

Development of water resources infrastructure in the Kyrgyz Republic: conflict potential

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Abstract. The article examines the potential of the infrastructure of water resources of the Kyrgyz Republic through the prism of the economic sustainability of the country, as well as issues of management and use. Water resources management is crucial for the further development of Kyrgyzstan. This includes improving the efficiency of water use in agriculture, responsible and sustainable development of hydropower resources, ensuring access to clean water for all segments of the population. The problems facing the water resources of Kyrgyzstan are noted, which, with the right policies, can use its water resources to promote economic growth and improve the well-being of its citizens. The potential of the water resources of the Kyrgyz Republic, which play an important role in the economic and political security of not only our country, but also the entire region of Central Asia, is considered. The water resources of the Kyrgyz Republic are completely formed on its own territory, and this is the political, economic and strategic advantage of the country. Kyrgyzstan is the only country in Central Asia with impressive water and hydropower resources. This should be Kyrgyzstan's biggest chance as a "water power".

Keywords: water resources, hydropower potential, sources of water resources, hydropower, geopolitical potential.

Introduction

One of the problems in terms of economic and political security is the potential of the water resources of the Kyrgyz Republic, which several times escalated into pronounced conflicts and even military clashes.

Kyrgyzstan, located in the center of Central Asia, has significant fresh water reserves, which play an important role in various sectors of the country's economy, such as agriculture, mining and energy industries. However, despite this, Kyrgyzstan faces a number of challenges in managing and protecting its water resources.

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In addition, it should be noted that the international cooperation that Kyrgyzstan is leading in the field of water protection, as well as technology, can help manage these resources. It is also necessary to consider new and innovative approaches that can improve the conditions for water resources in Kyrgyzstan and make their use more efficient and sustainable.

The subject of the researched work was devoted to the work of domestic researchers such as: Batykova A. Zh. Issues of using water resources of the Kyrgyz Republic, 2014; Dzhumaliev E.B. Problems of efficient use of water resources in the Kyrgyz Republic, 2019; Nuralieva N.M. Water potential of the Republic of Kyrgyzstan: problems and potentials of economic development, 2022; Omurzakov K.E. Selection of the region and substantiation of the topic of research on water resources management of the Kyrgyz Republic, 2015; Toktogulova N.K. On the issue of applying economic instruments in the use of water resources in the Kyrgyz Republic, 2011; Tologonov E.B. Water resources of the Kyrgyz Republic; Ergeshov A.A. Current state and use of water resources in southern Kyrgyzstan, 2017; Yusupova G.N. Water resources of the Kyrgyz Republic: economic and strategic advantages, 2014; Arkhangelskaya A.V., Kasymova V.M. Hydropower resources of the Kyrgyz Republic, 2016; Aitkeev B.B. Forecasting water resources of the Kyrgyz Republic to eliminate the crisis in the energy sector in the winter period 2022/2023, 2022.

Another important aspect in the development of water resources is the need for cooperation with other countries, especially within the framework of regional integration projects. Such projects can help reduce infrastructure costs and ensure more efficient use of resources, which will benefit all involved:

Firstly, integration cooperation gives business entities wider access to various kinds of resources, to the latest technologies across the entire region, and also makes it possible to produce products based on the capacious market of the entire integration group.

Secondly, the economic convergence of countries within the regional framework creates privileged conditions for firms of the countries participating in economic integration, protecting them to a certain extent from competition from firms from third countries.

Thirdly, integration interaction allows its participants to jointly solve the most acute social problems, such as equalizing the conditions for the development of some of the most backward areas, easing the situation on the labor market, providing social guarantees to low-income segments of the population, further developing healthcare systems, labor protection and social security [1].

The relevance of the research topic is due to the fact that there is a constant increase in demand for water resources, which includes improving the efficiency of water use in agriculture, the responsible and sustainable development of hydropower resources and ensuring access to clean water for all segments of the population.

Water resources perform three main functions for humanity:

- 1) food production,
- 2) energy production and industry,
- 3) household water consumption and satisfaction of sanitary and hygienic needs (in addition to transport, recreational, aesthetic and other functions).

It is not surprising that the unprecedented growth of the world economy in the 21st century, the population explosion and the accompanying increase in the anthropogenic pressure on ecosystems and natural water bodies have led to water shortages in many regions of the world. Mankind has known water scarcity almost since its inception, but its current scale is unprecedented.

