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Prospects for the development of green finance in Kazakhstan

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Abstract: Currently, Kazakhstan is gradually implementing a policy of greening the national economy. Kazakhstan, owning a huge territory, while having no access to the sea, due to huge raw materials reserves, was able to become a competitive country on the world stage in a short period of its independence, exporting oil and gas. At the same time, increasing the capacity of production enterprises, careful attitude for the environment and the environmental agenda were not the primary achieving goals, in contrast economic growth, increasing the income of the population, and attracting foreign investment were prioritized. All this led to extensive economic growth, which could not but affect and especially affected the ecology of those regions where production capacity is concentrated. For Kazakhstan, an environmentally responsible approach to production is more important than ever, because a rapid increase in the capacity of mining enterprises can lead to irreversible consequences for the country's natural resource fund. It is important to analyze the most attractive areas of production for landscaping, develop standards for defining a green project, establish legal regulation of green financing, make investing in environmentally friendly production more attractive than in a conventional project. This thesis reveals the current situation of the green financial system of Kazakhstan, compares it with the green financial systems of the leading countries - China and the USA, and also gives forecasts and recommendations for further development.

Key words: green finance; financial system; ratings; banks; sustainble development; environment; renewable energy; scenario

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1 Literature review

This literature review summarizes previous work related to green financing. We mainly used Kazakhstani sources of information in our work, but there were also foreign articles.For statistical data, we mainly used official international reports, such as the World Bank report, the Climate Bond Documents, as well as other reliable sources of information. The main Kazakh sources of information were such official documents as the Concept of Kazakhstan's Transition to a Green Economy published in 2013, the Environmental Code of the Republic of Kazakhstan updated in 2021, the Strategy Kazakhstan - 2050. They give an overall picture of the current state of the green finance system and summarize the work already done in Kazakhstan. The main foreign sources of information were the report Green Finance as a means to Solve global problems, the G20 Summary Report on Green Finance for 2016, the Establishment of a Green Financial System in China 2015. They give an overview of the international situation of the financial system and allow identifying best practices for the implementation.

2. Research methodology

The study was conducted using a mixed method and is based on both primary and secondary data with reliable references.

The qualitative analysis was based on secondary and primary data and analyzed the current situation of green finance in Kazakhstan. In addition, the weaknesses and strengths of Kazakhstan and international green financing were investigated. Besides, an interview with an official representative of the AIFC Green Finance Centre was conducted, thanks to which we determined the relevance of our research, learned more about the work of the center and the issue of green bonds. Thus, qualitative analysis is aimed at understanding general data, observations and conducting comparative analysis.

The quantitative part of research was based on the primary data. With the help of quantitative analysis, it was possible to demonstrate the development of green finance in Kazakhstan based on benchmarks. Statistical methods such as forecast and correlation analysis were used for this purpose. Sources such as the Statistics Committee of the Republic of Kazakhstan, the Climate Bonds Initiative and corporate

statistics were used. The collected information is presented in the form of tables and graphs with detailed explanations in the following sections.

The data were collected from reports of national and international organizations, legislation, scientific publications and other open sources. All explanations of the results were devoted to understanding the significance of the results for this thesis.

3 Green Finance

3.1 What is Green Financing

Presently, one of the significant and worldwide pressing issues is Climate Change. Scientists understanding the seriousness are very worried about the current situation. So plenty of developed countries are trying to resolve this issue with the help of available resources and laws. In order to use the resources more effectively Green Financing was introduced. In other words, green financing plays an important role in the fight against climate change. And the recent global pandemic has contributed to the development of green finance and opened up many prospects for improving the quality of life in general. “Green Financing is a loan or investment that maintains environmentally-friendly activity, such as purchasing ecologically harmless goods and services or building eco-friendly infrastructure.” Simply, Green financing uses financial products and services, such as loans, insurance, stocks, private equity and bonds in green or eco-friendly projects.

3.2 The ways of implementing Green Financing

The easiest and understandable way of implementing Green Financing is ESG principles. ESG principles could help to increase the awareness about Green Financing and its usefulness in general. The abbreviation ESG could be deciphered as "ecology, social policy and corporate governance". In a broad sense, this is known as socially responsible investing or sustainable investing. Thus, the ESG principles can be used as a first step towards green financing.

In addition, sustainable development is broadly defined as: “development which meets the needs of the present without compromising the ability of future generations to meet their own needs”.

But implementing green projects can be expensive. Although, in the future, green financing may also include financing for solving environmental problems related, for example, to the transition to electric vehicles. Thus, green financing can help to make the right decisions in the interests of the environment.

