

THE MAIN SOURCES OF ELECTRICITY PRODUCTION AND THEIR ANALYSIS IN THE CONDITIONS OF UZBEKISTAN

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ABSTRACT

The article examines the importance of energy in our daily lives, which is currently growing in demand, the analysis of 5 types of thermal energy generating stations (NPP, TES, HPS, WPS and PPS), their impact on ecology and the country's economy. Comparing the advantages and disadvantages of each station, conclusions and proposals were made about which of them is suitable for Uzbekistan.

Keywords: "green" energy source, power plant, NPP, TES, HPS, WPS, PPS, radioactive radiation, air pollution, Paris Agreement, ecology committee, water deficit, agriculture, wind pipelines, resource deficit, cost-effective methods, new energy sources, harmful gases, seasonal energy crisis, energia's block, energy security.

INTRODUCTION

Today, the energy sector is the basis of the development of any country. It is through energy that opportunities are created for the development of the economy, comfortable living of the population, for the moderate activities of education, medicine, utilities, in general, any sphere. But today it is very difficult to keep a huge energy infrastructure working or increase the volume of electricity production, not adapting the industry to the market economy. It is possible to achieve the goal only by improving the production of electricity, or, building alternatives, as well as using the most advanced, cost-effective methods. Market laws encourage the introduction of the most economical ways to generate energy, introduce the most optimal price options, apply the most advanced technological advances and create conditions for competition.

DISCUSSION

In general, on a global scale, we get a large part of the energy from oil, followed by coal, gas. Despite the fact that these energy sources can produce large amounts of electricity, as well as their technology and infrastructure already exist, there are also

several risks. Examples of these include the near future end of non-renewable energy resources, water and air pollution, oil refinery and oil platform explosions. Therefore, one of the alternative options for obtaining energy - the use of renewable resources-is also developing. Germany can be a clear example of this. But each country uses one way or another, based on its reserves, climate. Scientists say that the population of Uzbekistan consumes 2 times more energy by 2030 than today. This provides for faster energy sector reform and the choice of advanced solutions. 90% of the electricity generated in the country is provided by thermal power plants (TPP).

A thermal power plant (TPP) - is a set of devices that convert the thermal energy of organic fuels in solid, liquid, and gaseous States into electrical energy. Uzbekistan has major TPP such as Tashkent, New Angren, Syrdarya, Navoi, Talimarjan. The cost of electricity depends primarily on the costs of extracting and transporting the fuel used in power plants. Therefore, when choosing a place to build a power plant, the costs for transporting fuel and transmitting electrical energy are comparable. It cannot be denied that they have certain disadvantages, including the ease of obtaining energy, the ability to build quickly and cheaply, the use of domestic fuels, as well as the low cost of spent fuel (mainly coal), the possibility of installing the station anywhere near the fuel and water supply, and the fact that it requires less space than a hydroelectric plant. The average "lifespan" of TPP is 25 years, and first the overall efficiency of such stations is much lower, with only 30% of the fuel used in TPP being converted to useful electricity, meaning that the useful operating factor of IES is 30% -38%. Alternatively, we can see that the repair costs are high. Later aspects, namely, such stations use the resources of fossil fuels, in which a huge amount of harmful gases (for example, hydrocarbon dioxide) are released into the air, the exhaust of which is very dangerous, sulfur dioxide, nitrous oxide are the most polluting harmful gases in the air, and also contribute to global warming. From the experience of the world, we can see that the TPP is gradually losing its importance due to the recent increase in the costs of extraction and transportation of oil, gas and other minerals and the fact that they cause environmental problems. Associated with alternative or "green" energy sources, relatively new energy sources - various solar panels, bioreactors, wind and hydroelectric power plants-are growing in importance. Electricity generated by hydroelectric plants is "green" energy.

