Volume 2, Issue 4 April - 2024 **ISSN (E):** 2938-3803

TOWARDS SUSTAINABLE PROSPERITY: EXPLORING ALTERNATIVE ENERGY SOLUTIONS FOR ECONOMIC GROWTH IN UZBEKISTAN

Djemilov Ridvan Narimanovich
Student, Department of Economics,
Fergana Polytechnic Institute, Fergana, Republic of Uzbekistan
E-mail: ridvandzhemilov@gmail.com

Kurpayanidi, K.I.
PhD in Economics, Professor, Department of Economics,
Fergana Polytechnic Institute, Fergana, Republic of Uzbekistan
E-mail: antinari@gmail.com
https://orcid.org/0000-0001-8354-1512

Abstract:
This article critically examines the potential of alternative energy sources to drive economic development while fostering sustainability in Uzbekistan's energy sector. Through a meticulous analysis of the country's current energy landscape, renewable energy potential, and policy frameworks, the study elucidates the opportunities and challenges associated with transitioning to sustainable energy practices. Drawing on international experiences and best practices, the article offers strategic insights and recommendations for policymakers, stakeholders, and investors to promote the adoption of alternative energy solutions and create an enabling environment for sustainable economic growth. By highlighting the economic, environmental, and social benefits of alternative energy development, this research underscores the imperative for Uzbekistan to embrace renewable energy as a pathway towards long-term prosperity and environmental stewardship.

Keywords: Alternative energy, Uzbekistan, Economic growth, Sustainability, Renewable energy, Energy sector, Policy frameworks, Transition, Environmental stewardship, Sustainable development.

Introduction

Increasing energy efficiency and expanding the use of environmentally friendly, non-traditional and renewable energy sources is becoming more and more important today. The effective use of renewable energy sources allows for to reduction of the amount of harmful gases released into the environment while saving reserves of underground resources. Therefore, great attention is being paid to the use of alternative energy sources in various sectors of the economy all over the world [1].

According to experts, shortly, it is likely that the sustainable development of a country will depend on the importance of using renewable energy sources in the energy network.

Taking this into account, in recent years, large-scale works have been carried out to introduce the "Green Economy" system to the industrial sectors of our republic, increase energy efficiency in

Web of Humanities: Journal of Social Science and Humanitarian Research

Volume 2, Issue 4, April - 2024 **ISSN (E):** 2938-3803

the social sector and expand the use of renewable energy sources, accelerate innovative development, and rational use of natural resources.

Current Energy Landscape, Policy and Regulatory Framework

It is worth noting that the Decision PQ-57 of the President of the Republic of Uzbekistan dated February 16, 2023 "On measures to accelerate the introduction of renewable energy sources and energy-saving technologies in 2023", and "Reducing the volume of energy consumption in economic sectors and the social sphere in 2015-2019, The decision of May 5, 2015 "On the program of measures for the introduction of energy-saving technologies" gave impetus to further revitalization of work in this direction. These regulations have opened up new opportunities for solving several problems in the field of energy consumption, as well as for the use of non-traditional energy resources, including solar energy. As a result of this, the republican commission on the issues of energy efficiency and the development of renewable energy sources was established in our country, the International Institute of Solar Energy began to operate in Tashkent and with the support of the Asian Development Bank, the development of solar energy in Uzbekistan was launched. "road map" was developed.

The decision of the President of the Republic of Uzbekistan Shavkat Mirziyoyev "On the program of measures for the further development of renewable energy in 2017-2021, measures to increase energy efficiency in economic sectors and the social sphere" raised the efforts in this regard to a new level. , it is no exaggeration to say [2].

This document is important because it aims to further reduce the energy capacity of the gross domestic product in 2017-2021, reduce the cost of products and expand the use of energy from renewable sources. According to him, reducing the energy and resource capacity of the economy, widely introducing energy-saving technologies in production, expanding the use of renewable energy sources, and increasing labour efficiency are considered priority tasks in the near future.

In particular, based on the target parameters of further development of renewable energy, by 2025, it is planned to increase the share of renewable energy sources from 12.7% to 19.7%. It is planned to increase the share of hydropower plants from 12.7% to 15.8%, solar energy to 2.3%, and wind energy to 1.6% [3].

At the same time, based on the decision, it is planned to implement 810 projects for the development of renewable energy with a total cost of 5.3 billion dollars in 2017-2025.

