Shpinev Iu.S.

PHD in law, Senior Researcher Institute of State and Law of the Russian Academy of Sciences
Public agreement and accession agreement: similarities and differences

INVESTMENT IN NUCLEAR POWER THEORY AND PRACTICE

Summary

The author examines the current problems of investing in nuclear energy. At the beginning of the article, the author justifiably shows that nuclear power is one of the few branches of the national economy where Russia occupies one of the key positions in the world. Further, the article discusses the specifics and features of the industry that affect the desire of investors to invest in it, as well as offers solutions to these problems.

Keyword: Nuclear energy, features of nuclear energy, investment in energy, investment in nuclear energy.

For many years, Russia has been one of the few world powers that occupy a leading position in the development of nuclear energy. It is also important that this industry is one of the most technologically intensive sectors of the economy of any country.

We consider it necessary to note that at present Russia is the only power that is successfully working in all research and production areas of nuclear energy without exception [1, p. 43].

Our country holds the first positions in several directions. One of these promising areas can be considered the development and creation of fast neutron reactors with a closed fuel cycle, which are designed to help eliminate the most dangerous problems of the industry, which include:

- the problem of disposal of radioactive waste. At the same time, we note that the term radioactive waste is often used as a synonym for the phrase spent nuclear fuel, although these are completely different concepts. The use of radioactive waste in the future is not expected in any form, while spent nuclear fuel containing a sufficiently large number of fission elements is very actively used in such sectors of the national economy as medicine, agriculture, and others;

- the problem of non-proliferation of nuclear weapons, which is one of the most acute in the modern world. This problem is currently being solved both through international treaties [2] and regulatory legal acts of individual countries, primarily Russia and the United States [3];

- the problem of nuclear fuel reproduction. The most widely used for these purposes are currently the so-called PUREX processes, which are the regeneration of plutonium and uranium by extraction.

As one of the most knowledge-intensive and complex branches of the economy, nuclear energy has a number of specific problems that must be taken into account when investing in this area. These problems include:

- rather high cost of construction of new nuclear power plants, as well as maintenance and repair of existing ones;

- lack of raw materials for nuclear power plants in the required amount on the territory of our country;

- mandatory disposal of spent fuel or its enrichment;

- addressing issues of safety for humans and nature during the operation of nuclear power plants, as well as compliance with all international standards and agreements.

This branch of the economy is constantly developing and improving, using the latest achievements of science, including digital technologies, and Economics. Today, we can distinguish the following industry tasks:

- first of all, it is necessary to raise the overall efficiency of the industry;
- consolidate and increase the competitive advantages of Russian stations;
- to develop and put into operation new modern high-tech stations based on the latest achievements of science and technology;
- significantly reduce the cost of maintaining a nuclear power plant without changing the established quality of safety;
- develop and create a common system of the nuclear power complex, which contains blocks of raw materials, energy generation and waste management;
- prepare and implement a sound and competitive investment policy that can realize the industry's potential [4].

Given the significant cost of construction and operation of nuclear power plants, as well as the requirements for their safety, their activities cannot be carried out without the participation of the state. In times of global economic crises, the role of the state in the functioning of the entire energy crisis is greatly increased. First of all, this applies to the considered sector of the economy – nuclear energy. Among the most important activities of the state in this matter it is possible to allocate the supply of all the resources in the construction and reconstruction of nuclear power plants, as well as providing state guarantees for the necessary long-term investment projects.

The most significant measures of the state policy of the considered branch of the national economy in order to increase its efficiency are:

- creating a high-quality economic climate, which requires the adoption of clear rules of conduct that should guarantee any investor the guarantee and protection of their rights and legitimate interests;
- improvement of the regulatory framework that would have a positive impact on the development of competition in the industry;
- providing organizations in the industry with a tax regime of accelerated depreciation when investing in the replacement or improvement of fixed assets;
- creating positive conditions for business activities, including by reducing the tax burden, which requires making appropriate changes to existing regulations.

Security in the industry is achieved in various ways, the most significant of which can be called work to reduce the aging of fixed assets, and, of course, creating the necessary conditions for attracting investors to solve this problem.

Activities to attract investors to the nuclear power industry include:

- providing enterprises with investment tax credits;
- providing organizations and companies with vacations until the investor begins to make a profit;
- accounting of fixed assets according to the accelerated depreciation mode;
- insurance of investment risks, including at the expense of credit funds.

To implement an investment policy in this area that meets all the requirements of modern society, it is necessary to search for and develop state support measures to ensure the normal functioning of investment projects, which, in turn, will create favorable conditions for the introduction of innovative solutions in the nuclear energy industry in Russia, as well as contribute to the more successful implementation of foreign projects.

Solving problems related to investment issues in the industry today is one of the main tasks. The continued development of the nuclear energy sector, both in economic and scientific terms, will be more successful if the share of investment in the energy sector as a whole decreases relative to all investments, while the absolute amount of investment in the nuclear energy sector should increase.

Recently, the issues of investment in nuclear energy have been considered by many authors in one way or another [5].

Thus, according to A. I. Cherkasenko, the following economic and investment models are being actively improved in the industry:

- the total number of medium and large investment projects is increasing;
- nuclear power companies are actively involved in the economic life of the state, including through such an institution as public private partnership;
- work is gaining momentum to attract large funds to the industry, including from extra-budgetary funds;
- the experience and opportunities of private business in the implementation of large projects have been used more actively;
- the regulatory framework is being actively developed, which contributes to improving the quality of investment attractiveness of the industry [6, p. 19].