A hydroelectric power station (HPS) - is a complex of hydrotechnical structures and energy equipment that converts the energy of a stream of water into electricity using hydraulic turbines. Hydropower supplies one-sixth of the world's energy, 4,500 TWh/year. This is greater than that calculated by adding all other renewable energies, even more than Atomic Energy. Currently, the existing production capacity of the

Republic of Uzbekistan is 12.9 GW. 2.05 thousand MW or 15.8 percent of this corresponds to the contribution of hydroelectric plants. The water potential utilization factor of the Republic is about 27 percent. Uzbekistan hydropower has 49 hydroelectric power plants, including ChorvoqHPS, FarhadHPS, ChordaraHPS. It is also worth noting that ensuring the sustainable development of hydropower in conditions of increasing demand depends on a number of problematic issues. In this, the factor of labor, capital and modern technologies is weaker than natural factors. Because it is more difficult to predict the change in natural resources (water, precipitation, heat). The benefits of HPS are numerous, and can be used up to 70-100 years, and they can reach a very effective, useful work coefficient of up to 90%. While providing electricity, the HPS prevent the riverbed from silting up, allowing many cultivated areas to be irrigated. It is primarily a low-hydrocarbon power producer, which makes it clean, safe in many ways. The HPS's are considered very "flexible", and according to demand its electrical output can be easily changed. Some other power-generating devices, such as less, have additional costs of changing demand, TPP decreasing demand. Water, which is the source of electricity in HPS, can be used several times (the helmet of medium chirping HPS is a clear example of this). HPS require little labor. Current modern HPS are purely automated, as well as other costs are usually very low, which means that the cost of energy produced will be much cheaper compared to other alternatives. Medium traditional (dams) HPS fully cover the cost of construction in 5-8 years, and the area can also be used for other purposes: water sports, tourist and recreation purposes, and for farming. The disadvantages of hydroelectric power stations are also sufficient. For example as a result of the construction of large reservoirs associated with traditional HPS, the forests, swamps and grasslands of the biologically rich and fertile lowlands and River Valley are sometimes destroyed. Dams greatly reduce river flow, resulting in damage to ecosystems. This mainly involves migration of people and Wildlife. A large part of the fauna in the reservoirs also leads to extinction. As an example, it can be said that 70% of a snake fish that has passed through the turbine dies immediately. Since large traditional dammed hydraulic structures hold large volumes of water, any natural disaster, external effects such as poor-quality construction, the lower settlements of the river can cause enormous damage to nature as a whole. The 6th picket wall of the dam of the reservoir "Sardoba", located in the Syrdarya region, is a clear example of the fact that flooding occurred not only in the sardobans, but also in several settlements of neighboring Kazakhstan. Estimated damage exceeds a billion dollars. Also, some countries are using nuclear power plants(NPP), a modern and advanced technology.

Nuclear power plants (NPP) - are thermal power plants that generate electricity using thermal energy from nuclear decay. Uranium is used in such power plants. NPP are a very efficient source of energy because, a small amount of nuclear fuel produces large amounts of electricity. For example, 1 kg of uranium (conditional uranium fuel) will provide the amount of heat that 2.5 thousand tons of coal will give when burned.