As the risks associated with environmentally friendly projects increase, over time it can be expected that investments in green projects will become the norm. But there is a problem that private sector investors are unwilling to invest because of the long payback periods, lack of experience in this area and the buoyancy of prices for green products at the moment.

3.3 Why Green Finance is important

The world needs big investments in clean energy systems. Developing countries are all the more in need of significant investments in green projects, such as water supply and sanitation in fast-growing urban areas.

Turning directly to the circumstances occurring in Kazakhstan, it can be noted that the country has very low electricity prices compared to other countries in the CIS and Europe. This is because investments in various indirect subsidized tariffs for coal producers are unattractive, and therefore, new plants or their modernization cannot receive financing in the required volumes. It is known that Kazakhstan is a huge unexplored territory that has a significant potential in the development of renewable energy sources, open for the study and use of resources. The energy stability of the country directly depends on ensuring the overall balance of electricity from renewable sources, which is its value.

In May 2018, auctions were held on the latest projects in the environmental theme, more specifically in the field of renewable energy sources by the main authorized body of the government, the Ministry of Energy of Kazakhstan. During the implementation of the projects, tariff reductions were achieved in accordance with the latest global trends and the involvement of the most advanced international corporations in the field of renewable energy implementation. As a result, the total investment amounted to about 1 billion US dollars.

4. Green Finance in Kazakhstan

Since the day of independence, Kazakhstan has achieved great achievements. GDP growth has been more than 7% per year over the past 20 years. The standard of living has increased 10 times more in one generation, and the country is also classified by the World Bank as a middle-income country.

In addition, Kazakhstan is improving the level of the business structure, creating large-scale infrastructures and implementing programs of structural economic reforms. As a result, there is a flow of foreign direct investments, which leads to a slow but steady increase in the country's competitiveness.

One of the biggest problems that hinders the improvement of the country's economy is the threat of climate change associated with emissions and energy. To date, the time of energy consumption in Kazakhstan exceeds the norm of energy consumption. At the same time, it occupies one of the first places in the world in terms of emissions, as it is a frequent source of greenhouse gas emissions in Central Asia. Climate change has already affected the country, causing drought, deteriorating agriculture and desertification.

The main solution to this problem and the path to success is the transition to sustainable growth. Green growth will bring with it a different infrastructure, efficient use of all resources, and improved resources, including food security. This transition will help support and revive Kazakhstan's industry, citizens, economy, and eliminate threats to climate change adaptation.

In order to continue on the path of development and improvement, Kazakhstan needs to make a second revolution on the way to a low-carbon future.

This includes almost all political programs:

- How to diversify the economy through natural resources and oil.
- How to reduce overall greenhouse gas emissions and energy intensity.
- How to create new impetus for green growth while strengthening the political and institutional framework.

In connection with the pursuit of diversified and sustainable growth, the country has implemented development plans, national programs for the foundation and long-term development.

Kazakhstan has created an organizational and legal framework for the transition to "Green Economy" by enacting many of legislative documents, including “The Environmental Code” (2007) and The Act on Promotion of the Use of Renewable Energy Sources” (2007). Further, Kazakhstan is the first Central Asian country who created “The Concept of Transition to a Green Economy” (2013).

In the address of the President of the Republic of Kazakhstan in December 2012 was been discussed the country's development strategy until 2050. The President was said about his main goal: “Build a welfare society based on strong nations, developed economies and universal job opportunities, with Kazakhstan entering the top 30 of the world's most developed nations”.

Moving to Environmental Law Tasks of the Republic of Kazakhstan:

The highest level of environmental protection through the implementation of municipal legislative acts that were aimed at preventing environmental pollution, ensuring protection, providing suitable criteria for the life and health of people.

The vision of a transition to a “Green Economy” by 2050 can serve as an important document for an agreement between the Nature Conservation Agency and UNDP to address existing environmental problems. Adapting to climate change and addressing the challenge of reducing carbon dependence worldwide are other important challenges that need to be addressed by advancing appropriate governance systems and promoting sustainable and renewable energy development. The concept points to an increase in the efficiency of asset use, proposes measures to modernize the existing foundation, and more broadly, to protect the environment to improve living conditions in Kazakhstan. The concept analyzes existing natural disasters, and in order to eliminate them, it is necessary to identify successful approaches and measures that are consistent with activities around the world.

The AIFC Green Finance Center prepared a draft resolution of the Government of the Republic of Kazakhstan on the classification of "green" and sent it to the Ministry of Ecology, Geology and Natural Resources. Astana International Financial Center (the “Center”) The Green Finance Center (the “Center”) issued a resolution to the Ministry of Ecology on the “green” classification (“Classification”), geology and natural resources of the Government of the Republic of Kazakhstan.

