, the formation of organizational and economic mechanisms and ensuring their activity is of urgent importance in the context of the development of the country's economy based on digital technologies.

In order to determine the effectiveness of the digital economic infrastructure, it is possible to analyze the level of readiness to carry out production activities based on digital technologies, the level of development of ICT, the level of development and its position of e-Government, as well as the level of activity of using mobile communications through evaluation indices.

According to the Digital Readiness Index, in 2022, Uzbekistan will occupy 80th place among 140 countries, 50 places behind the top 30 countries. This negative result is not counted, because this assessment is conducted taking into account the latest international standards. In this regard, our country has a 3-year lag in terms of operational standards management. Although it has competitiveness in the international competitive market, it is important that the standards are taken into account to increase the possibilities of the investment attractiveness and added value creation dynamics for the coming years.

Table 2.3.

The indicative role of Uzbekistan in the digital economy1

International indexes	Index indicator	Intermediate (by position)	Position in the rating	Total number of participating countries
Cisco Digital Readiness Index - digital readiness index	11,14	0-30	80	140
ICT Development Index – ICT development index	5,1	0-20	95	177
E-Government Development Index - e-government development index	0,77	0-1	87	190
Mobile Connectivity Index – mobile index	51,5	0-100	124	190

According to the developed level of ICT, Uzbekistan took 95th place among 177 countries with a result of 5.1%. In general, since this situation shows the characteristic of deviation towards negative results, it is recommended to review the mechanism of security in the field of ICT.

Today, it is impossible to imagine the necessary identification documentation work of the population without electronic Government. The rate of using this service in our country is 87th among 190 countries, with a coefficient of 0.77. This high result means that this service is used by every 7th citizen of Uzbekistan.

Today, mobile communication has become a means of communication available to kindergarten children and schoolchildren. The demand for it has also grown in proportion to the increase in the number of users. In particular, we can see that our country took 124th place among 190 countries and did not enter the top 100 with a coefficient of 51.5. Although it has a relatively low position in this regard, it also has its advantages. For example: the occurrence of short circuits between the communication networks of mobile communications will be less, the efficiency of Internet users in controlling the Internet speed will be higher.

1 Siman Kemp. DIGITAL 2023: UZBEKISTAN. 14 FEBRUARY 2023. https://datareportal.com/reports/digital-2023-uzbekistan

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