**REPUBLIC OF AZERBAIJAN**

*On the rights of the manuscript*

# ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

# ENERGY RESOURCES OF TURKIC-SPEAKING STATES AND ACTUAL PROBLEMS OF THEIR USE

| | |
|---|---|
| Speciality: | 5304.01 – "Types of economic activity" |
| Field of science: | Economic sciences |
| Applicant: | **Guliyev Magsud Azad** |

**Baku – 2025**

The dissertation work was performed at Azerbaijan Cooperation University.

Scientific supervisor: Full member of ANAS, doctor of economic sciences, professor
**Samadzadeh Ziyad Aliabbas**

Official opponents: doctor of economic sciences, professor
**Elshan Ali İbrahimov**

Doctor of philosophy in economics, ass. prof.
**Sadig Binyamin Nazaraliyev**

Doctor of philosophy in economics, ass. prof.
**Taranə Mikayıl Ahmadova**

Dissertation Council- ED 2.46 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating Azerbaijan Cooperation University and Baku Business University

Chairman of the joint dissertation council: Full member of ANAS, doctor of economic sciences, professor,
**Samadzadeh Ziyad Aliabbas**

Scientific secretary of the joint dissertation council: Doctor of philosophy in economics, associate professor
**Mammadova Samira Yashar**

Chairman of the scientific seminar: Doctor of Economics, professor
**Huseynov Mohubbat Musa**

# INTRODUCTION

**Research issue rationale and development rate.** In the modern dynamic and global world, energy security plays a vital role. Increasing geopolitical trends and challenges, as well as geopolitical polarization, give special significance to the political weight of energy-rich states. In this regard, the fact that the Turkic-speaking states, located in the center of Eurasia, in a vast geography stretching from the Mediterranean coast to China, have billions of barrels of oil and trillions of cubic meters of hydrocarbon resources comes to the fore in the current era when energy is most needed. In addition to hydrocarbon resources, the renewable energy potential of the Turkic states is also quite large. When approaching the extremely relevant energy issue from the perspective of the Turkic-speaking states, it is also necessary to examine the internal problems of these states in the energy sector.

As a format for cooperation between Turkic-speaking states, the Turkic Council was first established by Azerbaijan, Kyrgyzstan, Kazakhstan and Türkiye on the basis of the Nakhchivan Agreement in 2009. Relations between Turkic states have intensified since the Second Karabakh War - after the absolute military victory of Azerbaijan in the 44-day military operations between Azerbaijan and Armenia in 2020. The union, which previously operated as the Turkic Council, was transformed into an organization in 2021, expanding its activities and number of members. This study examines the energy, economic, trade and security issues of the Turkic-speaking states recognized by the world community - Türkiye, Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan and Kyrgyzstan (the energy potential of the Turkish Republic of Northern Cyprus was theoretically touched upon). In the current era, the development of all areas from trade to transport, from energy to alliances are urgent issues ahead.

After the collapse of the Soviet Union in 1991, the energy potential of all Turkic-speaking states and their mutual cooperation with each other became one of the areas requiring research, and in recent years, steps have been taken by researchers in this direction. Azerbaijani scientists, academicians Z.A. Samadzadeh, D.A. Valiyev, I.V.

Alibayov, J.A. Feyziyev, N.G. Jafarov, have conducted research covering various areas on the Turkic states. Another Azerbaijani scientist, Chapay Sultanov, touched upon the importance of Baku oil during the world wars and also carried out analyses based on political and top secret documents. Turkish scientists have from time to time prepared extensive research on the Turkic states. This includes the research of Turgut Demirtepe, Murat Yılmaz, Abdulvahab Gara, Fakhri Solak, Nasrin Sarıahmadoğlu, Okan Yesilot, Ahmet Ganlıdara, Kemal Özcan, Professor Savaş Çelik, Erol Turan, Zekai Özdemir, Ismet Türkmen, Yunus Şenin, and other Turkic authors Zhulduz Kanapiyanova, Ishangulu Jumayev, Sardar Berdimuhammedov, Yerbolat Yerkebulanov, Leyla Makhmetova, Lyazzat Zhilkibagarova, Suat Beylur, Zhengizkhan Zhanaltay, Omirbek Hanayi, Azimkhan Khitaxunov. In addition, the scientific works of foreign authors Daniel Yergin and Tim Marshall have touched on the energy sector of some individual Turkic states. Although all of these studies touch on the energy issues of Turkic states, not all of them are entirely devoted to energy issues.

**Object and subject of reserarch.** The object of the research is the hydrocarbon and renewable energy resources of Turkic-speaking countries, and the subject is new scientific approaches and regularities in existing and potential energy resources and their use.