The development of a classification mechanism for green projects is a key element of the AIFC Administration's legislative initiative to develop a "green" financial system in the Republic of Kazakhstan. The Green Classification provides clear guidance for determining whether eligible activities and projects are environmentally sustainable and an important part of a country's green ecosystem.

On December 6, 2016, former Prime Minister Askar Mamin stressed in his speech that Kazakhstan was one of the first countries in the world to ratify the Paris Agreement. As part of the implementation of the document, the Republic of Kazakhstan plans to reduce greenhouse gas emissions by 15% by 2030. To this end, Kazakhstan updated its Nationally Determined Contribution (NDC) and adopted new environmental legislation.

Climate change is an extraordinary global problem that transcends national borders. This challenge requires coordinated decision-making and international cooperation at all levels to help countries transition to low-carbon economies.

To combat climate change and its adverse effects, 197 countries adopted the Paris Agreement at COP21 in Paris on December 12, 2015. The agreement, which came into force in less than a year, is a way to significantly reduce global greenhouse gas emissions, limit global temperature rises in this century to 2 degrees Celsius, and at the same time maintain it at 1 degree. The purpose is to find and limit it to 5 degrees.

To date, 189 countries are members of the Paris Agreement. One of this is Kazakhstan.

The former Prime Minister pointed out that President Kassym-Jomart Tokaev announced a goal to make Kazakhstan carbon-neutral by 2060 at the December 2020 Climate Ambitions Summit. According to calculations, this will reduce the expected damage from the mentioned risks by more than 2 times. Modeling results showed that by 2060 Kazakhstan will achieve an economy-wide balance of zero emissions. Most of the emissions will be avoided, and the remaining emissions will be captured by carbon capture and storage technologies and absorbed by vegetation and soil. Undoubtedly, the implementation of measures to decarbonize the economy will lead to a transformation in the fuel and energy complex. In 2017, the fuel and energy basket consisted of 54% coal, 24% oil and 22% gas. Model calculations showed that by 2060 the share of fossil energy resources in the structure of primary fuel and energy resources will decrease by 3.4 times and amount to 29%.

EXPO 2017 Astana - Future Energy became the first international exhibition in the CIS. "Energy of the Future" reflects the most relevant to humanity rational use of energy and natural resources, decline greenhouse gas emissions, use of renewable energy sources, transition to green technologies also raises the issue availability of electricity and poverty reduction. This event resulted in attracting the best technologies and solutions in the field of green economy to the Republic of Kazakhstan, also increasing the status of Kazakhstan on the world arena in the field of emission reduction greenhouse gases and climate change.

Summing up, Kazakhstan is moving towards improvement and sustainable development.

Timing of Kazakhstan's transition to a green economy (2013-2050)

2013-2020

Optimization distribution and efficiency resources

Development of green infrastructure

2020-2030

Rational usage natural resources large scale introduction of new RES and energy saving technologies

2030-2050

Full transition to green models growth transformation traditional industries economy and development of new industries based on RES.

5. International agreements

It cannot be said that Kazakhstan is just embarking on the path of greening the economy, because so far a lot of work has already been done and projects have been implemented, not only of state, but also of international importance. Examples of such global initiatives of Kazakhstan can be the conducting in 2017 of the specialized international exhibition Expo, which was held under the slogan “Energy of the Future”, the Green Bridge partnership program initiated by the first President of Kazakhstan Nursultan Nazarbayev in 2010, Kazakhstan's ratification of the Paris Agreement in 2016, as well as such important government decisions as the adoption of the Environmental Code in 2007, the Law on Support for the Use of Renewable Energy Sources in 2009, as well as the Concept of Transition to a Green Economy in 2013. International agreements the main purpose of which is the enhancement of ecology condition around the world signed by Kazakhstan are not just formal documents. They set clear goals, conditions and time limits for the implementation of plans and projects under these agreements. For example, one of the main objectives of the Paris Agreement is to keep the global average temperature to 1.5 degrees Celsius. In addition, under the Paris Agreement, all countries that have ratified this agreement will have to provide general reporting on the results of combating the effects of climate change from 2024. The Paris Agreement also pays special attention to developing countries, for example, article 9 of the Code clearly states that developed countries can provide financial resources and support developing states, including Kazakhstan, for measures to prevent climate change. Kazakhstan's accession to such important environmental projects encourages the government to openly define long-term plans to prevent sharp climatic fluctuations. Thus, President Kassym- Jomart Tokayev set a goal for Kazakhstan to achieve carbon neutrality status by 2060 and reduce greenhouse gas emissions by 15% by 2030. The Green Bridge