The purpose of the study is to identify the strategic advantages of developing the infrastructure of water resources in Kyrgyzstan, as a factor in a new format that reveals the development potential of both our country and its neighbors in Central Asia in the water and energy sector. Its essence is determined not only in solving its problems in hydropower as

energy, but also as an important component for the development of a promising area for the development of energy infrastructure.

The United Nations in connection with the great importance of water problems, 2003, has declared the International Year of Fresh Water, many national and international events - scientific, public, economic conferences and seminars. Eleven main directions for future action were formulated:

- meeting the basic needs of people for safe drinking water and sanitation;
- Ensuring food security through more efficient rational use of water resources;
- protecting ecosystems and ensuring their integrity through the management of water resources and resources;
- joint use by various economic entities and states of water resources on the basis of their management;
- protection from water-related hazards through risk management;
- water resources management based on determining the value of water in the economic, social, environmental, cultural sense and creating a price for water that does not place a heavy burden on the poor and vulnerable segments of the population;
- rational management of water resources under public control and respect for the interests of all segments of the population;
- development of a more environmentally friendly industry that does not cause damage to the quality of water and the needs of other consumers;
- taking into account the key role of water in energy production to ensure the growth of demand for it;
- the importance of water for a rapidly urbanizing world;
- ensuring the availability of information on water resources and water use for everyone [2].

With a relatively small area and good geological knowledge of the water resources of Kyrgyzstan, their energy potential is still poorly used. The development of new capacities of energy resources during the years of independence has remained unchanged. At the moment, it is this industry that is a deterrent to the further development of the country's economy, although it is one of the most attractive areas for foreign investors. Despite the presence in our country of a powerful hydropower potential of mountain and lowland rivers and artificial channels, there is no real development yet due to the lack of interest from potential investors. This is hindered by a number of problems accumulated over the years.

Economic and strategic advantages water infrastructure development Kyrgyz Republic

Water resources of the Kyrgyz Republic play an important role in economic stability not only in our country, but also in the entire region of Central Asia.

Kyrgyzstan is located in the central part of Central Asia and is one of the countries in the region rich in water resources. River systems, mountain lakes, groundwater and glaciers are all sources of water for Kyrgyzstan.

The water resources of the Kyrgyz Republic are completely formed on its own territory, and this is the economic and strategic advantage of the country. Kyrgyzstan is the only country in Central Asia with impressive water and hydropower resources. "Kyrgyzstan is the water tower of Central Asia," said Walter Fuest, director of the Swiss Cooperation Office [3].

On the territory of Kyrgyzstan, the emerging flows of water sources average about 51 billion cubic meters. m per year. Of this amount, our republic uses only about 25%, and the remaining lion's share is consumed by neighboring states - Uzbekistan, Kazakhstan and Tajikistan [4].

According to the following figure (Fig. 1.), let's consider the distribution of water sources in Kyrgyzstan.

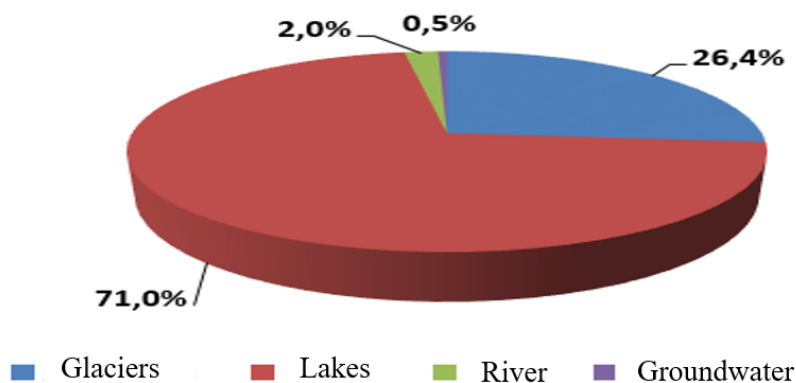


Fig 1. Structure of distribution of sources water resources of Kyrgyzstan [5]

Glaciers are significant sources of water in Kyrgyzstan. More than 26.4% of the territory of Kyrgyzstan is occupied by glaciers, which are mostly located on high mountain plateaus and mountain ranges. Glaciers discharge their waters into rivers and lakes, providing water not only to Kyrgyzstan, but also to neighboring countries.

