



SUPPLY OF BUILDINGS AND STRUCTURES WITH GEOTHERMAL ENERGY

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Abstract: *This article is about the importance of geothermal energy in the production of electricity, its consideration as the energy of the future, and the identification and implementation of the benefits that this energy brings to enterprises and organizations.*

Key words: *economic sectors, geothermal energy, heat source, electricity, chemical active substances.*

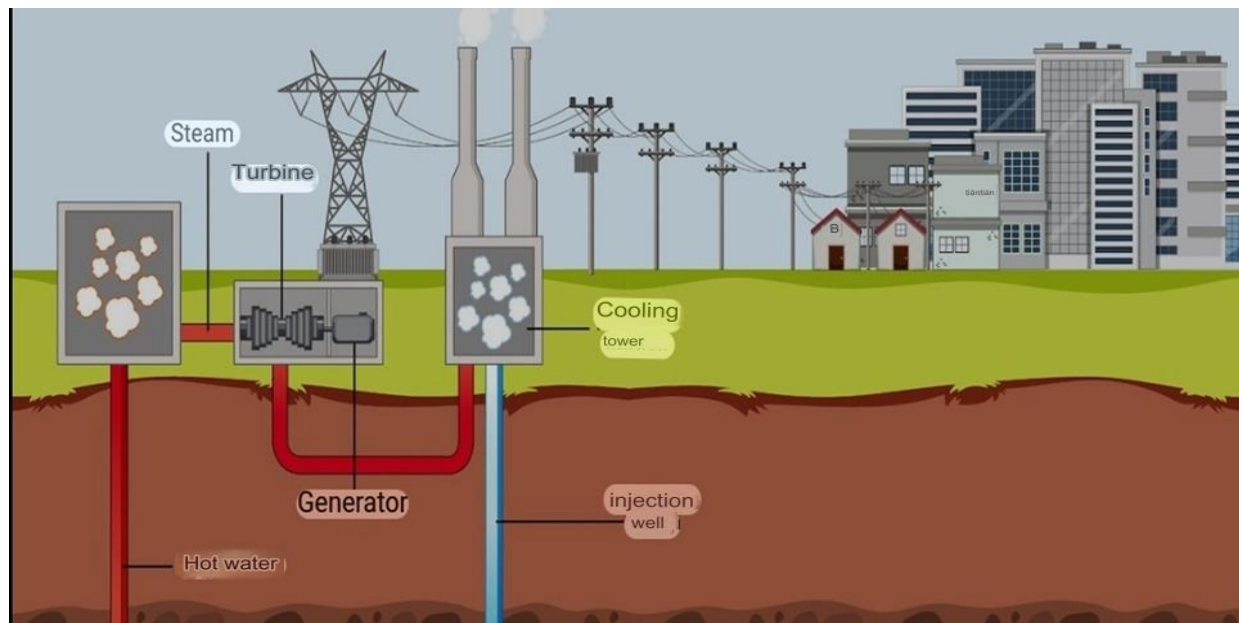
In the current era of globalized information and communication technologies, electronics and nanotechnologies have reached a new level, it is impossible to imagine our life without electricity. Even if there is no electricity for a day, many economic sectors will suffer. Nowadays, any industry needs electricity. Unfortunately, this demand cannot be avoided with the electricity obtained in conventional power plants. In addition, reserves of coal, gas and other fuel products are running out. Taking this into account, research is being conducted on alternative energy sources. New types of energy such as solar energy, wind energy, hydrogen energy are developing. Among these, scientific work is being done on Geothermal energy.