NPP are built in areas where it does not have its own energy base and where fuel is expensive and electricity is needed. Generating electricity in NPP is cost-effective and environmentally friendly, but risky. A malfunction in the station can destroy an entire creature with radioactive radiation. NPP's emit carbon dioxide and no greenhouse gases, which is promising under current global warming. Unlike other electrical manufacturers, the world-proven stockpile of uranium, the primary fuel of the NPP, reaches about 670 years. [1] according to the World Nuclear Association (WNA), Uzbekistan was ranked fifth in the ranking of natural uranium producing countries. Mined uranium is not processed in the country and is exported in full size to other countries. Proven reserves account for approximately 2% of the total world reserves. The "neighboring" Kazakhstan is considered the number 1 uranium miner in the world, providing 45% of its supply. This suggests a greater potential for NPP in Central Asia. In addition, it seems to be relevant for Uzbekistan, which is currently experiencing a crisis in seasonal energy, demand is greater than supply, and the future is expected to be greater in the bundan. But, the new NPP is a controversial topic in many ways, especially economically, and requires multibillion-dollar capital, investments. Compared to other sources of electricity production, the costs and deadlines for building nuclear plants largely depend on financing. In addition, NPP is strategically important and is the most dangerous "target". Giving to private management can also pose a huge risk. One of the main risks is nuclear waste, which must be safely disposed of, since, nuclear waste is extremely radioactive and can remain dangerous for thousands of years. Also problematic is the process of completing NPP, which requires additional spending. Nevertheless, it remains the cleanest, most efficient, sustainable energy source. Work on the construction of NPP in Uzbekistan also began to be planned from 2018. [2] our President SH.Mirziyoyev on July 10, 2018, gave a series of data on the NPP to be built, including the statement "the construction of the NPP shows a very large positive impact on investment processes. Of course, the issues of organizational preparation are of great importance. We bring the best of the technologies adopted in the world. There is a 60-year warranty, and about 4,000 of us Uzbek specialists work there. 4000 works around 8 000 if it works there. Cheap, safe, will be acceptable to our people"-in his speech. In cooperation with the Russian state corporation Rosatom, an agreement was reached on the construction of a nuclear power

plant. This complex consists of two energy blocks. The power of each will be 1 200 MW. This power plant is expected to be one of the safest and most modern in the world and will be operational by 2028. Of course, there are also a number of risks in this regard. In particular, it is from the economic side: to Uzbekistan, which is a lower-middle-income economy on the GDP indicator, this project is quite expensive. But if, when compared to other sources, fossil fuels are taken into account from a social, environmental and health point of view, nuclear energy is competitive. It can also justify itself in about 20 years if supply and the system as a whole are effectively established.

A wind power plant (WPP) - is a process used to generate mechanical power or electricity from the wind. Wind power is renewable energy, which is a popular alternative to fossil fuels to generate electricity. It is commonly used as a source of electricity in areas with consistently high wind speeds, such as coastal areas and open plains. There are several advantages of this energy source to both ecology and the country's economy. It can be said that it does not produce clean and greenhouse gas emissions as good environmental impacts. Examples of economic effects include:

- When the initial investment is made to establish a wind farm, the cost of generating electricity will be relatively low;
- Wind turbines can be installed on agricultural land, creating an additional source of income for farmers;
- Installation, operation and maintenance of the station can create jobs in local communities;
- Wind farms help reduce the dependence on imports of fossil fuels in countries;
- Contributes to sustainable development.

There are also certain disadvantages. Wind energy depends on the presence of wind, which can change with unpredictable and changeable weather conditions. This can make it difficult to rely on wind energy as a constant source of energy. In addition, the noise emitted by wind pipes can create inconveniences for residents living side by side.

Solar photovoltaic stations (SPS) - are environmentally friendly, safe and cost — effective stations. The working principle of SPS is as follows: sunlight falls on solar panels (photoelectric converter), sunlight is converted to the appearance of a constant current (inconvenient to use), and stored in battery batteries. With the help of the Inverter, the constant current is converted into an alternating current (the usual 220 V for us) and transmitted to the power grid. Solar power plants are a renewable, clean, “green” source of electricity that does not emit any greenhouse gases. While electricity in the world is currently being supplied by only 3%, this number is growing with great

speed. Solar energy has a number of advantages, for example, it can be used for 2 purposes by installing solar power panels on roofs, vacant open ground, as well as in public places. Installation, operation and maintenance of solar power plants will create additional jobs and contribute to reduced unemployment, reduce dependence on fossil fuels imported into the country and contribute to energy security. Solar electricity can be easily adapted, enlarged or reduced according to public or industrial needs, and the initial investment alone is sufficient to build them. As time goes by, he is at his own expense. The disadvantages of solar stations are also sufficient. Solar energy is considered extremely vulnerable to weather, and its potential decreases on cloudy or rainy days, making it difficult to rely on solar energy as permanent electricity. Stations require large amounts of open land to install solar panels, which can cause land use disputes, especially in densely populated areas. The initial cost of setting up a solar power plant may be high, which is of value to households and small entrepreneurs. The proper operation of solar panels requires constant maintenance, which leads to additional costs, the production and destruction of solar panels can adversely affect the environment, and when the panels are finished, their disposal is considered complex. This leads to potential waste and environmental problems.