In addition, Kyrgyzstan is rich in mountain lakes, the most famous of which are Issyk-Kul, Son-Kul and Chatyr-Kol. One of the most important reservoirs is Lake Issyk-Kul, which is the second largest mountain lake in the world. The Issyk-Kul reservoir has a volume of about 170 km³ and can meet the needs of water supply and hydropower for years to come. Lakes are an important source of fresh water and regulate water flows in rivers.

One of the important sources of water in Kyrgyzstan is mountain rivers. Most of the territory of Kyrgyzstan is located in mountainous regions, and more than 40 thousand rivers flow through this territory. The main rivers that flow through Kyrgyzstan are the Syr Darya, Chui, Talas, Naryn, Kara Darya and Issyk Kul. They provide water not only to Kyrgyzstan, but also to neighboring countries.

There are more than 3,500 rivers in the republic that flow through the territory of the Kyrgyz Republic and go to the states of Central Asia. The total annual flow of rivers in Kyrgyzstan is about 48-50 km. The Kyrgyz Republic uses 20-25% of the available water resources. The rest of the flow enters the territory of neighboring states: Kazakhstan, China, Tajikistan, Uzbekistan and is the subject of international water allocation. The division of river flow between Kazakhstan, Tajikistan, and Uzbekistan was based on the principle: “equal provision of an irrigated hectare”. Kyrgyzstan has the right to use 24% of water, the total limit is 11.9 km [2].

However, despite the wealth of water resources, Kyrgyzstan faces problems in their use and management. This is due to a number of issues, including a lack of infrastructure for effective water management, conflicts between water users, inefficient use and pollution of water resources, climate change, and declining snow and ice on mountain slopes.

Most of the rivers in Kyrgyzstan are mountainous in nature and the flows vary greatly depending on the season, weather conditions and topography. This creates problems for water management and limits their use for industry, agriculture and drinking water.

However, water use in Kyrgyzstan is difficult due to conflicts between users. For example, conflicts between countries over the water resources of the rivers flowing through Kyrgyzstan.

In general, the water resources of Kyrgyzstan are significant and important sources of fresh water for the region. However, in order to conserve and use these resources efficiently, efforts are needed to manage and protect water resources, improve infrastructure and technology, reduce water pollution, and cooperate between countries on the use and management of shared water resources.

The economic and strategic advantages of the water resources of the Kyrgyz Republic for the maximum use of water resources for the economic development of the country were raised by T. Usubaliev. On his initiative, a resolution was adopted by the People's Congress of the Jogorku Kenesh of the Kyrgyz Republic "On interstate water use by Uzbekistan, Kazakhstan and Tajikistan of the water resources of Kyrgyzstan", an appeal to the parliaments of these republics. Unfortunately, this decision was completely ignored, and the appeal was not heard [6]. However, neighboring countries continue to ignore the advantage as a "water power" even today.

It should also be specially noted that today the creation and promotion of a nationwide brand of Kyrgyzstan for drinking and medicinal water is important. It is required to actively promote the best drinking and mineral waters of Kyrgyzstan. We must not miss the opportunity to enter the world market. This level of action is not possible at the scale of individual enterprises. This requires active and direct state intervention.

Today, active measures are being taken in the world to form the largest consumer market of the 21st century. – the market of environmentally friendly drinking water. At the same time, humanity consumes more and more water every year. And the price of water is rising. Over the past 50 years, oil prices have increased 10 times, and for domestic water - about 100 times, for drinking water - 1000 times. The bottled water industry is one of the fastest growing in the world, and even in terms of growth rates it leaves the oil complex far behind. The total volume of sales in 2022 of exports of bottled water with sugar abroad increased by 6% to 10.8 million liters. In value terms, deliveries increased by 1.5 times. The market for bottled drinking and mineral water is one of the fastest growing consumer markets today: the growth rate in the last four years has been at the level of 20%, and the volumes in monetary terms by countries of supply are noted in the following volumes: Kazakhstan - 7.2 million liters; Uzbekistan - 2.6 million liters; Russia - 877.5 thousand liters; Georgia - 162.5 thousand liters; Mongolia - 14.4 thousand liters; Indefinite country - 6.3 thousand liters; USA - 2.8 thousand liters; South Korea - 1 thousand liters [7].

