

# **Analysis of Kazakhstan's Nuclear Power Plant Construction Plan and Prospects for Foreign Companies**

*Bexultan Zhapar, Researcher  
International Institute For Counter-Terrorism (ICT), Israel*

## **Introduction**

For many years, there have been talks in Kazakhstan about the construction of a nuclear power plant in Kazakhstan, arguing that there is an energy shortage in the country. In September 2021, the President of Kazakhstan instructed the government to explore the possibility of building a nuclear power plant in Kazakhstan. At the end of December 2021, the former head of the Ministry of Energy of Kazakhstan, Magzum Mirzagaliev, announced that the authorities of the republic are considering two geographical points for the potential construction of a nuclear power plant - the village of Ulken in the Almaty region and the city of Kurchatov in the East Kazakhstan region. At the same time, he stressed that the final decision on the choice of the site has not yet been made. The current energy minister, Bolat Akchulakov, said in early February that there was no concrete decision to build a nuclear power plant in Kazakhstan yet (Tass.ru, 2022).

## **Energy supply deficit**

Kazakhstan is among the rich countries in terms of the presence of minerals, but the energy potential is quite low. Currently, the country's electric power industry is provided mainly by coal. There is no reason to say that Kazakhstan is experiencing a shortage of electricity. Nevertheless, in the context of individual regions, in particular the southern ones, uneven consumption of electricity is formed.

“According to the information of the system operator Kazakhstan Electricity Grid Operating Company (KEGOC), in the heating season of 2022-2023, we can expect a shortage of electricity in the amount of up to a billion to one and a half billion kWh. On average, this, according to estimates, can be about 300 megawatts,” Zhandos Nurmaganbetov said (Kapital.kz, 2022).

At the same time, energy consumption is growing annually by 1.5-2%. Along with it, electricity production also increased. "Consumption grew by 1.5-2% per year. This is a normal increase and has happened every year since the 1990s. The energy system grew by 1.5-2% in line with consumption. The entire economy was focused on this growth, and we simply did not notice it. But when last year we had an increase of 7-8%, this, of course, was a shock for the energy system", the expert said. Another reason for the huge shortage of electricity is that a very large number of so-called "grey" miners of cryptocurrency have appeared in the country (Kazinform, 2022).

### **Diversification of sources**

Given the fact that 45% of the world's uranium production comes from Kazakhstan, the construction of a nuclear power plant will be the right step towards diversifying the sources of electricity supply (World Nuclear, 2022). In 2020, Kazakhstan had uranium reserves amounting to approximately 344 thousand metric tons, making it the country with the largest uranium reserves in the world (M. Garside, 2022).

Kazakhstan not only exports electricity, but also imports from Russia and Kyrgyzstan. As is the case with deliveries abroad, volumes from abroad are also growing. And the total volume of imported electricity reached 1.3 billion kWh, the largest share of which falls on Russia. In the context of individual regions (northern, eastern, southern), Kazakhstan is dependent on electricity imports (LS, 2021).

### **Transition to green energy**

At the moment, Kazakhstan ranks 5th in the world in terms of carbon dioxide emissions per capita (about 15.5 tons per person). Of course, these figures do not reflect the consequences of the consumption of an ordinary citizen in the course of his life. This indicator was formed due to the use of non-renewable minerals, in particular coal, for the production of electricity (Statista, 2020).

In the context of the global trend towards green energy and the recognition by the European Union of the use of nuclear energy as a clean energy source, Kazakhstan is clearly determined to demonstrate the implementation of the Paris

Agreement through the operation of nuclear energy, thereby reducing its carbon footprint (Deutsche Welle, 2022).