In addition, more than 56.5 million cubic meters of natural gas and more than 807.3 million kWh of electricity will be saved due to the introduction of modern energy-saving technologies in social and agricultural sector facilities.

According to experts, by 2025, the share of alternative energy sources in Uzbekistan should reach from 12.7% to 19.7%. In the composition of alternative energy, the share of solar energy reaches 2.3%, and the share of wind energy reaches 1.6%. Also, it is expected to save energy in the amount of 9.79 million tons of conditional fuel every year due to the energy used for production.

Measures aimed at ensuring the availability of guaranteed energy resources for the population will serve to improve the quality of life of the population in remote rural areas and increase their well-being.

In recent decades, large amounts of investment have been directed to the widespread use of hydrocarbons. Currently, the total volume of organic fuel used worldwide is 12 billion. it is the

Volume 2, Issue 4 April - 2024 **ISSN (E):** 2938-3803

equivalent of a ton of oil. That is, the amount of organic fuel extraction during the last forty years is more than the amount of hydrocarbon reserves extracted in the entire history of mankind. However, conventional energy reserves are limited. If such rates continue, according to calculations, black gold reserves on our planet will reach only 55-60 years. This term is estimated at 70-75 years for natural gas, and 150-160 years for coal. Moreover, due to the chronic consumption of hydrocarbon sources, the environment and public health are being damaged, climate change is observed, and the ozone layer is being destroyed. According to experts, oil and gas reserves can be exhausted after 55-75 years. Taking this into account, the development of non-traditional sources of energy, and its wider introduction into our lives is required by the times. Alternative sources of energy, such as the sun and wind, are not only unlimited but also environmentally friendly.

Humanity is always trying to find the most efficient sources of energy. Especially in today's era, this issue is gaining more urgent importance, and ensuring energy security is becoming one of the top priorities for every country.

There is a doubt that the next stage in the extraction of hydrocarbon raw materials, the so-called "shale revolution", may tomorrow become a serious factor that will change the place and role of some continents, countries and regions in the energy market and the geopolitical location of the world maybe not. However, such changes will never diminish the ever-increasing interest and need for renewable energy sources, primarily the use of the world's purest solar energy. When talking about this, it is necessary to pay special attention to the following facts. According to the International Energy Agency, while the growth rate of the world's electricity generation is an average of 3.4 per cent, solar energy, the most promising component of renewable energy sources, over the next five years is increasing every year at an unprecedented rate.

In these conditions, it is natural that the wider application of alternative energy sources in life is on the agenda. The reason is that their types, such as solar, hydro and wind energy, and biomass, are almost incomparable and renewable, very suitable for the current era of rapid innovation development, the same period for creating new jobs. In addition, the equipment and technology working on this basis are ecologically clean, environmentally friendly, and do not cause man-made disasters.

Therefore, at present, several countries are increasingly implementing projects aimed at the development of the sector, directing investments, and supporting promising developments and research. In this way, electricity and heat production bases and infrastructures are being built.

Although following this path of development requires a lot of effort, effort, and certain expenses, it is proven in practice that they are not wasted and fully justify themselves. Today, the cost of producing one kilowatt-hour of solar electricity is estimated to be 11-12 cents or less. This leads to the conclusion that photovoltaic devices will be able to compete with traditional ones in the near future in terms of the power they deliver.

Alternative Energy Potential in Uzbekistan

Our country has accumulated a lot of experience in conducting scientific and experimental research in the field of alternative energy sources, first of all, in the field of using solar energy. A scientific-experimental centre that has no parallel in Central Asia - the "Physics-Sun" scientific production association of the Academy of Sciences is operating. The results obtained in several

Volume 2, Issue 4, April - 2024 **ISSN (E):** 2938-3803

directions, such as low-potential devices for hot water and heat supply, photoelectric and thermodynamic converters for obtaining electricity, creation of special materials synthesis technologies, and use of solar energy in the thermal treatment of materials and structures.

At the same time, hot water supply systems for homes and social facilities have been developed based on solar water heating devices and are being used as an experiment.

Our country has underexplored renewable energy sources, mainly solar and wind resources, which have the potential to provide clean and sustainable energy. Uzbekistan is expected to become one of the most energy-intensive countries in Central Asia and Eastern Europe. From 2000 to 2020, electricity consumption increased from 76.8 billion kWh to 87.5 billion kWh per year. Account books show that by 2020, this indicator may be 25 per cent more, i.e. 101.8 billion kWh.