However, unfortunately, water as an economic resource is the most underestimated aspect of the economic development of Kyrgyzstan. Our state does not pay due attention to increasing the economic efficiency of the use of water resources, so they are used in the most wasteful way. In the water supply and distribution system, due to the irrigation system that does not meet the requirements of the time, large losses occur, which amount to about 40%. In the absence of appropriate control, users dump water, perceiving it as a gift of nature that does not require extraction costs, like oil and gas [8].

In Kyrgyzstan, due to illiterately built irrigation systems, large water losses are allowed. Thus, already at the beginning of the month, water distribution irrigation systems were not installed in many areas.

The strategic advantages of the water resources of the Kyrgyz Republic and the considered problems of the rational use of water resources at the present stage of the economic development of sovereign Kyrgyzstan require decisive and active actions from the state. The direct intervention of the state in solving the issues of rational use of water resources is one of the important tasks of ensuring the economic development of the country. Kyrgyzstan, not tomorrow, but today, must take advantage of what is geographically located at the source of water resources.

Hydropower potential of water resources of Kyrgyzstan

Water resources play a vital role in the Kyrgyz economy as they are essential for the production of hydroelectric power. This sector of the economy faces a serious alternative:

- on the one hand, it is necessary to increase energy generation in order to cover the constantly growing demand for it;

- on the other hand, it is necessary to minimize the impact of hydraulic structures on the natural environment of water resources and ensure high standards of socio-economic well-being.

The water resources of the Kyrgyz Republic, as a factor in a new format, reveals the development potential of both our country and its neighbors in Central Asia in the water and energy sector. At present, the whole world is on the threshold of an energy transition to a new stage of development. A large-scale introduction of renewable energy sources, the development of hydrogen energy, electric transport, the reduction of carbon emissions, and the struggle for carbon neutrality are planned.

Hydropower is another important sector of the Kyrgyz economy, capable of providing up to 50% of the country's electricity needs. Hydropower is a branch of "green energy" associated with the use of the energy of the flow and fall of water to generate electricity. Most of the hydropower generation in Kyrgyzstan comes from dams and reservoirs on the Naryn River and its tributaries.

Hydropower is the country's basic generating sources. The 5 largest hydroelectric power plants account for $\frac{3}{4}$ of the installed capacity of the country's power plants. The concentration of generation in the central and southern regions of the country (in the Jalal-Abad region, and the main consumers in the north of the country is one of the problems of the Kyrgyz energy sector. Electricity is transported partially through the territory of Kyrgyzstan, and the rest is looped through Uzbekistan, Kazakhstan and Tajikistan.

Also, it should be emphasized that the water resources of Kyrgyzstan are a strategic advantage of the country in the development of green energy. The development of this industry will not only help reduce dependence on energy imports, but also ensure environmental safety, create new jobs and help develop the country's economy as a whole. At the same time, it is necessary to take into account the risks and challenges associated with the development of green energy, and take measures to minimize their impact on the economy and the environment. Together we can create a sustainable and clean energy that will contribute to the development of Kyrgyzstan and will benefit all our citizens.

Consider the hydropower potential of Kyrgyzstan according to the following table (Table 1).

Table 1. Hydropower potential of Kyrgyzstan

Name	Power (MW)	Region	River
<u>At-Bashi HPP</u>	40	<u>Naryn region</u>	<u>At-Bashi</u>
<u>Tash-Kumyr HPP</u>	450	<u>Jalal-Abad region</u>	<u>Naryn</u>
<u>Shamaldy-Sai HPP</u>	240	<u>Jalal-Abad region</u>	<u>Naryn</u>
<u>Uchkurgan HPP</u>	180	<u>Jalal-Abad region</u>	<u>Naryn</u>
<u>Toktogul HPP</u>	1200	<u>Jalal-Abad region</u>	<u>Naryn</u>
<u>Kurpsai HPP</u>	800	<u>Jalal-Abad region</u>	<u>Naryn</u>
<u>Bystrovskaya HPP</u>	8.7	<u>Chui area</u>	<u>Chu</u>
<u>Lebedinovskaya HPP</u>	7.6	<u>Bishkek city</u>	<u>Big Chui Canal</u>
<u>Alamedinskaya HPP-1</u>	2.2	<u>Bishkek city</u>	<u>Big Chui Canal</u>
<u>Alamedinskaya HPP-2</u>	2.5	<u>Bishkek city</u>	<u>Big Chui Canal</u>
<u>Alamedinskaya HPP-3</u>	2.1	<u>Chui area</u>	<u>Big Chui Canal</u>
<u>Alamedinskaya HPP-4</u>	2.1	<u>Chui area</u>	<u>Big Chui Canal</u>
<u>Alamedinskaya HPP-5</u>	6.4	<u>Chui area</u>	<u>Big Chui Canal</u>

