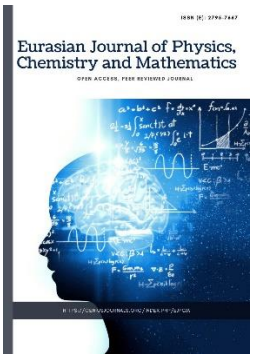

Nuclear Power Plant and Uzbekistan: how will a nuclear power plant contribute to the integration of the Republic of Uzbekistan into the global community?

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ABSTRACT

This article examines the economic, environmental, political prospects for the creation of a nuclear power plant in Uzbekistan in the face of a lack of electric energy. The situation in Uzbekistan and the state's need for energy are described in detail, options for solving this problem are listed. It explains why the right decision for Uzbekistan is to build a nuclear power plant, taking into account climatic conditions and the amount of uranium produced. This is an important step forward in the development of science, education, economics and medicine, since it entails the need for qualified personnel, the latest technologies and the production of radioactive materials on an industrial scale. The safety advantages of nuclear power plants are mentioned, compared to other energy sources such as thermal and hydroelectric power plants. The article shows the need to increase sustainable methods of energy production, profitable both economically and ecologically in long term

Keywords: Uranium (Nuclear Power Plant), Renewable energy source, Electricity, Nuclear safety, Integration

Today, the Republic of Uzbekistan generates 69 billion kilowatt per hour (kWh) every year. Almost 85% of all this generated energy comes from TPPs (Thermal Power Plants), other 13% from HPPs (Hydroelectric Power Plants). More than 60 billion meters squared of natural gas, about 3 million tons of oil products were produced in 2018, and coal extraction increased to 3.5 million tons. With the growth of the economy of Republic of Uzbekistan and the increase in the population, the demand for electricity will grow accordingly. By 2030, the need will be 117 billion kWh every year. Natural gas makes up 90% of all energy generated in thermal power plants, but their reserves will only last for the next 20-30 years. In addition, Uzbekistan ratified the Paris Agreement in 2017, which obliges Uzbekistan to take measures to reduce carbon dioxide emissions from 2020. Therefore, the question arises how to secure the future of a densely populated, landlocked, uranium-rich and economically ambitious Republic with a stable source of energy.

Options:

1) Develop renewable energy sources such as solar panels, windmills and hydroelectric power plants. Uzbekistan already has solar panels and windmills, but the amount of energy they generate is tiny relative to the numbers needed. And in order to increase the amount of

energy produced by renewable sources, we need large funds and natural conditions different from ours. Hydroelectric power stations, in turn, have a number of disadvantages, such as: flooding of large areas, restructuring of unique ecosystems along the riverbed, limited places where stations can be built, high seismicity in areas, etc.

2) Build the first nuclear power plant in Central Asia. To do this, there are financial means, the necessary resources and partner states with vast experience in nuclear energy. "When I got acquainted with the economics of this project, I came to the conclusion that 1 kWh produced at nuclear power plants will be practically equal in cost to 1 kWh produced at hydroelectric power plants or thermal power plants, provided that these facilities are being built now, and not 30 years ago. For example, if you start building a hydroelectric power station for 200 or 400 Megawatt, then the costs of its construction and the subsequent cost of 1 kWh will be comparable to those of a nuclear power plant," Deputy Energy Minister Sherzod Khodjaev.

So why the second option is the right solution for the Republic?

Uzbekistan owns 2.3% of all uranium on the planet, ranks 5th in uranium production, 10th in its reserves among all countries. A nuclear power plant with 2 power units of the 3+ generation with VVER-1200 (Water-Water Energetic Reactor) reactors could provide the country with 15-30% of all generated electricity for 2017, which is 18.9 billion kWh per year. In this regard, an agreement was signed on cooperation between the Republic of Uzbekistan and the Russian Federation in the creation, design, operation, training, assistance in ensuring safety, radioactive waste management, applied research, etc. Nuclear energy is environmentally friendly. Unlike thermal power plants, nuclear power plants do not produce harmful carbon monoxide. The construction of a nuclear power plant will save the remaining natural gas, reduce its combustion, which will lead to a reduction in carbon monoxide in the atmosphere by 3 million per year. One granule of uranium fuel provides as much energy as one ton of coal, 3.5 barrels of oil or 481 meters squared of natural gas.