Geothermal energy is the heat energy of the earth. The use of geothermal hot water is a great help in saving heat energy and keeping the environment clean. The first power plant to obtain electricity from such underground water was built in the Tuscany Province of Italy, and later in New Zealand, the USA, and Japan. There



are more than 100 Geothermal power plants around the world. Their total capacity is 3 million kW. The share of geothermal resources in the fuel-energy balance of industrially developed countries is on average 5-10%. Geothermal hot water is used as a heat source at a temperature from 40° to 100-150°. It has a temperature of 150° to 300° during the generation of electricity. Geothermal waters are used as a source of heat in Uzbekistan. Another advantage of geothermal energy is that it is an inexhaustible source of energy. As long as there is energy in the earth's core, hot water is formed under the soil. This energy has penetrated into the energy of many countries and is developing. Reykjavík, the capital of Iceland, is named the cleanest city in the world thanks to Geothermal hot waters. Due to the activity of underground layers in Iceland, hot water seeps out of the volcanically active areas. That's why more than 60% of Iceland's energy comes from geothermal energy. In Iceland, this energy is used not only for electricity, but also for heating industrial enterprises, plants and factories, and for the cultivation of greenhouse products.

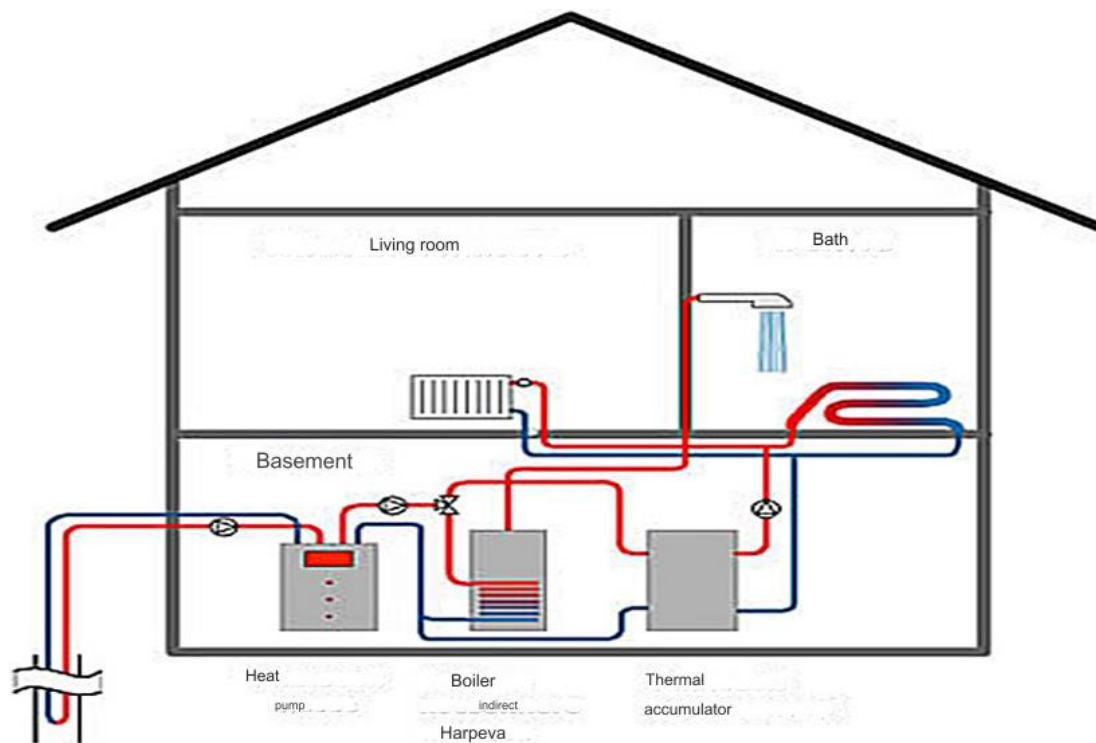
Sources of such resources have been identified in more than 10 places in our country. In particular, water with a temperature of 60-70 degrees leaks out in the districts of Mubarak, Koson, Qamashi of our country. There are many such areas in our republic in Namangan, Bukhara and Navoi regions. For example, in Kashkadarya, such waters are used only for the purpose of obtaining iodine and bromine. Energy is wasted.