Name	Power (MW)	Region	River
<u>Alamedinskaya HPP-6</u>	6.4	<u>Chui area</u>	<u>Big Chui Canal</u>
<u>Malaya Alamedinskaya HPP</u>	0.4	<u>Chui area</u>	<u>Big Chui Canal</u>
<u>Kambarata HPP-2</u>	120 ^[Δ]	<u>Jalal-Abad region</u>	<u>Naryn</u>

Compiled by the authors based on source data: [9]

In Kyrgyzstan, 12 mini hydroelectric power plants with a capacity of 58 megawatts are fully operational, and six more small hydroelectric power plants with a productive capacity of 37 megawatts will be launched by the end of 2022.

However, the potential for hydropower development in Kyrgyzstan is limited by the country's small size and topography, as well as complex water sharing agreements with downstream countries.

In addition to hydropower, water resources are also important for domestic and industrial use in Kyrgyzstan. Access to clean water is a major problem in many rural areas of the country, and waterborne diseases are a major public health problem. Lack of adequate sanitation infrastructure exacerbates this problem, leading to contamination of water sources and increased health risks.

Arkhangelskaya A. V. and Kasymova V. M. in their studies note that the hydropower potential of the water resources of the Kyrgyz Republic is 90% of the electricity generated in the country, which is formed and greatly increases the attractiveness of the country's hydropower sector for "green" investors who are concerned about conservation of natural capital for future generations.

The gross hydropower potential of 267 rivers of Kyrgyzstan today exceeds 245 billion kWh of electricity. However, recently experts have already made distinctions in the descriptions of the hydropower potential (HEP) of the country, clearly distinguishing between gross, technological, and economic. These data are as follows: technological GEP - 132.6 billion kW / h, economic - 60 billion kW / h. [10].

Accordingly, the development of the country's hydropower should be based on relevant research, analysis and long-term forecast of the growth of energy consumption by the population in conjunction with the projected economic growth and potential export opportunities to assess and eliminate the risks of electricity shortages in the long term. The assessment of the hydropower potential needs to be determined taking into account the observed and expected impact of climate change on the water resources of the republic, which will allow assessing the real possibility of growth of the hydropower sector in the future.

At the current stage of development of electricity, the generation of operating HPPs of the Kyrgyz Republic is about 12.5 billion kWh. The electric power industry accounts for about 5% of GDP and 16% of the country's industrial output.

The problem of sustainable power supply in the winter period in the northern regions, when there are peak seasonal overloads, remains insufficiently resolved.

Therefore, in this case, a separate topic is the demand for electricity in the Central Asian region and the potential of water resources in Kyrgyzstan creates conditions for their joint development with neighboring countries of Central Asia (Uzbekistan, Kazakhstan) through direct investment in large investment energy projects.

International cooperation in the hydropower sector seems possible, first of all, in the field of technological modernization of the energy sector, in the field of improving the fiscal and tariff policy and strengthening the managerial potential of the energy sector.

Problems in the use of water resources

Kyrgyzstan faces several challenges in the use of water resources. One of the main problems is the lack of funds and technologies for the efficient use of water resources, which leads to their inefficient use and overspending.

In addition, the water supply and sanitation infrastructure in Kyrgyzstan needs significant improvement. Insufficient funding and outdated equipment mean that many cities and rural areas have limited access to clean drinking water and adequate sanitation. This leads to problems with public health and environmental pollution [11].

Water, just like oil and gas, is a natural resource, and the operation of water management systems and structures that have a direct or indirect impact on the economic conditions of other states also requires material costs for maintenance and repair, and in turn should bring dividends to our country.

Now in Kyrgyzstan there is an active search for a meaningful model of the country's economic development, where in the field of water resources regulation it is important to be able to use the natural potential in the right direction. As K. Imanaliev notes, the one who has a lot of weapons does not always win in international politics. Often the winner is the one who knows how to put forward conditions correctly" [3].

Over time, the water resources of Kyrgyzstan should be valued as oil, gas, gold and other strategically important natural resources. Today, the potential of water resources makes it possible to make the country prosperous without compromising its own sovereignty. In terms of the level of water supply per person per year, Kyrgyzstan is many times superior to other states of Central Asia.