If you look at the list of leading countries in the production of nuclear electricity, then all these countries will also top the list of the most developed countries. In 2017, the "big five" countries accounted for 70% of all nuclear generation in the world - the United States, France, China, Russia and South Korea. The nuclear power plant will allow Uzbekistan to significantly develop its economy and integrate into the world community, provide an opportunity to create an economic union between countries such as Russia, Korea, Turkey, China and implement bilateral migration of labor and technological flows. Also, instead of exporting raw uranium and burning gas, the country will use its own uranium, and process and export gas, which will bring more than 550-600 million USD a year. In addition to the absence of greenhouse gas emissions, the continuous operation of the station is also a plus. The problem with renewable energy like wind and solar is that they only produce energy under favorable conditions when the wind is blowing or the sun is shining.

While the operation of nuclear power plants is not intermittent, nuclear power plants are able to operate without interruption or maintenance for several years, making it a more reliable and stable source of energy. In addition, an important factor is the financial resources necessary for the maintenance of nuclear power plants. Nuclear power plants are cheaper to maintain than coal-fired or natural gas-fired plants. Even taking into account such costs as the management of radioactive fuel and the disposal of nuclear waste, the cost is from 30 to 45% of a coal-fired power plant and from 18 to 23% of a combined cycle plant. Taking into account the international experience in the construction of Russian NPPs, it is estimated that one USD invested in nuclear power plants under the RosAtom project, which includes 2 VVER-1200 reactors and localization at the level

of 20-30%, can bring $1.9 to local suppliers, $4.3 in the country's GDP and $1.4 to the budget in the form of tax revenues. And the products of the nuclear industry are in demand in geology, medicine, agriculture and other sectors of the country's economy.

The amount of energy produced is also superior to most other forms. The US Department of Energy estimates that replacing a 1 Gigawatt(GW) nuclear power plant would require 2 GW of coal, or 3-4 GW from renewable sources to generate the same amount of electricity.

To this day, nuclear safety is a topic of heated debate, for most people the first thing that is associated with a nuclear power plant is all the disasters that have occurred on them. Earthquake and tsunami at the Fukushima-1 nuclear power plant (Japan), Accident at the Chernobyl nuclear power plant (USSR), Kyshtym accident (USSR). But do not forget that according to statistics, nuclear power plants are one of the safest power plants. Compared to the death toll before 2008, an average of 120 deaths per Terawatt per hour per year from coal combustion, 99.5 from oil, 71.9 from natural gas, and less than 0.01 from nuclear power plants. It is important that over the past 22 years, the number of incidents in nuclear power plants around the world has decreased on average 38 times, from 0.38 incidents per 200 working hours to 0.1. And in the environmental aspect, nuclear power plants are one of the least polluting ways to generate electricity. By 2019, emissions of harmful substances into the atmosphere amount to 953 thousand tons. The construction and operation of a nuclear power plant with a capacity of 2,400 Megawatt will reduce emissions into the atmosphere of about 30,000 tons of nitrogen oxide and 150,000 tons of carbon monoxide.

The nuclear power plant will improve not only the energy industry of the Republic. The construction of a nuclear power plant means an increase in jobs for highly qualified specialists in the field of science and technology. It was for this purpose that the branch of NRNU MEPhI (National Research Nuclear University "Moscow Engineering Physics Institute") was established in the city of Tashkent. MEPhI has vast experience in training professionals in the field of nuclear physics. And its branch, which was opened in 2019, will train future workers of the Uzbek NPP. All the conditions for the successful implementation of this project were created here: a new educational building equipped with all the necessary appliance, frequent conversations and seminars with representatives of UzAtom and the Academy of Sciences of the Republic of Uzbekistan, and in the future, it is planned to build a student campus. In addition, all students of the Tashkent branch were admitted to study on a grant basis, which significantly reduces the pressure on scholars.

The nuclear power plant will create jobs for engineers, scientists, builders, and maintenance personnel. In addition, it contributes to research and development, as it implies the availability of the latest technology, electronics and materials that can be used in many areas of activity. The nuclear industry also contributes to the development of the healthcare system, education, economy, and also improves the image of Uzbekistan on a geopolitical scale by entering the elite club of countries using nuclear energy for peaceful purposes, which will help attract foreign investors.

In conclusion, I would like to emphasize that nuclear energy is the best option for the near future of our country, oil reserves will last for the next 20 years, natural gas and coal for about 20-30 years. The development of the nuclear industry is definitely one of the best, if not the only, decision the government can make when it comes to providing Uzbekistan with energy.

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