**Aims and objectives of the research.** The purpose of the study is to examine the policies, implemented projects and problems of the Turkic-speaking states on both hydrocarbon and green energy resources, and to develop scientifically substantiated proposals and recommendations in this direction. To achieve this goal, the following tasks have been set:

- examination of the development stages and characteristics of hydrocarbon and renewable energy resources of the Turkic-speaking states, as well as their energy policies;
- studying the existing problems of traditional energy resources (oil, gas and coal), as well as the export sales prices of energy;
- considering the global trends that the Turkic states should pay attention to in the context of both energy and political processes taking place in the changing world order;

- analyzing the factors affecting the economic development of the Turkic states;

- carrying out a SWOT analysis that includes the weaknesses, strengths, opportunities and threats of the Turkic states;

- calculation of the costs of switching to green energy (wind and solar energy) and the hypothetical volume of carbon emissions;

- econometric assessment of the relationship between population growth and electricity production in the Turkic states and the potential impact of this relationship;

- application of a survey method among the population in the Turkic states regarding the transition to green energy;

- conducting complex discussions on the present and future of the energy sector, as well as the vision of green energy, based on interviews with a green energy company participating in the global energy transition;

- developing proposals and recommendations by analyzing the energy resources of the Turkic states and their current problems related to their use.

**Research methods.** In the research statistical analysis, comparative analysis, generalization, grouping, SWOT, hypothetical analysis, Pearson correlation, simple linear regression, survey and interview methods were used.

**Basic theses for defense:**

1. exploration of hydrocarbon resources of Turkic-speaking states and investment and development of renewable energy potential are already one of the challenges of the time.

2. Azerbaijan is located in a strategic geographical area and in order to increase the country's investment attractiveness, it is necessary to form a website called "Why invest in Azerbaijan?".

3. the construction of pipelines carrying hydrocarbons to the West through Azerbaijan by the Caspian Turkic states is important in terms of diversifying their energy export routes.

4. investments in innovation and new technologies, as well as the energy sector, and exchanges of technological experience would be beneficial in terms of the comprehensive development of the Turkic states.

5. there is a need to modernize electricity transmission lines between the Turkic states. In the context of global economic challenges, there is a serious need to study the problems of using energy resources of the Turkic states and prepare proposals for the efficient use of them. It is important to conduct correlation and regression analyses in order to study the impact of population growth on electricity production in Azerbaijan, Türkiye and Uzbekistan.

6. it is important to conduct a survey in Türkiye, Azerbaijan, Kazakhstan and Uzbekistan regarding the transition to green energy and to study the proposals of the population and to take these proposals into account in the large-scale development of the sector.

7. it is of exceptional importance to determine the costs of transition to wind and solar energy in the Turkic states through a hypothetical analysis.

8. it is essential to forecast the future of the global energy sector based on an interview with one of the companies playing a key role in the global green energy transition.

9. the conclusion of agreements on reducing export tariffs to zero in order to increase trade turnover between Turkic states is important due to its positive impact on the economic development of the states.

**Scientific novelty of the research.** The scientific novelty of the study includes the following:

- development trends of hydrocarbon and renewable energy resources of Turkic-speaking states and the impact of energy on the economic and political independence of states were explained through retrospective analysis;
- geopolitical and geoeconomic conflicts, global risks were investigated and the inclusion of new challenges in the future development plans of Turkic states was justified;
- average costs of transition to wind and solar energy for Türkiye, Azerbaijan and Uzbekistan were calculated through hypothetical analysis;
- economic development problems and security issues of Turkic states were investigated and certain proposals were formulated in this regard;
- strengths and weaknesses, opportunities and threats of Turkic

states were classified through SWOT analysis;

- a survey was conducted among the population of Azerbaijan, Türkiye, Kazakhstan and Uzbekistan related to the green transition, revealing people's difficulties and proposals in the transition to green energy, as well as their attitude to the green transition and the attitude of the population of Turkic states to the green policy implemented by the states;

- Pearson correlation and simple linear regression analyses were conducted to analyze the relationship between demographic growth and electricity production, and the degree of impact of population growth on electricity production was determined;

- an interview was conducted with ACWA Power, one of the key participants in the global energy transition, on the topic of global transition. Practical conclusions were obtained on who will benefit and who will lose in the transition to green energy.

**Theoretical and practical significance of the research.**

The results, suggestions and recommendations obtained in the research work conducted on the Turkic states can play a role as a tool in conducting training and education work on the Turkic world in higher education institutions of both Azerbaijan and other Turkic-speaking states, as well as in implementing improvement work in this direction. In addition to the above, it is possible that the suggestions and recommendations of the research work carried out on the Turkic states can be implemented by those states in the future.

**Approbation and implementation.** The main provisions of the research were reflected in 4 theses (2 of which were published abroad) and 9 articles (3 of which were published abroad) published in prestigious international and republican journals recommended by the Higher Attestation Commission under the President of the Republic of Azerbaijan, as well as in conference proceedings. Conference materials are “Azerbaijan's progression towards sustainable energy: analyzing hypothetical outcomes of theoretical research” (Baku, 2024), “Renewable energy transition in the heart of Central Asia: scenarios and forecasts for Uzbekistan” (Tashkent, 2024), “Public assessment of the transition to green energy in Türkiye: survey results” (Baku, 2024), “Green energy transition survey in Azerbaijan: energy

efficiency and electric vehicles" (Istanbul, 2025).