Meanwhile, looking at renewable energy resources in Uzbekistan:

- Solar energy: 525 to 760 billion. up to kWh;
- Wind energy: up to 1 trillion kWh;
- Hydropower: 21 billion. more than kWh;
- Biomass: 6 billion cubic meters

Renewable energy still takes time and money to show its effectiveness. Let's look at our current main problems in statistical observations. Of course, the question arises as to why this indicator is high. There are various reasons for the high consumption of energy GDP in our republic, and one of the main reasons is the fact that physically outdated technologies are still used in industrial enterprises. This causes 60 per cent of the energy coming from the primary source to be lost in transmission and distribution systems. In addition, burning gas in flare devices also means blowing a large amount of money into the sky (Figure 1).

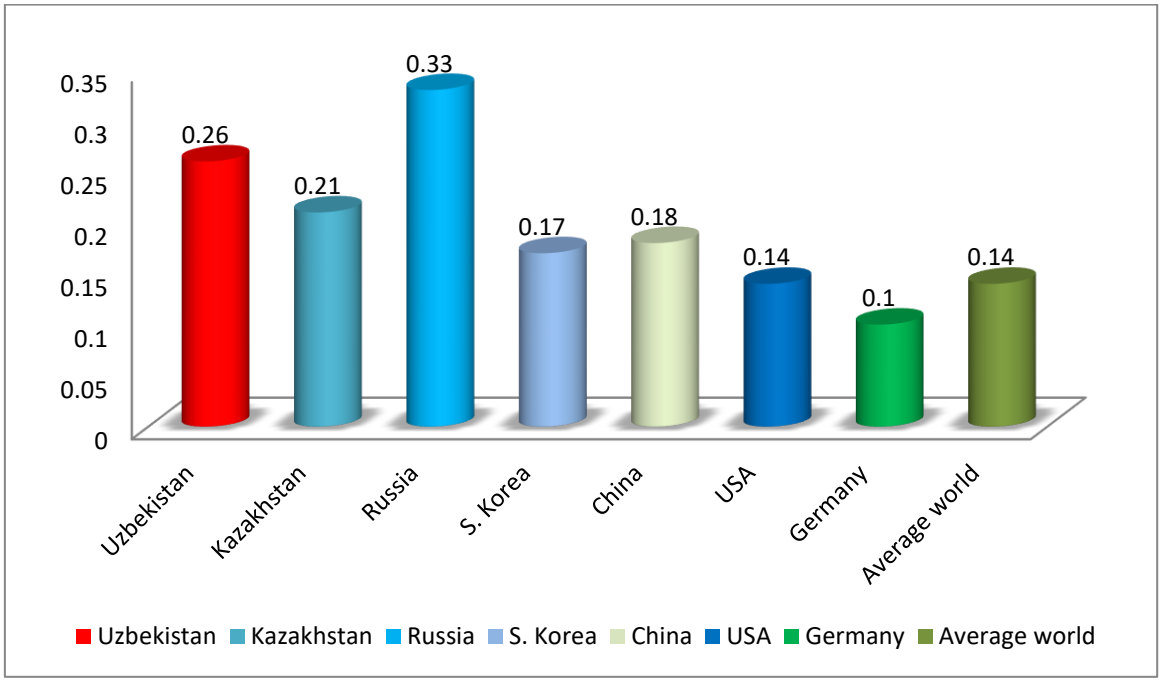

Figure 1. Uzbekistan's GDP energy consumption, kg oil equivalent/USD [4].

For example, in 2011, the amount of damage caused by gas burning in flare equipment amounted to 500 million US dollars. With this amount of money, you can install a solar-powered vacuum

Volume 2, Issue 4 April - 2024 **ISSN (E):** 2938-3803

water heater on the roofs of 1.5 million houses in Uzbekistan or a solar panel system on the roofs of more than 1 million houses.

However, equipping your home completely with this system does not come cheap. Even developed countries are not alien to this problem. For example, the SolarCity energy company, which has been in operation for more than ten years in the state of California, USA, found a solution by leasing these systems instead of selling them to residents. To date, SolarCity serves more than 300,000 homes, and its devices can be paid off through loans and leases over 10 to 20 years [5-8].

The transition to a "green economy", on the contrary, ensures the improvement of the population's well-being and quality of life, without exposing future generations to environmental hazards or ecological shortages.