partnership program initiated by Kazakhstan has also become an important step of the state in promoting the idea of updating sustainable development. The importance and value of this program lies in the fact that it was joined by such large countries as Russia, Germany, Sweden, as well as Kyrgyzstan, Georgia, Mongolia, Belarus, Montenegro, Latvia, Albania, Finland, Hungary, Bulgaria, Spain, a total of 15 countries, including Kazakhstan and another 16 non-governmental organizations. The countries that have signed the charter of the program continuously exchange technologies and best practices for greening the economy. The key focus of the Green Bridge Partnership program is the role of financial and economic mechanisms in the fight for greening. Within the framework of this partnership program, a project was implemented to open the first green village of Arnasai in 2015, located near the capital of Kazakhstan, where innovative green technologies are used and all conditions are created for combining the best environmentally friendly practices. In addition, the Green Bridge approved and developed the NGO standard “System of voluntary certification of real estate objects “Green Standard of Kazakhstan” in 2016.

6. The role of international banks in the development of green finance in Kazakhstan

Along with the above-mentioned international and regional partnerships, promising green projects are becoming more and more attractive for foreign capital and investment. Based on the fact that green projects are a riskier investment than a conventional “non-green” project, Kazakhstan banks refuse to invest in such an initiative. Therefore, large international banks, such as the World Bank, the European Bank for Reconstruction and Development (EBRD), and the Asian Development Bank (ADB) can provide budget support for such projects. The European Bank for Reconstruction and Development (EBRD) plays a special role in the development of Kazakhstan's energy sector and the promotion of environmentally friendly enterprises. Currently, the number of active EBRD projects in Kazakhstan is 123 enterprises. In the past 2021 alone, the EBRD invested $630 million in 18 projects throughout our country, 40% of the financing was related to "green investments" (The data is taken from the Internet resource kapital.kz, article dated 27.01.2022). The activities of the Asian Development Bank (ADB) in Kazakhstan are currently focused on sustainable recovery after the coronavirus pandemic, reducing Kazakhstan's dependence on raw materials exports, and addressing issues directly related to climate

change. Various agreements are signed between the state and international banks that encourage the greening of the economy. For example, in 2014, the Government of Kazakhstan and the International Bank for Reconstruction and Development (a credit institution of the World Bank) signed a grant agreement for the implementation of the project “Improving Energy Efficiency in Kazakhstan”.

7. China’s and USA’s experience

Despite the active support of the state and the sharp increase in climate changes especially in recent years, which has led to global activation in greening national economies, Kazakhstan is just beginning to follow the path of sustainable development and careful use of natural resources, it is important to take into account the experience of those countries that have succeeded and already have positive results of green financing and make relevant methods for further applications in our country. To analyze the policy of green financing, we chose two countries – China and the USA. The reasons for choosing these countries were their role on the world stage, the degree of influence on the economy of other states, the size of the gross domestic product and, of course, the standards applied by these countries for the development of green finance. According to the statistics of gross domestic product from World Bank (2020), The United States of America and China occupy the first and second places, respectively, in the overall ranking of countries by GDP. Another reason for choosing these countries is their initiative and high degree of involvement in promoting green finance at the international level. The authorities will have to evaluate the models and initiatives taken by these states and choose the most optimal strategy for the development of green finance for Kazakhstan. The study of the strategies of the above countries in the field of green financing will allow for a comparative analysis with the "green" way of development of Kazakhstan, identify strengths and weaknesses, reveal best practices for making changes and adjustments. In a short period of time, China was able to become the second largest economy in the world, due to the increase in industrial production, the development of the textile industry, coal metallurgy, as well as pharmaceutical and electronic industries. Chinese goods are in demand all over the world primarily due to their affordability (low prices). Of course, such a large number of manufacturing enterprises concentrated in China cannot but harm the environment and human health. It is for this reason that China in the 2010s set

a course for greening the national economy and initiated the idea of greening the IFS in 2016 during its presidency of the G20 (Arkhipova, 2017, p. 15). The budget policy of green financing of China clearly defines that national "green" projects should be financed only by 10-15% at the expense of the state, and by 85-90% through the involvement of private funds and investments (Green Finance Task Force Report, 2015, p. 21). Kazakhstan is trying to adhere to the same approach in the allocation of the budget for green projects. According to the Concept of Kazakhstan's transition to a "green economy" (2013), for the implementation of the economic "greening" plan, a large share of investments, as well as in China, should be attracted at the expense of private investors, but this Concept does not indicate a percentage ratio.