In addition, scientific articles include "Green export of Kazakhstan: development opportunities and problems" (Baku, 2023), "Energy policy of the Republic of Turkmenistan: lost opportunities and future perspective" (Baku, 2024), "Analysis of Azerbaijan's green energy discourse: true shades of green energy" (Baku, 2024), "Analysis of foreign trade relations of turkısh-speaking countries" (Baku, 2024), "Green growth in Uzbekistan: prospective green priorities for carbon-neutral development" (Baku, 2024), "Green energy transition in Azerbaijan: analyzing survey results" (Tashkent, 2024), "Clean Energy Transition Dilemma: Future Value of Green Investment in Azerbaijan" (Baku, 2024), "Türkiye's Energy Security Challenges: A Theoretical Aspects Of Shifting From Hydrocarbons To Renewables" (Ternopil, 2024), "Green Transition: The case of Turkey and Central Asian countries" (Kiyv, 2025).

**The name of the organization where the dissertation was conducted.** Azerbaijan Cooperation University.

**The volume of the dissertation's structural sections separately and the general volume.** The dissertation consists of an introduction, three chapters, a conclusion, a list of references, and appendices, totaling 302635 characters**.** Introduction 10717 characters, chapter I 108703 characters, chapter II 71482 characters, chapter III 22762 characters, conclusion 16379 characters, reference list 48171 characters. The volume of the dissertation consists of 230043 characters, excluding graphs, tables, diagrams and the list of used literature.

## BASIC CONTENT OF THE DISSERTATION

In the **"Introduction"** of the dissertation, the relevance of the topic and degree of elaboration, the object and subject of the research, the goals and objectives of the research, methods, the main propositions defended, the scientific innovation of the research, its theoretical and practical significance, approval and application, and the overall scope of the work are explained.

In the **first chapter of the dissertation entitled "Theoretical foundations of studying hydrocarbon and renewable energy resources of Turkic-speaking countries in the global world"**, the history and stages of development of traditional resources (oil, gas, coal) of Turkic states, green energy policy, green goals, and global threats against the backdrop of changing global world order were examined, and the role of energy in the economic and national security of states was examined from a retrospective perspective.

Brief summaries of these studies by country are as follows.

*Türkiye.* When we look at the provision of energy security, which is as important as national security, from a wide spectrum and in the recent history, we can first see the agreement reached with the Iraqi state on August 27, 1973 in the oil sector regarding the construction of the Kirkuk-Ceyhan oil pipeline for the purpose of transporting crude oil. Its constuction came to an end in 1976 and the first crude oil transportation a year leater in 1977. The construction of the second pipeline which was parallel to the first was started in 1985 and was completed two years later.

Today, the energy resources imported from neighboring countries play a major role in Türkiye's energy supply. The Türkiye-Iran gas pipeline, the Blue Stream and TurkStream gas pipelines from Russia through the Black Sea, the South Caucasus Pipeline (Baku-Tbilisi-Erzurum) from Azerbaijan, the Trans Anatolian Gas Pipeline (TANAP) and the Baku-Tbilisi-Ceyhan (BTC) oil pipeline are included in this list.

*Azerbaijan.* Azerbaijan has historically been rich and famous for its oil resources, and to this day, industrial production and development of oil have gone through five stages. Stage V is the new oil strategy that began in 1994. As a result of political chaos for power in newly independent Azerbaijan, conflicts between pro-government forces, and the war launched by Armenia, 20% of the country's territory - Karabakh lands - came under occupation. Only in 1993 did the national leader of the Azerbaijani people Heydar Aliyev come to political power at the insistence of the people of Azerbaijan and put an end to the struggle for power. On September 20, 1994, which provided the basis for the development of a new era,

an agreement was signed with the world's largest oil producing companies on the use of the Azeri-Chirag-Gunashli field, the largest oil field in the Azerbaijani sector of the Caspian Sea - the "Contract of the Century".

The oil strategy of the Great Leader paved the way for the export of Azerbaijani oil to the world via the BTC pipeline from the Turkish port of Ceyhan. In accordance with the principles described by the national leader of Azerbaijan Heydar Aliyev "*One Nation, Two States*" and by the national leader of Türkiye Mustafa Kemal Ataturk, "*Azerbaijan's joy is our joy, its sorrow is our sorrow*", the brotherly republics have now brought their relations to the level of alliance in all areas. Back in 2002, at the initiative of Türkiye, the "Trabzon Agreement" was signed between Azerbaijan, Georgia and Türkiye, which covers issues in the field of security, especially ensuring the security of energy-carrying pipelines. According to the agreement, the countries undertook to ensure the security of the pipelines within their borders. On June 15, 2021, the "Shusha Declaration" was signed between Türkiye and Azerbaijan, which includes an alliance in all areas.

Today, Azerbaijan no longer exports not only oil, but also natural gas to neighboring countries and Europe through pipelines. With the TANAP and Trans-Adriatic (TAP) pipelines, Azerbaijan has become a Pan-European gas supplier.

*Kazakhstan.* This country currently has 3% of the world's oil reserves, in other words, 30 billion barrels of oil reserves. Despite its huge gas reserves, the country ensures its gas supply through imports. At the same time, Kazakhstan has over 840 thousand tons of uranium reserves.