V. V. Romanova draws attention to the need for early amendments to such important laws for the nuclear energy industry as the Law of the Russian Federation of February 21, 1992 № 2395-1 «On subsoil» [7] and Federal laws of December 30, 1995 № 225-FZ «On production sharing agreements» [8], in terms of improving the processes of field development. In addition, the need for fundamental and applied research in the field of atomic law is pointed out [9, p. 95].

A. A. Karneev points out that when making a decision to increase the volume of investment in nuclear power, it is necessary to understand the structure of NPP financing, since it is greatly influenced by the composition of a particular national energy market. According to the scientist all markets can be divided into three types:

- a regulated market in which companies that generate energy independently sell it and control the price, which gives a potential investor the opportunity to transfer a share of risks to the end user;
- an unregulated market in which power generating organizations themselves operate in conditions of constant investment risks and competition;
- a hybrid market in which activities are carried out by several organizations that eventually turn into large corporations with their own energy sales channels [10, p. 50].

Industry experts note that investments in nuclear power facilities are more risky than projects of other types of energy, highlighting the following risks:

- increased risks during construction, which are declared significant expenses during construction, as well as a much more complex engineering and technological task than during the construction of other objects;
- risks caused by ambiguity in the price of electricity, primarily associated with a long return on investment;
- political risks associated with the constantly changing attitude of different countries to nuclear energy in General;
- risks associated with the need to obtain various licenses for the construction of nuclear power plants, the procedure for obtaining which is sometimes equivalent to the construction itself;
- risks associated with the need to comply with strict rules related to radioactive waste [11, p. 53].

According to T. M. Ivanov, public-private partnership can provide significant assistance in the implementation of such major projects as nuclear power plants, since:

- this will help protect non-core assets from default and increase the rating of credit obligations of project participants;
- it will contribute to the distribution of risks, since the lender is forced to accept a certain share of risks;
- will lead to an increase in debt capital relative to the company's own funds [12, p. 105].

Using the example of the United States, Y. V. Chernyakhovskaya and D. L. Korolkov distinguish three components of successful cooperation in the framework of public-private partnership in the construction of nuclear power plants:

- guaranteed return on investment based on a huge and sustainable sales market;
- non-changing course of the state in the field of nuclear energy;
- features of the electricity market in some States [13, p. 103].

The works of E. K. Zemlyacheva [14], Lizikova [15], M. N. Pautova [16] and others are also devoted to investment issues in the field of nuclear energy.

The authors point out certain specifics of regulating investment relations in the industry under consideration, which follows from the specifics of the nuclear power industry itself, since, as a complex branch of law, it is subject to both dispositive norms of Civil law and special industry laws containing, as a rule, mandatory norms.

The use of dispositive norms is due to increased security in the nuclear power industry, including the problems of non-proliferation of nuclear weapons and waste disposal. In this case, we are dealing with the restriction of civil law principles in the public interest [17, p. 68].

The works of O. A. Supatayeva [18], A. I. Grishchenko [19], M. S. Lizikova [20], V. A. Bogonenko [21] and others are devoted to the issues of legal regulation of nuclear energy.

The main regulatory document regulating the legal regulation of nuclear energy is Federal law № 170-FZ of November 21, 1995 «On the use of atomic energy» (hereinafter – the law on atomic energy). This law reflects all the main provisions and principles of regulating legal relations that arise in the use of nuclear energy.

The main principles of legal regulation in this area are:

- providing increased security;
- for full availability information, with the exception of information containing a state secret;
- participation of all interested parties in the discussion of issues related to nuclear energy;
 - full compensation for damages;
 - enhanced protection of persons living in the nuclear power plant area;
 - division of responsibility between different nuclear power authorities;
 - independence of the bodies that control the safety of nuclear energy;
 - compliance with international agreements in the industry under consideration.

Based on the described principles, the main tasks of legal regulation of relations in the field of obtaining and using nuclear energy are to develop the legal framework for the state management of nuclear energy, as well as to determine the rights, duties and responsibilities of all involved persons.

Distinctive features of nuclear energy that affect the nature of legal relations in the sphere of its use are:

- nuclear energy is a complex institution that regulates relations from scientific research and mining to storage and disposal of nuclear waste;
- the duality of nuclear energy, which consists in the fact that it is a combination of material (buildings and structures) and non-material (knowledge) elements;
- significant dependence on science and Economics;
- use in various sectors of the national economy;
- used in the civil and military spheres (dual purpose);
- is a source of increased danger;
- subject to regulation by various legislative norms (dispositive and mandatory), as well as a large number of by-laws;
- a significant part is regulated by international treaties;
- it is not limited, as a rule, to the territory of one state.

In connection with these features, investment activities in the field of nuclear energy have the following contradictions:

- between dispositive and imperative norms;
- between attracting maximum investment and limiting the participation of foreign investors;
- between the Declaration of protection of investors' rights and the absence of one;
- between the investor's desire to extract the maximum profit and the restriction on the export of capital abroad.

Thus, it can be summarized that in order to improve the investment climate in the field of nuclear energy, it is necessary to:

- create uniform rules that do not change for a sufficiently long period of time in the field of pricing;
- provide preferential taxation of investors;
- simplify the work of foreign investors.

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