The most popular tools used for green financing

The most important instruments of green financing are a "green" loan and a "green" bond. The most active participants in global syndicated lending by borrower countries are the United States (1st place in the rating and 34.5% of credit resources), the United Kingdom (2nd place and 8%), as well as China and India (6th and 7th places, respectively, and 4% each) (Arkhipova, 2017, p.10). Global syndicated loans are especially popular in the implementation of green projects directly related to construction, infrastructure and transport, agriculture and timber processing, as well as in the promotion of clean energy. However, the share of green loans is still significantly lower than the usual bank loans that are not aimed at implementing environmentally friendly projects. According to the G20, only 5-10% of bank loans in a small number of countries can be classified as green (G20 Green Finance Synthesis Report, 2016, p. 6). China also holds a leading position in issuing green bonds. China's Shanghai Pudong Development Bank and Bank of China are among the largest green bond issuers.

Common environmental problems of China and Kazakhstan and prospects for the development of alternative energy sources through green financing

One of the urgent environmental problems of both China and Kazakhstan is a sharp increase in air pollution indicators, in China – especially in those areas where manufacturing enterprises are located, and in Kazakhstan – in the capital and in Almaty, due to the growth in residents of these cities, the increase in transport infrastructure, the concentration of thermal power plants increasing their production capacity

especially in the cold season. In addition to Nur – Sultan and Almaty, air pollution is at a high level in such cities as Karaganda, Temirtau, Atyrau, Aktobe, Balkhash, Ust – Kamenogorsk, Zhezkazgan and Shymkent. In China, due to the high population density and insufficient territorial resources for an even distribution of residents, the situation with air pollution is also in a deplorable state. So only in 8 out of 74 large cities the air is habitable and does not exceed critical pollution levels. The energy sector of China is concentrated on the dominant position of coal generation. China is the largest country in the world producing and consuming coal. Therefore, in order to improve the environmental situation, the government introduces a reduction in the production of certain enterprises, restrictions and prohibitions on the construction and commissioning of new coal-fired power plants, as well as the closure of some of them. Coal mining is also an important and integral part of the economy of Kazakhstan. Just like China, Kazakhstan is among the top ten countries in terms of coal reserves. The main coal deposits are the Karaganda and Ekibastuz coal basins. Coal is the main raw material for heating the municipal sector. However, it is predicted that by 2030 coal mining will be sharply reduced and replaced by alternative energy sources (Samruk – Kazyna report, 2018, p.22). Currently, the demand for coal in the domestic market is much less than the production capacity. Therefore, it is important to carry out planned monitoring of all enterprises, determine which of them need modernization and reduce the production capacity of some of them. Promising industries for investment and an alternative to coal are gasification and nuclear power. The atom produces carbon-free energy generation, that is, without emissions of environmentally harmful substances. Currently, Kazakhstan is actively considering the need to build a nuclear power plant and a final decision should be made already in the current 2022. According to the calculations of the Ministry of Energy of the Republic of Kazakhstan and based on international experience, the construction of only one power unit can cost $ 5 billion.

The influence of domestic and international banks on greening the financial system

China plans to develop a green finance system by introducing measures that restrict investment in polluting enterprises and make them unattractive, as well as by significantly increasing institutional mechanisms that encourage green investment. It is planned to create a Chinese Environmental

Development Bank, as well as other local green banks. In Kazakhstan, the level of investor involvement in green financing is not as high as in China, so the creation of a separate bank for issuing green loans and bonds is not necessary. It is important to carry out landscaping of already existing banks. Currently, the body representing green finance in Kazakhstan is the AIFC Green Finance Center, established in 2018. However, in recent years, banks have also been taking active steps to switch to ESG financing. Thus, the Halyk Bank of Kazakhstan, within the framework of the agreement on green lending, issued a green loan for a total amount of 7.9 billion tenge. At the expense of the funds received, Kaz Green Energy will begin construction of a bioelectric power plant in the city of Zhezkazgan. Also, a green credit line in the amount of $20 million tenge was signed between the EBRD and CenterCredit Bank. In addition, the EBRD's Green Economy Financing Facility project has been launched since 2020, the main task of which is to support and encourage the development of green technologies in Kazakhstan.