Today, Kyrgyzstan has the largest reservoir in Central Asia (Toktogul), built (during the Soviet period) largely for irrigation in the summer of the lower reaches of Kyrgyzstan and the Uzbek part of the Ferghana Valley. From a regional point of view, there is a serious conflict over the use of water by neighboring countries, especially when it comes time for irrigation.

However, it should be noted that due to the changed situation today, Kyrgyzstan is not officially bound by agreements for the irrigation of the territory of neighboring countries. As well as the economic problems of Kyrgyzstan, it is necessary to rely on the generation of its own electricity in winter with the help of hydroelectric power plants. Kyrgyzstan is not able to replace the electricity generated by hydroelectric power plants with other types of energy resources, and the extraction process leads to a decrease in water levels in reservoirs. Also, sufficient water levels must remain in the summer to meet national water demand. In this regard, the situation is complicated and is a source of regional conflict, which, in general, is not resolved to the maximum in favor of our country [12].

Another problem is cutting off water resources for the construction of hydroelectric power plants, which have become the main form of electricity generation in Kyrgyzstan. The construction of hydroelectric power plants can lead to changes in ecosystems, affect fish and waterfowl populations, and reduce access to water resources for local residents.

As noted by Esenamanov A., a change in the water use regime in one country inevitably affects the interests of other countries. Therefore, today, in the context of global climate change, the need to develop, institutionalize and implement a policy that will improve the efficiency of water management as a strategic resource for the needs of Kyrgyzstan and Central Asia as a whole becomes especially relevant. One of the measures to ensure the conservation of the natural water potential could be the declaration of the formation zones of the country's most important watercourses as specially protected natural areas (SPNA) [13].

Water is one of the key factors for the socio-economic well-being of the countries of Central Asia and, accordingly, the water resources of Kyrgyzstan are the subject of interstate interests. The states adjacent to Kyrgyzstan need water for irrigation purposes, mainly during the summer growing season. The existing shortage of energy resources in the country makes it more profitable for Kyrgyzstan to discharge water from reservoirs in winter, when the volume of

electricity consumption in the country increases significantly, which is also not unambiguously perceived by neighboring countries.

Conflict Potential of Water Resources of the Kyrgyz Republic

Of course, it cannot be said that water resources regularly become the sole cause of armed conflicts or wars. However, it would be a mistake to underestimate or completely ignore the complex relationship between water resources and national security [14].

As oil and gas prices began to rise, Kyrgyzstan and Tajikistan faced a choice: either pay world energy prices, which would put a heavy burden on their underdeveloped economies, or develop their own hydropower.

The choice was made in favor of the latter option. Dams built during the Soviet era in Kyrgyzstan and Tajikistan for the needs of irrigation supply to Uzbekistan and Kazakhstan began to be used in hydropower mode. This is associated with water discharge in winter and accumulation in summer, which threatens to maintain a stable flow of water to the irrigated fields of the countries of the lower basin, which has provoked an increase in political tension in the region.

The situation escalated sharply after Tajikistan and Kyrgyzstan announced their plans to revive the projects for the construction of large hydroelectric power stations developed back in Soviet times. The interest of Kyrgyzstan and Tajikistan in their construction was dictated not only by economic considerations (providing the energy needs of the country and exporting energy resources abroad). For many developing countries, and in this respect these two countries are no exception, the construction of large hydroelectric power plants serves the political purpose of strengthening the nation-state and the position of the ruling elite. Therefore, even despite the fact that, according to a number of IBRD experts, the Kambarata HPP-2 is economically unprofitable and will not solve the problem of Kyrgyzstan's energy independence, certain groups of the local political elite insist on the implementation of the project, seeking to extract considerable economic dividends from this in the context of corrupt government systems. management.

Three countries were at the center of the conflict - Kyrgyzstan, Tajikistan and Uzbekistan. Unlike the latter, Kazakhstan, which is also interested in ensuring a stable flow of transboundary rivers, takes a more restrained position and does not openly go to conflict, while Uzbekistan, trying to put pressure on the leadership of neighboring countries, demonstrates its unwillingness to put up with possible threats by various methods (energy blockade, railroad war, cold war). Moreover, the leadership of Uzbekistan in the competition for water does not even exclude the possibility of deploying military operations in the region [15].