The decline in oil production after the collapse of the Soviet Union resulted in economic problems. At the beginning of the period of independence, a 50/50 agreement was reached with Chevron (USA) on the development of the Tengiz oil field. In 1992, an agreement was signed with the Sultanate of Oman to finance the construction of a new oil pipeline. Later, Russia also joined this agreement. In 1999, the Caspian Pipeline Consortium (CPC), also known as the Tengiz-Novorossiysk oil pipeline, began construction, and two years later

the project was completed.

Kazakhstan already exports its oil via the Trans-Caspian route to the port of Baku by ships, and from there via BTC. Along with Western countries, China is also a buyer of Kazakh oil. Oil is exported to China via the Kenkiyak-Alashankou oil pipeline.

*Turkmenistan*. The country, which gained independence in 1991, has 0.6 billion barrels of oil and 13.6 trillion cubic meters of gas reserves.

Turkmenistan, which is better known for its gas resources in the energy sector, has developed its gas sector in 4 stages. Turkmenistan plays an important role in meeting China's gas demand. The first 3 lines of the Central-Asia-China (CAC) gas pipeline, Lines A, B and C (passing through Turkmenistan-Uzbekistan-Kazakhstan), can export 55 billion cubic meters of gas per year, and the commissioning of Line D of the CAC pipeline, which is currently under construction in China, will further increase the total annual gas export level. Line D of the pipeline differs from the previous ones in its geography. Thus, this line extends to China through the territories of Turkmenistan, Uzbekistan, Tajikistan and Kyrgyzstan. After the pipeline is put into operation, Turkmenistan's gas exports to China will reach a total of 65 billion cubic meters.

The Turkmenistan-Afghanistan-Pakistan-India (TAPI) gas pipeline, which runs from Turkmenistan to India, is named after the first letters of these countries. The annual transmission volume of TAPI is planned to be 27 billion cubic meters in the first year and 33 billion cubic meters in the following years.

*Uzbekistan.* Located in the heart of Central Asia, Uzbekistan has 594 million barrels of oil and 1.7 trillion cubic meters of gas reserves, according to the Organization of the Petroleum Exporting Countries (OPEC). In the first years of its independence, the issue of self-sufficiency in energy resources was emphasized, and as a result of the policy pursued, Uzbekistan, which previously imported energy, has now become an energy exporter. The natural gas supply of southern Kazakhstan, Kyrgyzstan and Tajikistan is ensured by imports from Uzbekistan. The Galif-Dushanbe and Shurtan-Sheradan pipelines transported gas to Tajikistan. Russia and China

also took part in Uzbekistan's gas export geography. The Bukhara-Ural pipeline served as a gas supplier to the Ural region of Russia for many years and is now in need of renovation. Gas is being supplied to China through the CAC pipeline. In recent years, the country has experienced serious problems in the gas sector and, as a result, Uzbekistan has become a gas importer. In addition to oil and gas resources, the country has coal and uranium deposits. The estimated coal reserves are 5.7 billion tons. Uranium was discovered in 1940 during the Soviet era and the volume of reserves is 139.2 thousand tons. Uzbekistan, which produces 3.5 thousand tons of uranium per year, does not use uranium domestically. The uranium produced is exported in full to China.

*Kyrgyzstan.* Hydrocarbon resources are at a marginal level, unlike other Turkic-speaking states. Most oil and gas fields were exploited during the Soviet era. Oil and gas production has declined significantly since 1992 due to obsolete equipment and technology. Potential reserves are located in the Fergana and Alai valleys of the country and in the Naryn, Issyk-Kul and East Chui basins. The explored coal reserves in Kyrgyzstan are estimated at 1.3 billion tons. According to the Kyrgyz government, this figure is much higher - 2 billion tons.

The state, which is fundamentally dependent on natural gas imports, sold its gas network to the Russian company Gazprom in 2013. According to the terms, Gazprom will invest in the development of the gas network over the next 25 years. Gas imports are carried out through the Bukhara-Dashkent-Bishkek-Almaty pipeline. This figure is around 300 million cubic meters per year.

*Turkish Republic of Northern Cyprus*. In the eastern Mediterranean, in the region where the TRNC is located, it is estimated that there are 3.45 trillion cubic meters of offshore gas deposits. However, there are many countries in the Eastern Mediterranean region that share borders, and therefore, the exact form of sharing has not been determined. The Republic of Türkiye is one of the countries that claims rights in this region.

In addition to the traditional resources of the Turkic states, the green energy potential was also investigated.

*Green energy*. The section dedicated to renewable energy issues looks at the target indicators for greenhouse gas emissions (GHG) and the share of green energy in electricity generation in the Turkic states for 2030. In terms of GHG emissions, Türkiye has targeted a reduction of 41% (base year 2012), Azerbaijan 35% (base year 1990), Kazakhstan 15% (but 25% is planned as a conditional commitment, base year 1990), Uzbekistan 35% (base year 2010), Turkmenistan 20%, (methane emissions 30%, base year 2010) and Kyrgyzstan 15.97%.

