Energy – Released in Nuclear Reactions

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ABSTRACT

Modern civilization of unthinkable without electrical energy. Use nuclear fuel for electricity generation – an extremely tempting idea. The energy released in nuclear reactions is millions of times higher than that given by ordinary chemical reactions (for example, the combustion reaction).

Keywords: nuclear power, nuclear fuel, power deficiency construction.

Energy - is the most important branch of the national economy, covering energy resources, generation, transformation, transmission and use of various types of energy. This is the basis of the state economy. The world is undergoing a process of industrialization, which requires additional consumption of materials, which increases energy costs. With the growth of the population, energy costs for tillage, harvesting, fertilizer production, etc. increase.

The energy problem is one of the most important problems that humanity has to solve today. The sharp increase in the production and consumption of energy has put forward a new acute problem of environmental pollution, which poses a serious danger to mankind. [1]

At present, many of the planet's easily accessible natural resources are being exhausted. Raw materials have to be mined at great depths or on the sea shelves. The limited world reserves of oil and gas, it would seem, put mankind before the prospect of an energy crisis. However, the use of nuclear energy gives mankind the opportunity to avoid this, just as the results of fundamental research in the physics of the atomic nucleus make it possible to avert the threat of an energy crisis by using the energy released during certain reactions of atomic nuclei.

Modern civilization is unthinkable without electrical energy. The generation and use of electricity is increasing every year, but the specter of the coming energy starvation is already looming in front of mankind due to the depletion of fossil fuel deposits and the increasing environmental losses in the production of electricity.

The energy released in nuclear reactions is millions of times higher than that given by conventional chemical reactions (combustion, for example), so that the calorific value of nuclear fuel is immeasurably greater than that of conventional fuel. Using nuclear fuel to generate electricity is an extremely tempting idea. The advantages of nuclear power plants (NPP) over thermal (CHP) and hydroelectric power plants (HPP) are obvious: there is no waste, gas emissions, there is no need to carry out huge volumes of construction, build dams and bury fertile land at the bottom of reservoirs. Perhaps more environmentally friendly than nuclear power plants, only power plants that use the energy of solar radiation or wind. But both windmills and solar stations are still low-power and cannot meet people's needs

for cheap electricity - and this need is growing faster. And yet, the feasibility of building and operating nuclear power plants is often questioned due to the harmful effects of radioactive substances on the environment and humans [3].

What economic or energy reasons prompted Uzbekistan to implement such a complex and rather costly project? There are several. Firstly, the dynamically developing republic no longer has enough operating energy capacities. Despite the impressive reserves of hydrocarbons, Uzbekistan is striving to introduce new alternative energy sources, including hydrostations and heliostations.

To date, the republic has practically exhausted the possibilities of hydroelectric power plants. Small HPPs under construction and planned cannot significantly change the current situation. In April 2017, Uzbekistan joined the Paris Agreement on Climate Change, according to which the member countries of this agreement must make every effort to reduce carbon dioxide emissions into the atmosphere.

This provides for a reduction in the share of thermal power plants, which in Uzbekistan account for 87 percent. Renewable energy sources, despite the rapid development, environmental friendliness and safety, today cannot solve the problem of energy shortage due to the high cost of electricity generated, instability and low efficiency. Therefore, the development of nuclear energy is the most appropriate. The Russian "Rosatom" plans to build a complex of two power units in our countries. The power of the nuclear power plant will be 2,300 MW, which, as planned, should cover up to 20% of the country's electricity needs.

According to the calculations of the authorities, the nuclear power plant will save up to 4 billion cubic meters of natural gas, and there is a chance to earn up to $600 million a year. Critics of the construction of the nuclear power plant say that Uzbekistan could build a solar power plant. The republic is located in the subtropics, and there are colossal territories for panels, but their cost exceeds the costs of building and maintaining a nuclear power plant.

How was the site chosen for the nuclear power plant (NPP)? First of all, for the maintenance of nuclear power plants, large sources of technical and drinking water are needed, as well as the availability of developed infrastructure, including residential, to accommodate builders, and then, the personnel of the future plant. In addition, an important role is played by the proximity of the power facility to power lines, through which the generated gigawatts will be delivered to end consumers or buyers abroad. Another obligatory point is the presence of railways and highways.

What will nuclear energy give Uzbekistan? The enterprises of Uzbekistan will also benefit from this, since all other industries will work on the construction of the station, one way or another. The construction of the nuclear power plant will also increase the level of education in the republic, because new highly qualified specialists will be required to service this facility. From a social point of view, the nuclear power plant will provide work at the construction stage from 6 to 10 thousand people, and during the operation period, personnel of 1500-2000 highly qualified specialists will be required. A branch of the Moscow Engineering Physics Institute will be opened in Uzbekistan to train personnel in the nuclear field. The first 15 specialists from the republic are now studying at the head university MEPhI. [2]

Even if a nuclear power plant works perfectly and without the slightest failure, its operation inevitably leads to the accumulation of radioactive substances. Therefore, people have to solve a very serious problem, the name of which is the safe storage of waste. Waste from any industry with a huge scale of production of energy, various products and materials creates a huge problem. Pollution of the environment and atmosphere in many parts of our planet inspires anxiety and fear. We are talking about the possibility of preserving the animal and plant world no longer in its original form, but at least within the minimum environmental standards. Radioactive waste is generated at almost all stages of the nuclear cycle. They accumulate in the form of liquid, solid and

gaseous substances with different levels of activity and concentration. Most of the waste is low-level: water used to clean gases and surfaces of the reactor, gloves and shoes, contaminated tools and burnt out light bulbs from radioactive rooms, spent equipment, dust, gas filters, and much more.

Gases and polluted water are passed through special filters until they reach the purity of atmospheric air and drinking water. The filters that have become radioactive are recycled along with solid waste. They are mixed with cement and turned into blocks or poured into steel containers together with hot bitumen. The most difficult thing to prepare for long-term storage is high-level waste. It is best to turn such "garbage" into glass and ceramics. To do this, the waste is calcined and fused with substances that form a glass-ceramic mass. It is calculated that it will take at least 100 years to dissolve 1 mm of the surface layer of such a mass in water.

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