### **Nuclear power plants development plans of the government of Kazakhstan**

In the annual Messages of the President of the Republic of Kazakhstan to the people of Kazakhstan, the strategic task of significantly accelerating the pace of development of the country's economy is formulated, primarily through the large-scale introduction of high technologies and science-intensive industries, which would serve as a reliable foundation for accelerated and sustainable development of the economy as a whole. Among the most important directions of domestic and foreign policy, the need was noted for the development of electric power resources and the creation of the foundations of nuclear energy, which is able to involve in the accelerated development a complex of complex high-tech industries based on:

- The latest technologies and using the latest achievements of science and technology;
- Standards that guarantee high quality of products and production management, which, in general, significantly increases their competitiveness in the world market;
- The high requirements for the staffing of the nuclear industry, which will significantly improve the professional qualities of the "human capital" of the country.

The above circumstances determine the special role of nuclear energy in accelerating the overall development of the economy of Kazakhstan. The message of the President of the Republic of Kazakhstan to the people of Kazakhstan "New Kazakhstan in the New World" (2007) states that "...Diversification of energy sources requires the development of nuclear energy in order to provide resources for the sustainable development of the entire territory of the country".

State policy in the nuclear field should be aimed at:

- Creation of the foundations for the development of nuclear energy sources;

- Further development of uranium mining and processing industries, accelerated development of related industries;
- Development of nuclear science, including to provide scientific and technical support for the development of nuclear energy and the uranium industry and maintain the country's nuclear competence;
- Protection of public health, the environment, rehabilitation of radiation-hazardous territories, their involvement in economic turnover and the implementation of social projects in the nuclear industry;
- Improving the system of professional training and advanced training of personnel for the nuclear industry;
- Improving the regulatory legal framework governing activities in the nuclear industry;
- Ensuring nuclear, radiation, industrial safety and physical protection of nuclear industry facilities;
- Ensuring the regime of non-proliferation of nuclear weapons;
- Development of international cooperation in the field of peaceful use of atomic energy.

### **Influence of the Geopolitical Situation**

On June 17, 2022, the President of Kazakhstan at the Russian Economic Forum openly did not recognize the Donetsk People's Republic (DPR) and Luhansk People's Republic (LPR), which demonstrates the independent position of Kazakhstan regarding the Ukrainian-Russian crisis. After these statements, Russia blocked the export of Kazakh oil through the pipeline, which goes through Russian pipes to the EU market. The official reason for stopping exports is mines from the Second World War (Eurasianet, 2022).

Kassym-Zhomart Tokayev's statements about relations with Moscow, based on the desire not to reorient Kazakhstan for the sake of the interests of only one, albeit an important partner in the person of Moscow, can be considered a promising vector for activating Kazakhstan in the search for alternative centres of gravity that will allow continuing the multi-vector format of Kazakhstan's foreign policy.

So, despite the expansion of tendentious stuffing in the information space of the CIS regarding potential territorial claims of Moscow, the creation of obstacles to the

stable transportation of hydrocarbons in the direction of Europe, the Kazakh authorities are trying to pursue an independent policy on various issues on the international agenda and in domestic affairs, including those related to the implementation of economic projects.

Also, the ineffectiveness of the Russian army in the Ukrainian-Russian conflict gives rise to reconsider Russia, the de facto leader of the Collective Security Treaty Organisation (CSTO), as a guarantor of security. The January events at the beginning of 2022 in Kazakhstan made it possible for Moscow to demonstrate the efficiency of the CSTO as an instrument of influence. Now Kazakhstan will have to get rid of the formed image as a satellite and debtor of Russia. The consequences of the January events in January 2022, combined with Russian aggression in Ukraine, will again affect protest moods in Kazakhstan if the choice falls on the Russian Rosatom.

### **Kazakhstan Nuclear Power Plants (KNPP LTD) in search of reliable partners**

Considering the above arguments, it is impossible to state with certainty that the choice of a contractor for the construction of a nuclear power plant will necessarily be in favour of Russia. So, since the second quarter, the relevant government agencies of Kazakhstan have stepped up their work to find foreign companies that can take part in the implementation of this project as technology suppliers and construction contractors. For example, a Kazakh delegation led by Vice Minister of Energy Zhandos Nurmaganbetov visited South Korea, where they got acquainted with the capabilities of local companies in the field of nuclear power plant construction. As is known, as a result of the visit, a memorandum of understanding was signed between the Kazakh operator in the field of nuclear energy - "Kazakhstan Nuclear Power Plants" and the Korean company "Korea Hydro & Nuclear Power" (Tengrinews, 2022).