The states have also set targets for the share of green energy in total energy generation. In the 2030 green energy targets, Türkiye has 50%, Azerbaijan 35.5%, Kazakhstan 15%, but a plan to become a carbon-neutral country by 2060 has been adopted, Uzbekistan has planned to have a green energy share of 40%, Turkmenistan 10% in total electricity production. Although 90% electricity production in Kyrgyzstan belongs to hydropower, according to the state's plans for 2040, it is aimed to have a 10% green energy share excluding hydropower.

On December 17, 2022, an agreement on a strategic partnership in the field of green energy was signed within the framework of the EU-Azerbaijan energy partnership. According to the agreement, green energy produced in Azerbaijan will be exported to Romania, Hungary and other EU countries via a cable to be laid under the Black Sea. In addition, as a result of the laying of a power line from Uzbekistan and Kazakhstan to Azerbaijan under the Caspian Sea, the green corridor will cover a wider geography.

The dissertation shows the global risks that the world will face and that the Turkic-speaking states should also focus on solving, and these threats are as follows[1]:

- *Increase in the cost of living*. As a result of the collapse during the Covid-19 pandemic and the Russia-Ukraine war, the increase in the prices of basic consumer goods is accelerating. At the same time, the export-import process of inflation to other countries along the

[1] The global risks report 2023 / manag. Dir. S.Zahidi – Geneva: World Economic Forum, - 2023. – 98 p.

global trade chain affects the economies of states. This leads to social problems. The vulnerable segment of the population's ability to cope with this problem is an urgent problem in all countries of the world. Even the European Union countries confirm the rapid increase in the cost of living and this is expressed by the population.

- *Geoeconomic confrantation*. As is known, one of the main trade routes from east to west and vice versa in Eurasia is now the Middle Corridor. Starting from China, passing through the territory of the Turkic-speaking states located in Central Asia, the Middle Corridor, extending to the Caspian Sea and through Azerbaijan, Georgia and Türkiye to Europe, has become the center of global attention. In this regard, the use of the northern and sea routes may create certain geoeconomic conflicts, and this must be taken into account by the Turkic-speaking states.

- *Polarization of society*. It is also clear from our research that the increase in social inequality in the world is causing problems. This, in turn, may have a profound impact on the world's political system and create conflicts between rich and poor nations on a global scale. The continuation of this process in a chain-like manner will lead to a great degree of distrust between states and a sharp increase in prices.

**The second chapter of the dissertation is called "Real and hypothetical analysis of resource-rich Turkic states in the energy and economic fields".** This chapter studies the problems in the energy sector, and the research work is based on a deeper study with GDP, SWOT, hypothetical and real economic analyses.

The research provides statistics on oil and gas resources of Azerbaijan and Turkmenistan since the 19th century, and other countries since 1985. The research notes that among the Turkic states, Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan have oil reserves. Among them, Kazakhstan and Azerbaijan are considered the main oil producers and exporters. An analysis of oil production statistics for recent years (2010-2023) suggests that, with the exception of Kazakhstan, oil production in the other mentioned states in 2023 decreased compared to previous years. In Kazakhstan, this figure was 81 million tons in 2010 and 90 million tons in 2023.

The research also analyzed gas production, consumption and

export of the Turkic states in detail. Analysis of the statistics of hydrocarbon resources of the states shows that natural gas production in Azerbaijan and Kazakhstan is on an upward trend, while in Uzbekistan it is decreasing. As for the consumption level, in Azerbaijan this figure increased more than 2 times in 2010-2023, while in Kazakhstan and Uzbekistan it was accompanied by increases and decreases.

During these years, Turkmenistan's gas production and consumption increased, production was set at 80.6 billion cubic meters in 2023, and consumption at 40.6 billion cubic meters. Türkiye's gas consumption increased from 39 billion in 2010 to 50 billion cubic meters in 2023.

Except for Azerbaijan and Turkmenistan, other Turkic states use coal. Therefore, a scenario of replacing coal with natural gas was developed in the dissertation for Türkiye. Calculations show that in order to realize the substitution of hard coal and its types, Türkiye needs additional gas in the amount of gas it currently imports. For the same amount of additional gas imports, new energy infrastructure should be created and large projects should be financed. The study found that Türkiye has huge potential in the field of renewable energy. In this regard, investing in the transition to the large-scale use of green energy resources is considered more efficient than hydrocarbon projects.

The study conducted a hypothetical analysis of the transition to solar and wind energy instead of natural gas in electricity generation in Türkiye, Azerbaijan and Uzbekistan. The analysis is based on the installation costs and the energy yield coefficient of a green (solar and wind) power plant per 1 megawatt. The hypothetical analysis conducted on the basis of solar energy replacement showed that the amount required for a complete transition to solar energy in electricity generation is tens of billions of dollars[2].

[2] Guliyev, M. Renewable Energy Transition in the Heart of Central Asia: Scenarios And Forecasts For Uzbekistan // International scientific-practical conference on Green Economy - The Economy of The Future: Innovations, Investments And Prospects. Tashkent, Uzbekistan, - 2024, - II collection of materials, p. 179-184. https://doi.org/10.5281/zenodo.11030045

Both the installation costs and the energy yield coefficient of wind power plants are higher than those of solar power plants[3]. When the same hypothetical analysis is applied to wind energy, it is revealed that 44-121 billion US dollars are needed to form a wind energy infrastructure in the countries[4]. The analysis of the hypothetical transition to green energy shows that emission indicators will be significantly lower and renewable energy types are very effective in this regard.