The main points that contributed to the success of the Chinese green financial system:

1) Analyzing the experience of China, we highlighted that one of the first steps that laid a stable foundation for the development of green finance in this country was *the classification of green instruments (bonds and loans),* as well as a clear taxonomy of the green projects themselves, which will be directed through the above financial instruments investment. In Kazakhstan, as in China, at the end of 2021, a taxonomy of projects that can be financed through the use of green financial instruments was officially approved if these projects meet certain criteria. Such clearly defined classification and legally fixed definitions allow avoiding inefficient allocation of financial resources and making sure that the investor will be directed specifically to the green project.
2) The next important point that contributed to the development of the green finance market in China was the presence of independent monitoring organizations that regularly monitor the process of issuing green bonds. Such an institution checks whether the issued bond really meets the green standards. In China, there are not one, but seven bodies involved in the regulation and monitoring

of green finance: In order for such an independent monitoring organization to start working effectively in Kazakhstan, it is important that institutions providing green financing services, advisory assistance on green investment to all interested parties involved in issuing green bonds (AIFC Green Finance Center) adhere to the principle of transparency and accessibility of accounting documents.

3) In addition, government incentives have become an important factor in the development of the green finance system in China. The state is trying to create all conditions for attracting investment in green projects. An example is the provision of a corporate tax credit for the interest received on green bonds, the creation of free admission of foreign investors to the national financial market, the introduction of a system of control by banks over the level of risk of socially significant and environmental projects.

USA's experience

Unlike China and Kazakhstan, the United States has firmly entered the "green" financial market, we can say that it has successfully adapted to the conditions of a new segment of the "green" financial system, which has allowed over the past 13 years to issue "green" bonds worth over $ 211.7 billion and outstrip China, which over the same period issued "green" bonds worth $ 127.3 billion and became its main competitor.

In the structure of the distribution of the received US investments, most of the amount was directed to the energy sector of the economy, which amounted to about 80%, and the remaining resources were directed to construction and transport. Considering the specifics of the distribution of "green" investments of the USA, China and Kazakhstan, it should be noted that the energy segment of the economy is the most attractive. However, if we compare with the distribution of "green" investment funds on a global scale, it can be noted that "green" finances directed to the energy sector in 2020 accounted for about 35% of all

green finance funds in the world, and in 2021 this indicator remained at the same level (Huang, H. & Zhang, J., 2021).

After analyzing the general trends in the development of the green finance in USA and China, it follows that the most attractive industry segments are energy, construction, transport, and less attractive are the agricultural sector, waste recycling, industrial segment and solving water problems. In many ways, the global distribution structure of "green" finance differs from the priorities of the United States, China and Kazakhstan, which is focused on solving the problems of the energy sector of the economy. For Kazakhstan, such a globality in the approach of green financing is explained by high penalties for carbon dioxide emissions from thermal power plants, which dominate the structure of energy sources in the republic. However, such an approach in the distribution of green finance does not change the extremely low level of electricity production from RES (Samruk – Kazyna report, 2018).

At the same time, it should be noted that Kazakhstan's activation in the green finance market began in 2020 and its development coincided with the pandemic period, therefore, a comparison of the effectiveness of behavior in this segment of the financial market will not give objective conclusions reflecting the progressiveness of its development in comparison with the leaders: China and the USA.

8. Data collection

At first, data on the volumes of green financing in Kazakhstan and other countries were collected. In this study, the green bond market represents the green finance sector. Because among all the instruments of green finance (green lending, subsidies and quotas), they are the most popular and developed in the context of global trends. The United States and China were taken as benchmarks. These countries are the world's best practices, according to which Kazakhstan creates its own strategy. The collection of information on the volume of green bond issuance, gave an insight of the trends in the development of the green market. A Table 1 was compiled on the volumes of green bonds issued by three countries in the period from 2015 to 2021. It is important to emphasize that the number of available observations was not very large, due to the lack of quarterly or semi-annual data, for this

reason, the stability of the model may be in question. But the annual data also gave a general understanding of the growth of the market.

	2015	2016	2017	2018	2019	2020	2021
China	1	23,6	22,9	31,1	31,3	23,8	55
USA	10,5	30,3	42,4	34,1	51,3	52,1	77
Kazakhstan	0	0	0	0	0	0,0324	0,081

Table 1. Green bond market volume, $ billions, 2015-2021

Source: Climate Bonds Initiative reports

The volume of bond issuance in the Table 1 is expressed in billions of dollars. Information on China and the United States was taken from the annual reports of the Climate Bonds Initiative. It needs to be noted that there is a Climate Bonds Taxonomy, which indicates whether a particular bond fits the definition of a green bond. If they correspond to the taxonomy, they are included in the CBI database for green bonds. These bonds are called internationally-aligned green bonds.