### **Prospects for Foreign Companies**

At present, the relevant organisations of Kazakhstan are studying in detail the sites for the construction of a nuclear power plant, which will determine the choice of the type of reactor plant, including its technical characteristics. The only requirement that is known so far is the availability of technology and experience in operating a generation 3+, pressurised water reactor with a capacity of 1000 to 1400 MW, says

Rinat Okasov, Deputy General Director of Kazakhstan Nuclear Power Plants LTD. It is planned to build two power units with the possibility of completing two more units. The vendor company must have experience in the construction and operation of commissioned NPPs (Serikpayev, 2022).

All potential contractors have experience in operating a pressurised water reactor (including South Korea). The main advantages of a pressurised water reactor are: The natural availability of the moderator and coolant (water) and the maturity of the technology: the reactors are well studied. The current state of the art makes it possible to guarantee the safe operation of the reactor for at least 60-80 years, with the subsequent extension of the operating life, so the price factor will play an important role when choosing a technology supplier, since it will have to compete with other players with similar technology.

### **Challenges of Development of the nuclear power program in Kazakhstan**

It is wrong to say that there are obvious problems in Kazakhstan on the way to the development of nuclear energy. Given that Kazakhstan is a country with a deeply rooted tradition of authoritarian rule, the model developed in Singapore by longtime dictator Lee Kwang Yew has an obvious appeal, and therefore the implementation of public policy can be fast and quite effective if the problem is approached correctly. Another question arises: can the model developed in Southeast Asia be successfully and sustainably transferred to Central Asia, in particular in addressing the problem of energy security in Kazakhstan? (Hedlund, 2022)

Yes, since the issue of building a nuclear power plant is not a problem at the regional level, which can be solved by local self-government, but this issue is personally controlled by the President of Kazakhstan himself. That is, the construction of a nuclear power plant in Kazakhstan will be given great attention by the government and the international community, in particular through relevant organisations such as the International Atomic Energy Agency (IAEA).

The problem lies elsewhere - the technology for enriching uranium to fuel concentrations is exactly the same as for weapons. Formally, the Non-Proliferation Treaty does not prohibit non-nuclear countries from producing fuel for their own nuclear power plants, if this is done under the control of the IAEA (IAEA, 1970)

Therefore, the government of Kazakhstan will have to work intensively on communication with the IAEA in the framework of the non-proliferation of nuclear weapons. But again, this issue is not a big problem, since Kazakhstan already has experience with nuclear technology and does not intend to create nuclear weapons.

## **Conclusion**

Given the international agenda, which is the growing demand for clean energy sources, also the growing demand for electricity will further push Kazakhstan to build nuclear power plants. Additional obstacles may arise when communicating with the IAEA, but one should not expect that Kazakhstan can follow the "Iranian scenario". If Kazakhstan fulfils all the conditions specified in the IAEA Statute, then the operation of nuclear energy will be welcomed, first of all, by the European Union, which is increasing its international influence as a regulatory force. As part of Kazakhstan's transition to "peaceful atom", the EU will play a consultative role, as it seeks to translate the concept of "green energy" to other countries.

The development of the international geopolitical situation and the need for a radical modernization of the country are pushing Kazakhstan to make more pragmatic decisions, which obviously allows South Korean companies to become more active in the market of Kazakhstan. Now to say that the choice of a contractor is obvious is not entirely true. The selection of the main technology supplier for the construction of the nuclear power plant will be based solely on suitable technologies for Kazakhstan. Considering Kazakhstan's interest in South Korean technologies and the high level of trust of Kazakhstanis in this country, new opportunities are opening up for South Korea as a technology supplier.

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