In 2024, the 29th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change – COP29 summit was held in Azerbaijan. The COP29 summit concluded with the adoption of new decisions by the world's countries related to the green transition. The parties reached a full operationalisation of Article 6 of the Paris Climate Agreement - the Transparent Carbon Market, and this event took place in Baku for the first time in the history of the COP. A consensus was reached on increasing the total amount of annual climate finance provided by developed countries to 1.3 trillion US dollars by 2035 and on annual assistance of 300 billion US dollars. Another name for COP29 is the "*Baku Climate Unity Pact*", and this name was given based on the results of the conference.

The dissertation identifies the strengths, weaknesses, opportunities and threats of the Turkish states using the SWOT analysis method. In general, the strengths of the states include their location in a strategically important geography, both traditional and renewable energy potential, possession of rare metals and other advantages, but at the same time, the analysis also reflects the fact that they face global threats such as the geoeconomic confrontation of great powers, global climate change, and the formation of a new

[3] Guliyev, M. Azerbaijan's Progresssion towards Sustainable Energy: Analyzing Hypothetical Outcomes of Theoretical Research // VI. International Scientific Conference of Economics and Management Researchers. Baku, Azerbaijan, - 2024, - p. 1531-1541.

[4] Guliyev, M. Türkiye's energy security challenges: a theoretical aspects of shifting from hydrocarbons to renewables // Journal of European Economy, - 2024, vol 91, issue 4, p.635-653

world order in the current uncertainty.

According to the research, the demographic forecasts of the Turkic states for the near future are positive. The largest increase is expected in Türkiye and Uzbekistan, while the population of Azerbaijan and Kazakhstan is projected to increase to 11 million and 21 million, respectively. In this ranking, an increase of about 1 million is expected in Kyrgyzstan, and the last increase is expected in Turkmenistan.

The Turkic states have agreed to establish an investment fund among themselves for the systematic development of the economy. The Turkish Investment Fund (TIF), with a charter capital of 500 million US dollars, will provide financing for the development of all sectors of the countries represented in the Organization of Turkic States. The research work shows in detail that international financial institutions such as the International Monetary Fund (IMF), dictating their own interests, provide financial resources to countries at high interest rates, based on the principle of "*who borrows today, receives instructions tomorrow*". It is noted here that Türkiye ended this dependence by paying off its last debt to the IMF in 2013, against the backdrop of the IMF's demands which collapse the state's economy allocating financial resources to Türkiye. After Azerbaijan's financial stability increased, the IMF, when closing its Baku office in June 2023, stated that the country had sufficient financial resources.

The Middle Corridor route is a Europe-China trade route. The route from Kazakhstan to Azerbaijan and from this region to Europe is now in the spotlight due to the geopolitical situation in the world. Thus, the cargo carrying capacity of the ports of Azerbaijan, Kazakhstan and Turkmenistan in the Caspian Sea, which is the main passage of the Middle Corridor, is as follows: the Turkmenbashi port of Turkmenistan is 17 million tons, the volume of the Baku port is being increased from 15 million tons to 25 million tons, the Aktau port of Kazakhstan is 17.7 million, the Kuryk port is currently 6 million tons, and will be increased to 10 million by 2030. One of the important issues in the Middle Corridor is the export of Kazakh and Kyrgyz coal to Türkiye. It is believed that the export of coal by the Turkic states to Türkiye will be both profitable for Türkiye in terms

of price and will contribute to the reduction of energy import costs, as well as have a positive impact on the growth of trade between them. This activity is possible, especially if the China-Kyrgyzstan-Uzbekistan-Caspian Sea railway opens the way for Kyrgyzstan's exports to the West.

The dissertation noted that one of the main advantages of the Middle Corridor is its short time compared to other routes. The Azerbaijani state attaches special importance to the railway connection to Türkiye through its historical land, Zangezur. This corridor, connecting Azerbaijan with Nakhchivan and Türkiye, was confirmed by Armenia's signature on the act of capitulation (November 10, 2020), in the Second Karabakh War. The Zangezur corridor will play an important role in expanding the geography of transport routes.

**In the third chapter of the dissertation "Perspective development directions of the energy sector of the Turkic states" is studied.**

In this chapter, the correlation between demographic growth and electricity production was examined using the econometric analysis method and simple linear regression was applied. In addition, a green survey was conducted among the population in Türkiye, Azerbaijan, Kazakhstan and Uzbekistan. The future of the global energy market was discussed based on an interview with ACWA Power.

Pearson correlation was applied to Azerbaijan, Türkiye, Kazakhstan and Uzbekistan. It is known that the significance level of the correlation varies between -1 and +1. All indicators are greater than the value of $r = 0.9$ and the fact that this result is close to positive 1 proves that there is a significantly strong relationship between the variables and at the same time such a result allows us to apply the regression analysis method to these countries.