Analyzing the above data, we can cite the following table:

Graph 1.

When we analyzed the conditions of Uzbekistan, we considered that the TPP is the most inefficient electrical manufacturer in comparison. In this case, the highest level of air pollution and indirect mortality can be cited as one of the main reasons. In recent years, Uzbekistan has been ranked among the highest levels of air pollution. This is illustrated by the fact that dust storms of recent times have also increased. According to the state Ecology committee, 41.2% or 909 thousand tons of total emissions into atmospheric air correspond to industrial and manufacturing enterprises, and the role of TPP is especially large in this. [3] in addition, Uzbekistan has adopted a law on the ratification of the Paris Agreement (Paris, December 12, 2015) in 2018, which we believe should be phased out of the TPP in order to achieve its goals.

Although the use of HPS's in the conditions of Uzbekistan seems to be the cheapest, safe and reasonable, it is highly dependent on natural factors, including water resources. [4] according to The Economist Intelligence Unity, by 2040 the water deficit was among the area where an observable water deficit was 80%, i.e. a very high water deficit, at a rate of 100% on the observable water-to-supply ratio indicator. The indicators of all countries of not only Uzbekistan, but also Central Asia, except

Tajikistan, are higher than 80%. This is very alarming, and it is very likely that the main focus of conflict in the region is caused by a water deficit. In addition, global warming has a significant impact on the Central Asian region compared to other regions. This can also pose strategic risks to Uzbekistan, which receives nearly 78.5% of its main water resources from neighboring countries. In such conditions, it will not have good consequences to “trust” the HPS.

[5] The use of wind and solar energy in the conditions of Uzbekistan is promising, especially due to the fact that in terms of extremely favorable geographical location, there is a sunny sky on 85-87 percent of the year, SPS is very effective. In this regard, great work is being carried out in our country, including the approval of the “strategy for the transition of the Republic of Uzbekistan to a green economy in the period 2019-2030 “is a big step on this path. But, we need to focus on their instability. Because considering that the main consumption is mainly observed in the winter season, energy sources like this lose some degree of relevance at the same deficit time.

In the conditions of Uzbekistan, when we analyze the nuclear power plant, its level of security and economic aspects come to the fore. To the NPP, which is planned to be built in Navoi, a resistance rally in neighboring Kazakhstan indicates that it is wrong for us to solve such projects “on our own”. We also need to be sure that the companies that are building such projects have not been politicized in any way. A strategic project like this should be from the most important tasks of the state, to prevent some kind of pressure gap, to ensure future energy security right now. In our opinion, NPP is one of the best energy sources for Uzbekistan. In the first place, the NPP is stable, it supplies energy in a moderate way, both in summer and in winter. The fact that no greenhouse gases are emitted from NPP, that they can be used in the long term, and that uranium, an NPP fuel, is released “on our own”, indicates the importance of NPP to Uzbekistan. Our recommendation is that in the form of a tender for the company to build NPP, it is advisable to accept an offer that is most acceptable in all respects, fully in the interests of Uzbekistan. Also, before the construction of this project, it is necessary to calculate all possible risks, accordingly, to obtain the “consent” of neighboring states.

CONCLUSION

In conclusion, the best sources of energy are wind and solar energy, if viewed from the point of view of Energy Security, air pollution levels and several other indicators of Uzbekistan. The organization of the production of such green energy sources, the expansion of their use, fully corresponds to the interests of Uzbekistan, which has the largest population in the region.

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