China is a major player in the global green bond market, but not all bonds issued by it are included in the CBI database due to differences in green projects allowed in accordance with China's internal guidelines and international definitions. The types of projects that are considered environmentally friendly by domestic, but not by international investors, include: improving the efficiency of coal use, electricity infrastructure using fossil fuel energy, clean coal and improved coal efficiency, large hydroelectric power plants, landfill disposal and etc. As a result of non-compliance with the standards, part of the financing amount was not taken into account, so there are sharp jumps between some years.

As for US green bonds, they are in line with international definitions. There are no variables for Kazakhstan from 2015 to 2019, because this was a relatively new and unexplored area of finance for the country. Only with the opening of the Green Finance Center in 2018, the prerequisites and measures for the development of the green finance market were created. It should also be noted that all green bonds issued in Kazakhstan comply with international standards.

According to the collected data, the United States was the first-largest country to issue green bonds with a cumulative value of about 297 billion US dollars on the domestic and foreign markets. China was the second-largest country, with a cumulative value of about 188 billion US dollars and Kazakhstan ranks third with a cumulative value of about 0,113 billion or 113 million US dollars.

These data were further used in event research.

8.1 Data analysis

Based on the collected information, we made a forecast in order to demonstrate the further growth of green finance in Kazakhstan. Taking into account the development of green finance in Kazakhstan now, as the first hypothesis, we can assume that the volume of financing in Kazakhstan will grow in the same trend as in the United States over the past six years. The hypothesis was based on the US benchmark, since China turned out to be not quite a stable model due to data jumps.

First, with the help of the forecast function in Excel, we built a Table 2. According to the definition of the Microsoft website, "the FORECAST.ETC function calculates or predicts future values based on existing (historical) values using the AAA version of the Exponential smoothing algorithm (ETS). The predicted value is a continuation of the historical values for the specified target date, which should be a continuation of the timeline".

Year	Green bond volume
2020fact	0,0324
2021fact	0,081
2022forecast	0,13
2023forecast	0,18
2024forecast	0,23
2025forecast	0,28
2026forecast	0,32

Table 2. Kazakhstani green bond market volume forecast, $ billions, 2020-2026

Thus, the total volume of the green market for the projected five years will be approximately 1 billion dollars.

But, according to the hypothesis, it is necessary to imagine what the growth would be if it were similar to the growth in the USA. In order to project the growth of the USA on Kazakhstan, we superimposed the average annual growth of America on the forecast of Kazakhstan (Table 2). Based on the green bond volumes in the USA (Table 3), the average growth rate in the USA was 51.45%.

Year	Green bond volume	Growth rate
2015	10,5	
2016	30,3	188,57%
2017	42,4	39,93%
2018	34,1	-19,58%
2019	51,3	50,44%
2020	52,1	1,56%
2021	77	47,79%

Table 3. Growth rate of the USA green bond market, $ billions, 2015-2021

We can assume that the current growth rate of green bond volume in Kazakhstan at the current stage of development of green economy is considerable with the average growth rate of the USA in the same stage of development of the green economy in the period 2015-2020. In addition, the option of market development as it was in the USA is also possible in Kazakhstan, since the average annual growth of the USA according to available data was 51.45%, in Kazakhstan this indicator is 150%.

Year	Optimistic scenario	Realistic scenario	Pessimistic scenario
2021	0,08100	0,08100	0,08100
2022	0,12673	0,12268	0,11863
2023	0,19827	0,18580	0,17373

2024	0,31020	0,28140	0,25444
2025	0,48532	0,42619	0,37264
2026	0,75930	0,64548	0,54574

Table 4. Kazakhstani green bond market volume forecast scenarios based on average USA green bond growth rate, $ billions, 2021-2026