Simple linear regression analysis conducted on Azerbaijan, Türkiye, Kazakhstan and Uzbekistan showed that the p value is significant, that it satisfies the condition of $p < 0.05$. The results of the analysis show that the impact of demographic growth on electricity production in the Turkic states is positive. The fact that the results are quite different indicates the importance of more

efficient use of electricity resources.

The study reflects the results of a survey conducted among the population in Türkiye, Azerbaijan, Kazakhstan and Uzbekistan on the transition to green energy. Based on the responses to the survey, this chapter concludes that the green transition is supported in the Turkic countries, and the population is aware of climate issues and green energy. Participants noted a number of difficulties related to the green transition - the high cost of equipment, maintenance costs. When asked about the attitude towards the transition to electric vehicles and its problematic aspects, the lack of battery charging stations, the long charging time and the high price of electric vehicles were particularly emphasized.

In the interview with ACWA Power, discussions were held on both the green transition in the Turkic countries and the future of the global energy sector, and a total of 7 questions were addressed. The last question was about who will benefit and who will lose in the green energy transition. It was stated that, in principle, there are no losers in this transition. If the issue is approached from a humane, humane perspective, there is no loser here. Because this process is beneficial in terms of environmental protection and renewable energy is clean energy. Therefore, this issue will undoubtedly lead to and will yield positive results. Renewable energy will play a key role in the future. This is important not only for the environment but also for the economy. It is noted that in the near future, product exports to the European Union will be carried out according to the Carbon Border Adjustment System and additional taxes (tariffs) will be applied to products produced without using green energy and molecules. At this point, it is clear who is the winner and who is the loser.

**The "Conclusion"** of the dissertation contains suggestions and recommendations. We summarize them briefly.

1. Since the Turkic states have a large green energy potential, the development of this field will be in line with the call of the times. In order to calculate the average costs of the green transition, a hypothetical analysis of the replacement of natural gas with solar and wind energy in electricity production in Türkiye, Azerbaijan and

Uzbekistan was conducted. For this, the volume of electricity production obtained with natural gas was kept constant. The hypothetical analysis conducted on the basis of solar energy replacement showed that the amount required for a complete transition to solar energy in electricity production varies between 3%-40% of the countries' GDP indicators for 2023, and this ratio varies around 65%-100% for the transition to wind energy. As a result of the analysis, it was revealed that huge financial resources are needed to form a green energy infrastructure. Based on the results of the hypothetical analysis of the replacement of coal use with natural gas in Türkiye, the study revealed that in order to realize the replacement of coal and its types, additional gas is required in the amount of gas currently imported by Türkiye. This necessitates additional investments and the formation of additional infrastructure. Instead of realizing this hypothetical scenario that requires huge resources, it was considered effective to switch to a more active use of green energy. The greatness of Türkiye's renewable energy potential also provides a basis for realizing the mentioned process.

2. In order to further increase the investment attractiveness of Azerbaijan, which is one of the main leading countries in the Middle Corridor, the creation of a web page called "Why invest in Azerbaijan" and the placement of guidance materials in international languages here, informing potential investors about the work done and the applied benefits, would contribute to a further increase in investment flows. It is advisable to implement this project in other Turkic countries that have not implemented it.

3. Investments in the energy sector are necessary for Uzbekistan and Kyrgyzstan. It was noted during the study that the hydropower potential of Kyrgyzstan is very huge. It is known that the electricity transmission lines in the Turkic states were built during the Soviet era and this system is now outdated. In terms of deepening interstate relations, it would be appropriate to modernize this system or build new lines.

4. The delivery of both traditional and renewable energy resources of the Turkic states located on the eastern shores of the Caspian Sea to the European markets through Azerbaijan would both contribute

to the expansion of the export geography of those countries and further increase their strategic importance.

5. Investments should be made in innovation and new technologies in addition to the development of the energy sector so that the development of the state is comprehensive. Technological superiority will lead to the exchange of experience between Turkic-speaking states and, taking into account current world trends, will ensure adaptation over time for the future.

6. Pearson correlation and simple linear regression were applied to determine the connection between population growth and electricity production. A simple linear regression analysis conducted on Azerbaijan, Türkiye, Kazakhstan and Uzbekistan showed that the impact of demographic growth on electricity production varied between 3 and 13 units. The rather diverse results indicate a more efficient use of electricity resources.

7. A survey was conducted in Azerbaijan, Türkiye, Kazakhstan and Uzbekistan in order to learn the opinions and suggestions of the population on the transition to green energy. According to the results of the survey, the population in the Turkic countries is aware of the existing differences between traditional and green energy and has a high level of climate awareness.

At the individual level, respondents stated that the main obstacles to the transition to the use of green energy types were the high cost of devices for these types of energy and the increase in maintenance costs.

The main problems in the transition to electric cars were the lack of battery charging stations, the long battery charging time and the high price of electric cars.

The proposals received from the population on the development of the green energy sector mainly include awareness-raising, state incentives, sale of devices with credit or leasing, and support for technical supervision.