According to the results of the research, experts identify five main directions of transition to "Green" rails:

1. Introduction of renewable energy sources.
2. "Greening" in the field of housing and communal economy.
3. Development of "clean" transport.
4. Improving the waste management system.
5. Improvement of land and water resources management system.

Specialists in each of these areas transition to a "green economy".

Calculated the total additional annual benefits through For example, the expected profit in the renewable energy sector is more than 5 billion dollars. At the same time, "Greening" policies lead to additional "Green" employment. According to estimates, 175,000 additional jobs can be created in the renewable energy sector alone by 2020 and about 270,000 by 2050.

Improving the efficiency of water resources uses wide application of water-saving technologies, and prevention of soil degradation and salinization due to the modernization of water management systems. The introduction of organic farming rules and the use of micro-organisms and plant protection products instead of mineral fertilizers and pesticides will not only fill the country's tables, and increase the export of environmentally friendly products that are in high demand to foreign markets, but in the future, mainly agriculture allows to create hundreds of thousands of new jobs in places [9-12].

An important direction of the "Greening" of the water industry is the improvement of the drinking water supply system and the development of ecologically clean sewage systems. One of the practical steps in this direction is the modernization of water supply networks with the participation of the Asian Development Bank the modernization of water supply networks with the participation of the World Bank, and the improvement of the main water pipelines in the Aral Sea region, the creation of local drinking water systems using desalination plants. Today, the ecological movement, together with other organizations, participates in the development of promising projects to improve the supply of drinking water to settlements. They propose strengthening the protection of drinking water sources from contamination and destruction, providing drinking water to hard-to-reach and remote settlements, and improving industrial and domestic waste treatment systems.

Any economic system cannot be imagined without an energy component. It has been proven in practice, that is, alternative energy production leads to the formation of a new technological base

Web of Humanities: Journal of Social Science and Humanitarian Research

Volume 2, Issue 4, April - 2024 **ISSN (E):** 2938-3803

for electricity and heat production, increasing energy efficiency, improving the quality of life, and creating new jobs. In several countries, there is a task to increase the share of alternative energy sources in the next ten years by 20, and in some up to 30 per cent. The experience of using renewable energy sources shows that, despite the high costs of their purchase and their operation, they usually fully cover their costs during the period of operation.

According to experts, the transition of Uzbekistan to the "Green Economy" system will include all aspects of industrial production, agriculture, management, reform and modernization of the education system, employee qualification and retraining, and new jobs requires a systematic approach to creation [14].

Benefits of Alternative Energy for Economic Growth

Today, the development of international cooperation in the implementation of reforms in the field of electricity is of priority. Joint-stock company "Uzbekenergo" as an authorized body in the field of electric power in our country, in addition to the implementation of the centralized power supply of the sectors of our economy and the population, also provides thermal energy for industrial and communal-household needs in the cities of our republic.

At the moment, there are 54 enterprises in "Uzbekenergo" JSC. These include 40 joint-stock companies, 11 unitary enterprises and 3 limited liability companies. Currently, the total installed capacity of Uzbekistan's power stations exceeds 14.1 million kilowatts. In particular, "Uzbekenergo" JSC produces 13.6 million kilowatts of electricity. 85% of this electricity comes from thermal power plants, 12% from hydropower plants [15].

Unitary enterprise "Uzelektarmoq" specializes in the supply of electricity from the source to distribution enterprises through its 220-500 kV main lines with a total length of 8,800 km. Following the decree of the President of the Republic of Uzbekistan dated March 4, 2015, in the period 2017-2021, 62 investment projects with a total value of 11 billion US dollars have been implemented in Uzbekenergo JSC to ensure structural changes, modernization and diversification of production implementation is envisaged. It is worth noting that 25 of the above projects belong to the field of thermal energy.

Implementation of activities in the field of thermal energy ensures the introduction of modern technologies into the production of electricity based on highly efficient steam-gas and gas turbine devices. In addition, JSC "Uzbekenergo" pays special attention to the modernization of the electricity accounting system with the implementation of the automated system of electricity control and calculation. This project will be implemented in stages throughout the country in the future.