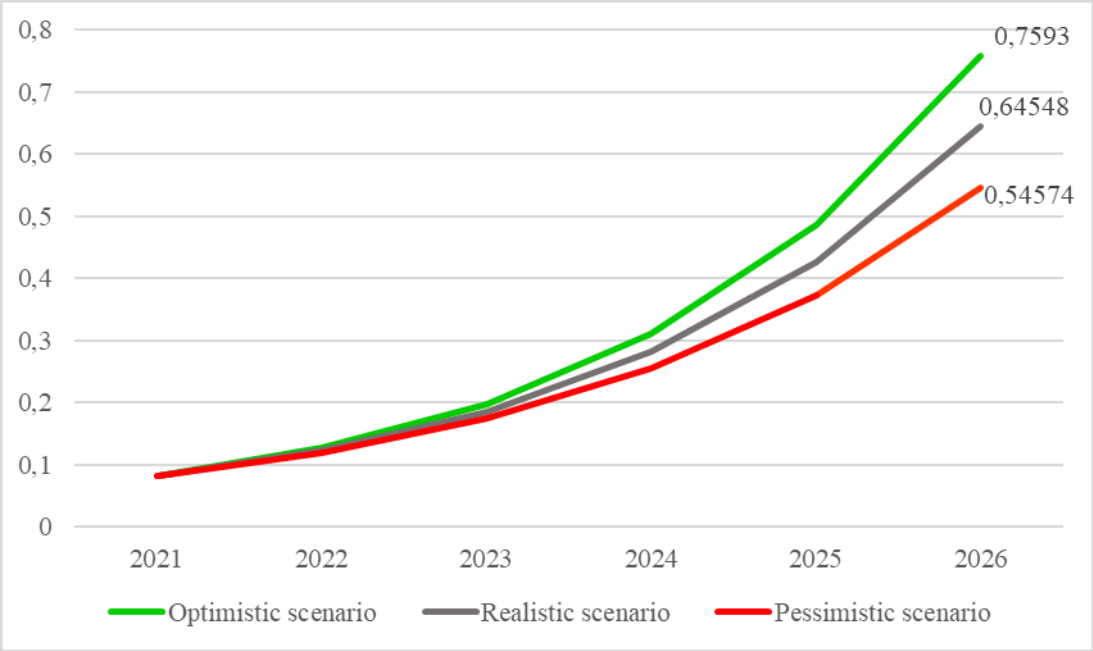

Chart 5. Kazakhstani green bond market volume forecast scenarios, $ billions, 2021-2026

As can be seen from Table 4, we have built not only the forecast itself, but also possible negative and positive outcomes of events. In this analysis, we gave them the names of realistic, optimistic and pessimistic scenarios. Calculations are made taking into account the 95% confidence interval. In a realistic scenario, the 5% deviation in the formula was represented as 1, in a pessimistic as 0.95, in an optimistic 1.05. That is, optimistic and pessimistic scenarios were obtained as a result of taking into account a deviation of 5%, more or less respectively, from the value of the previous period.

According to the second forecast, the total investment volume will be about 1 billion 600 million dollars by the end of 2026.

The renewable energy industry is in high demand among other sectors of the green economy. Therefore, as a second hypothesis, we assume that there is a connection between the development of green financing and an increase in the share of renewable energy sources in the total energy volume. For clarity, we will conduct this analysis on both Kazakhstan and the USA.

To study this hypothesis, we conducted a correlation analysis using the CORREL function in Excel. For the analysis, in addition to data on the volumes of green finance, data on the share of renewable energy (RES) in the total energy sector were also collected.

Year	**The volume of green bond market, billions $**	**The share of renewable energy in the total volume of energy, %**
2015	10,50	13,80
2016	30,30	15,60
2017	42,40	17,70
2018	34,10	17,60
2019	51,30	18,30
2020	52,10	20,60
2021	78,00	22,70

Correlation	0,964202298

Table 6. The share of RES in total U.S. energy, 2015-2021

Year	**The volume of green bond market, billions $**	**The share of renewable energy in the total volume of energy, %**
2015	0	0,50
2016	0	1,10
2017	0	1,20

2018	0	1,30
2019	0	1,60
2020	0,0324	2,80
2021	0,081	3,50

Correlation	0,916421426

Table 7. The share of RES in the total energy volume of Kazakhstan, 2015-2021

In both cases (Table 6, 7), there is a correlation coefficient above 90%, which means that there is a strong interdependence in the growth of these data sets. That is, it is possible to predict changes in one variable by the behavior of another correlating variable.

As a result, after analyzing the data sets and making a forecast based on them, we have demonstrated that the future of green finance in Kazakhstan has great prospects for development following the benchmarks. Thus, the first hypothesis was confirmed. Also, based on the high correlation coefficient, we can conclude that the growth of the green bond market has a great impact on the share of RES in the total energy volume of Kazakhstan. So, the results of the correlation analysis confirmed the correctness of the second hypothesis.

Conclusion

As mentioned above, Kazakhstan has all the prospects for the development of green financing within the country. Despite the fact that green projects are often expensive and difficult to implement due to a number of reasons, there is every chance that Kazakhstan will take a leading position in the global flow to improve the planet in the environmental aspect. The long-term experience of other developed countries can help in this in many ways.

Thus, if Kazakhstan continues to support the growth of green financing and implement the policies and standards of foreign countries, it has all the prospects for the development of this industry, and consequently, the green economy. Thus, it was concluded that with the proper development of green finance, green energy will grow and develop proportionally.

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