8. As a result of the interview with ACWA Power, it was revealed that there is no loser in the global transition to green energy in terms of nature protection, viable environment and the existence of the planet. It was also noted that if the exporting party produces a product

to Europe without using green energy, additional taxes will be imposed on it, and it was stated that there is only one winner in this transition;

9. In terms of increasing trade turnover between Turkic states, it should be noted that as a result of our research, an increase in trade volume between the countries was recorded. It should be noted that the former Soviet countries signed agreements with each other within the framework of the CIS on reducing export tariffs to zero. In the same framework, the conclusion of an agreement with Türkiye will increase the level of trade between the Turkic states. Of course, in this deepening, it would be appropriate for the countries to assess the positive and negative aspects of the impacts on imports and exports sectorally.

10. There is sufficient potential for the Turkic states to live in conditions of stability. Ensuring their national and economic security should be considered the most important strategic task of the coming period.

**The main provisions of the dissertation work, the obtained results and proposals are reflected in the following published works of the author:**

1. Quliyev, M.A. Green export of Kazakhstan: development opportunities and problems // - Baku: The Scientific-Analytical Journal "Economic Reforms", - 2023, № 3 (8), - p. 66-76.

2. Quliyev, M.A. Analysis of Azerbaijan's green energy discourse: true shades of green energy // - Baku: The Scientific-Practical Journal "Statistical News", - 2024, № 1, - p. 4-13. DOİ: 10.338.70/2413-6557-2024-10-1-4-13

3. Quliyev, M.A. Green growth in Uzbekistan: prospective green priorities for carbon-neutral development // Baku: Journal of Science and Innovative Technologies, - 2024, № 2, - p. 12-22. DOI: 10.30546/2616-4418.30.2024.012

4. Quliyev, M.A. Analysis of foreign trade relations of turkısh-speaking countries // - Baku: Journal of Tourism and Hospitality Studies, - 2024, №1, - p. 107-119. DOI:

doi.org/10.61226/12.2.2023/20241.9

5. Quliyev, M.A. Public assessment of the transition to green energy in Türkiye: survey results // Trends of The Modern Era: "Green Economy and Sustainable Development" I International Conference of Researchers on Economics and Social Sciences, - Baku, Azerbaijan: - 16 December – 17 December, - 2024, - II collection, p. 116-124.

6. Quliyev, M.A. Energy policy of the Republic of Turkmenistan: lost opportunities and future perspective // - Baku: “Cooperation” scientific-practical journal, - 2024, № 1 (72), - p. 182-188. DOI:10.30546/1.72.2024.17

7. Guliyev, M. Azerbaijan's Progression towards Sustainable Energy: Analyzing Hypothhetical Outcomes of Theoretical Research // VI. International Scientific Conference of Economics and Management Researchers. Baku, Azerbaijan, - 2024, - p. 1531-1541.

8. Guliyev, M. Clean energy transition dilemma: future value of green investment in Azerbaijan // Special Issue on “Global Strategy for sustainable development: Innovation, modelling, and alliances. International Journal of Humanities and Social Development Research, - 2024, p. 104-111. DOI:10.30546/ BAKUCOP29.2024.1.098.

9. Guliyev, M. Green Energy Transition in Azerbaijan: Analyzing Survey Results // Actual Problems of Humanities and Social Sciences, - 2024, vol 6, issue 4, p. 208-214. DOI: https://doi.org/10.47390/SPR1342V4I6Y2024N32

10. Guliyev, M. Renewable Energy Transition in the Heart of Central Asia: Scenarios And Forecasts For Uzbekistan // International scientific-practical conference on Green Economy - The Economy of The Future: Innovations, Investments And Prospects. Tashkent, Uzbekistan, - 2024, - II collection of materials, p. 179-184. https://doi.org/10.5281/zenodo.11030045

11. Guliyev, M. Türkiye’s energy security challenges: a theoretical aspects of shifting from hydrocarbons to renewables // Journal of European Economy, - 2024, vol 91, issue 4, p.635-653

12. Quliyev, M. Green energy transition survey in Azerbaijan: energy efficiency and electric vehicles // 1st National Energy

Transition and Sustainability Conference (EDSK'25), - Istanbul, Türkiye: - 9 January – 10 January, - 2025, p. 36-47. DOI: https://doi.org/10.61150/gedikyay.250303

13. Quliyev, M. Green Transition: The case of Turkey and Central Asian countries // Scientia Fructuosa, - 2025, issue 1, vol 159, p. 61-74. DOI: 10.31617/1.2025(159)04

The defense of the dissertation will be held on 29 May 2025, at 14:00 at the meeting of the Dissertation Council ED 2.46 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan Cooperation University and Baku Business University.

Address: AZ1106, Baku city, Narimanov district, Najaf Narimanov street 93.

The dissertation is accessible at the library of Azerbaijan Cooperation University.

Electronic versions of the dissertation and abstract are available on the official website (www.aku.edu.az) of Azerbaijan Cooperation University.

The abstract was sent to the required addresses on 26 April 2025.

Signed for print: 23.04.2025

Paper format: 60x84 1/16

Volume: 36317 sign

Number of hard copies: 20 copies