It should also be noted that this issue is still relevant in other countries of the world. That is why the effective use of alternative energy sources is of great importance in the world today. Today, by 2030, it is planned to increase the electric power capacity of our republic by an additional 10,000 MW by implementing more than 50 projects in the field of thermal energy and alternative/renewable energy. It covers the increase of electricity production capacity in our country, modernization of power units in existing thermal power plants, construction of additional modern power units in them, construction of modern thermal power plants, as well as the introduction of nuclear energy, which is new for Uzbekistan is explained by receiving. At the same time, it is planned to modernize existing hydroelectric power plants, build new hydroelectric

Volume 2, Issue 4 April - 2024 **ISSN (E):** 2938-3803

power plants, and build solar and wind power plants in the field of renewable energy. The use of solar and wind energy is especially promising. It should be said that in recent years effective projects are being developed in our country for the effective use of such renewable energy sources. In particular, to effectively use renewable energy sources in the coming years, it is planned to build 3 solar power plants with a capacity of 100 mW each in the Samarkand, Navoi and Surkhandarya regions, and a wind power plant with a capacity of 102 mW in Navoi region.

Implementation of modern energy-saving technological equipment specified in the program allows for a significant increase in the efficiency of energy production while consuming less heat. In 2016, two steam-gas units with a capacity of 450 mW were put into operation at the Tallimarjon thermal power station to provide the consumers of the republic with electricity and reduce the consumption of energy reserves. They produce 7 billion kWh of electricity per year. Also, a 150 million mW power unit was launched at the Angren thermal power station. Its annual electricity production volume is 900 million kWh. At the moment, the second steam-gas unit with a capacity of 450 mW at the Navoi thermal power station, two steam-gas units with a capacity of 230-280 mW at the Takhyatosh thermal power station, and Toraqorgon with a total capacity of 900 mW at Namangan. Construction of the thermal power station is being carried out at a rapid pace.

At the moment, 88.5% of electricity in the electric power sector of Uzbekistan is produced in thermal power stations, 10.6% in hydroelectric power stations, and 0.9% in block stations. The electric power resources of the Republic in the 1st quarter of 2018 were 103.9 per cent compared to the same period last year [16].

As we mentioned above, Uzbekistan has a large reserve of renewable energy sources (wind, solar, and hydraulic energy), and it is promising to include them in the heat-energy balance. Why, in all regions of the country, the duration of sunny days is from 2650 to 3050 hours per year. According to the analysis of experts, the total capacity of solar energy in our country is estimated to be from 525 billion kWh to 760 billion kWh.

To develop renewable energy, first of all, investment projects of modernization and reconstruction of Tashkent, Qadiriya, Lower Bozsuv and Shahrikhan cascades involving the use of hydropower potential are being implemented.

The coal industry also occupies an important place in the economy of our country. A stable supply of coal to the economy and population ensures the success of economic and social reforms in the country. If we take into account that the coal reserves found in our republic are 2.2 billion tons, and the estimated reserves are more than 5.7 billion tons, it is obvious that the industry is promising.

In general, taking into account the importance of increasing the share of coal in the energy balance of Uzbekistan, a coal industry development program was developed in 2017-2021. Currently, an average of 3.7 million tons of coal is mined per year, but due to the implementation of the adopted program, it will reach 14 million tons per year by 2030.

Another noteworthy point is that the widespread application of "Green technologies" in our country in the fields of agriculture, energy, waste management, transport, education and science will create more than 550 thousand new jobs in the next ten years.

In short, to raise the research and implementation of renewable energy resources in our republic to a higher level, to find timely organizational-legal, scientific-technical, innovative solutions to existing problems, to improve the country's development, people's well-being, public health,

Volume 2, Issue 4, April - 2024 **ISSN (E):** 2938-3803

environment is relevant in more effective provision of environmental cleanliness.

Conclusions

Developing a long-term strategy of structural changes in the economy of Uzbekistan requires taking into account not only domestic but also global processes and problems. From this point of view, the transition of sustainable economic development to a new, innovative economy based on the efficient use of resources is one of the most effective means of implementing consistent structural changes and sustainable development.

In summary, every country strives to achieve sustainable economic growth because economic growth:

1. increase in national product volume and income;
2. efficient use of resources;
3. to the emergence of new needs and opportunities;
4. it leads to an increase in the country's prestige in international markets and, most importantly, ensures the well-being of the population.

In a word, all the implemented economic reforms are aimed at only one goal - to increase the well-being of the population, improve the way of life and please our people.

In the regions of our republic, reserves for the use of energy from renewable energy sources have not yet been fully utilized, and there is a need to develop regionally targeted programs for them. However, there are great opportunities to use alternative and renewable energy sources in our country. Let's say that the main part of the year in our republic is 300 sunny days, according to experts, its power is equal to 50 trillion 973 million tons of conditional fuel, which is much more than the total energy reserves identified in our country. In addition, the natural conditions of our country are favourable for the combined use of solar and wind energy. Especially in our country, there are wide opportunities for the development of small-scale alternative energy sources.