The average gradient of geothermal waters in our country is $40^{\circ}\text{C}/\text{km}$. And the flow of heat vapor is equal to $0.06 \text{ W}/\text{mA}^2$. The results of scientific investigations have shown that Uzbekistan is a country with great power of geothermal energy, and the presence of such resources in each of its regions has been proven in practice. The gross potential of geothermal waters in Uzbekistan is estimated at 170.8 thousand tons of oil energy. In 1984, only 1800 MW of energy was obtained from geothermal waters, of which: America - 500; Italy – 420; Mexico – 75; Japan - 70. Electricity generation from geothermal waters began mainly after the beginning of the earth's energy crisis and the height of the struggle for clean energy. Thermal hydroelectric power plants are similar to thermal power plants, only thermal power plants do not have a steam boiler, and geothermal power plants do not need fuel, so they do not need transportation. Today, the total capacity of geothermal power plants in the world is 107,510 MW. The quality of geothermal energy is evaluated according to its temperature, mineralization (dry residue), total hardness, acidity (pH), gas composition, gas saturation and is classified as follows. According to scientists, the energy capacity of geothermal energy is 137 trillion. A



ton of coal is equivalent to 10 times more energy than all the energy resources in the earth's crust. Currently, all geothermal power plants in the world.



the total capacity is smaller than the capacity of other types of renewable energy power plants. But in some countries, this type of energy is one of the main sources of energy (for example, the country of Iceland). In addition, the use of geothermal energy is increasing year by year. For example, in 1990, the installed capacity of geothermal energy was 5,000 MW, in 2000 it was 6,000 MW, and in 2008 it was 10,500 MW. Geothermal power plants and their principle of operation Geothermal energy is the process of finding and using it, processing it and bringing it to a certain state of energy and delivering quality energy to the consumer.

According to the classification of geothermal energy, the territory of Uzbekistan is a region with normal geothermal potential. Such regions have a geothermal temperature gradient of 40 oS/km, and heat fluxes are approximately 0.06 W/m². Geothermal energy in the republic is mainly made up of geothermal waters. In



practice, geothermal waters are available in all regions of the republic. The average temperature of geothermal waters in the republic is 45.5 °C, the hottest waters are in Bukhara (56 °C) and Surkhandarya (50 °C) regions. Geothermal waters with a temperature above 40 °C are used for low-temperature heating (with or without heat pumps). The gross potential of geothermal waters in Uzbekistan is 170.8 thousand t n.e. is estimated in size. Bukhara (56.8 thousand t n.e.) and Namangan (29.8 thousand t n.e.) regions have the greatest potential.

Geothermal energy is heat energy in the Earth's crust that comes from the planet's core and radioactive decay of materials. The high temperature and pressure in the Earth's interior causes some rocks to melt and the hard mantle to behave plastically. This causes parts of the mantle to move upward because it is lighter than the surrounding rock. The temperature at the core-mantle boundary can exceed 4000 °C.

Geothermal heating, using water from hot springs, has been used for bathing since the Paleolithic era and for space heating since ancient Rome. Recently, geothermal energy, the term used to generate electricity from geothermal energy, has gained importance. According to estimates, the Earth's geothermal resources are theoretically insufficient to meet humanity's energy needs, although a very small fraction is currently exploited, often in areas near tectonic plate boundaries.

As a result of government research and industry experience, geothermal energy production costs have decreased by 25% compared to the 1980s and 1990s[3]. Recent technological advances have dramatically reduced costs and thus expanded the range and size of livable resources. In 2021, the US Department of Energy estimates that geothermal energy from a power plant "built today" will cost about \$0.05/kWh



In 2019, there was 13,900 megawatts (MW) of geothermal capacity worldwide. As of 2010, an additional 28 gigawatts of direct geothermal heating capacity had been installed for district heating, space heating, spas, industrial processes, desalination, and agricultural applications.

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