One of the most serious conflicts is related to the use of the Syrdarya River, which is formed at the confluence of the Naryn and Karadarya rivers in the Tien Shan in Kyrgyzstan and flows into the Aral Sea. The river is key to agriculture and energy in several Central Asian countries, including Kyrgyzstan, Uzbekistan and Kazakhstan. This caused serious conflicts between these countries, which continue to this day.

Another conflict is related to the use of water for irrigation in Kyrgyzstan. In some areas of the country, including the Fergana Valley, there are traditional irrigation systems that use water from rivers and lakes. However, in recent years, Kyrgyzstan has begun building hydroelectric power plants and reservoirs, which has led to a decrease in the amount of water entering these irrigation systems. This caused discontent among the locals and led to conflicts with the government.

Until recently, Russia remained aloof from solving the water problems of the Central Asian countries. However, due to historical and geopolitical reasons, the Russian Federation cannot be outside this problematic field of the region. Of course, she is interested in resolving water conflicts that threaten her interests and national security. In addition, the need to participate in solving the problems of energy and water use in Central Asia is due to the increased activity of

other international players (USA, EU, China, Iran), offering their intermediary services and striving to strengthen their positions in the region, pushing aside Russia, which, according to some experts, “having taken control of the region’s water resources, he sets himself the task of playing the role of the main arbiter in Central Asian interstate relations, or, in short, managing the region [15].

In addition, Kyrgyzstan also faces the problem of water pollution caused by industrial and agricultural production, as well as an insufficient waste management system.

Finally, Kyrgyzstan also faces the challenge of long-term management and protection of its water resources. There are still issues related to the definition of water rights and the development of effective policies for the use of water resources at the international level.

There is also the problem of water pollution in Kyrgyzstan. In a number of regions of the country there are no wastewater treatment systems, which leads to the pollution of rivers and lakes.

Climate change also affects the water resources of Kyrgyzstan. In recent years, the amount of snow and ice on mountain slopes has been decreasing, which leads to a reduction in water flows in rivers and a decrease in fresh water reserves [16].

To solve these problems, it is necessary to introduce more efficient technologies for the management and use of water resources, as well as invest in the renewal of water supply and sanitation infrastructure. There is also a need for better coordination between various stakeholders and the development of a long-term management strategy.

Conclusion

In conclusion, it should be noted that the water resources of Kyrgyzstan are a huge potential for the development of green energy, which can become a key factor in the country's long-term economic development strategy. Today, the energy sector is one of the main and most promising sectors of the economy of Kyrgyzstan, and green energy is becoming increasingly relevant in the face of a deteriorating environmental situation in the world.

Accordingly, under these conditions, the Kyrgyz Republic should take into account international experience on water issues, and also not forget that the water resources of Kyrgyzstan are not only not unlimited, but tend to decrease. This dictates the need not for indirect, but for direct state intervention in order to improve the efficiency of water resources use. Therefore, the control and management of water resources is a central problem that must be solved to ensure sustainable economic, political and environmental development of the country.

The use of water resources and the development of the potential of its infrastructure for the production of hydropower is an effective way to develop an environmentally friendly and cost-effective energy that will allow Kyrgyzstan to reduce its dependence on energy imports and ensure its energy security. Moreover, it will create new opportunities for economic development and job creation, which in turn will contribute to the social and economic development of the country.

However, at the moment only about 10% of the hydropower potential of Kyrgyzstan is used for electricity generation. This is due to the fact that the country lacks a sufficiently developed infrastructure for the transmission and distribution of electricity. In addition, the full development of hydropower in Kyrgyzstan requires significant investments, modern technologies with financing for the construction of new hydroelectric power plants.

Hydropower is a water resource sector that uses renewable energy sources. In general, the development of water resources based on hydropower in Kyrgyzstan is a promising direction for the country, which can contribute to its economic and environmental development in the long term. But in order for this potential of hydropower to be realized to the full, it is necessary to take measures to modernize the infrastructure, increase investments and train specialists in the field of hydropower. It is also important to ensure transparent and efficient management of

water resources and create favorable conditions for business development and investment attraction.

Thus, the development of water resources infrastructure is of great importance, being the main driving force of human security. It must be recognized that the threat of so-called “water wars” has not yet become a reality. On the contrary, many regions threatened by water scarcity have managed to avoid conflicts through discussions, compromises and agreements. This is because water, being an indispensable element, can serve in geopolitics to build confidence and a condition for peace.

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