In short, economic development in the future cannot be imagined without innovative technologies. In this direction, the use of alternative energy sources is of particular importance.

References

1. Laldjebaev, M., Isaev, R., & Saukhimov, A. (2021). Renewable energy in Central Asia: An overview of potentials, deployment, outlook, and barriers. Energy Reports, 7, 3125-3136.
2. The decision of the President of the Republic of Uzbekistan Shavkat Mirziyoyev "On the program of measures to further develop renewable energy, increase energy efficiency in economic sectors and the social sphere in 2017-2021".
3. Commentary on the decision of the President of the Republic of Uzbekistan "On the program of measures to further develop renewable energy, increase energy efficiency in economic sectors and the social sphere in 2017-2021".
4. Vakhabov A.V., Khajibakiev Sh.Kh., Theoretical and practical aspects of ensuring sustainable economic growth based on "Green economy", the scientific electronic journal "21st century: science and education issues". #2, 2017.
5. Курпаяниди, К.И. (2024). Экономическая теория: практикум. Учебник. Farg‘ona, SUNRISE-PRO, 2024. — 600 с.
6. Kurpayanidi, K. I. (2024). Institutional aspects and risks in the digital economy: ways to reduce

Volume 2, Issue 4 April - 2024 **ISSN (E):** 2938-3803

uncertainty for economic agents. *Qo'qon universiteti xabarnomasi ("Вестник Кокандского университета – Kokand University Herald") ilmiy-elektron jurnali. №9(8), 21-25 bb.* ISSN 2181-1695. Doi: https://doi.org/10.54613/ku.v9i9.827

7. Kurpayanidi, K. I. (2023). Innovation and competitiveness: Modelling future economic growth through the national innovation system of Uzbekistan. *E3S Web Conf. Volume* 460, 2023. International Scientific Conference on Biotechnology and Food Technology (BFT-2023). Doi: https://doi.org/10.1051/e3sconf/202346003013
8. Курпаяниди К.И. (2023). Развивая микроэкономический анализ: методология изучения институциональной среды малых предприятий. *Экономика и предпринимательство – Journal of Economy and entrepreneurship. Moskva, 9 (158).* 947-956. Doi: https://doi.org/10.34925/EIP.2023.158.09.182
9. Kurpayanidi, K. I. (2023). Analysing the functioning of enterprise management in the context of institutional reforms.*Yashil iqtisodiyot va taraqqiyot.* 10. 581-585. ISSN: 2992-8982. Doi: https://doi.org/10.5281/zenodo.10190057
10. Kurpayanidi, K. I. (2023). Innovation and innovation activity: key aspects of economic transformation. *Iqtisodiyot: tahlillar va prognozlar.3 (23).* 12-20ю ISSN 2181-0567. Doi: https://doi.org/10.5281/zenodo.10049446
11. Kurpayanidi, K. I. (2023). Economic transformation through institutional reforms: analysing challenges and perspectives of enterprise management. *Xorazm Ma'mun Akademiyasi Axborotnomasi - Вестник Хорезмской академии Маъмуна. Xiva, 10-2 (107). 32-36 bb.* ISSN 2091-573 X. Doi: https://doi.org/10.5281/zenodo.10049468
12. Kurpayanidi, K. I. (2023). Retrospective analysis of innovative activity of business entities in the conditions of transformation. E3S Web of Conf.Volume 402. eISSN: 2267-1242. Doi: https://doi.org/10.1051/e3sconf/202340213015
13. Kurpayanidi, K. I. (2023). The role of innovation and innovative activities in the conditions of economic transformation: analysis of theoretical aspects. *Iqtisodiyot: tahlillar va prognozlar. 2 (22). Aprel-Iyun. 14-20.* ISSN 2181-0567. Doi: https://doi.org/10.5281/zenodo.8141649
14. http://www.pv.uz/uz/24196
15. http://uza.uz/uz/politics/mdh-elektr-energetika-kengashimng-majlisi-04-11-2017?monthKn&yeai^2017&element_code^dh-elektr-energetika-kengashiming-majlisi-04-11- 2017§yun_codeqpohtics
16. https://mineconomy.uz/uz/node/2095