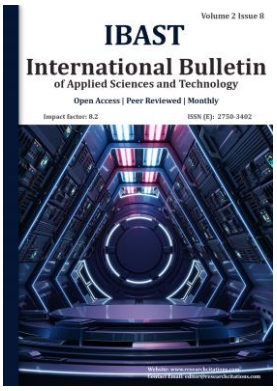

CALCULATION OF ENERGY CONSUMPTION FOR HYDROTHERM EXTRACTION WHEN USING THE ILIM HYDROTHERMAL MINE LOCATED IN THE BUKHARA-KHIVA REGION OF THE REPUBLIC OF UZBEKISTAN FOR HEATING BUILDINGS

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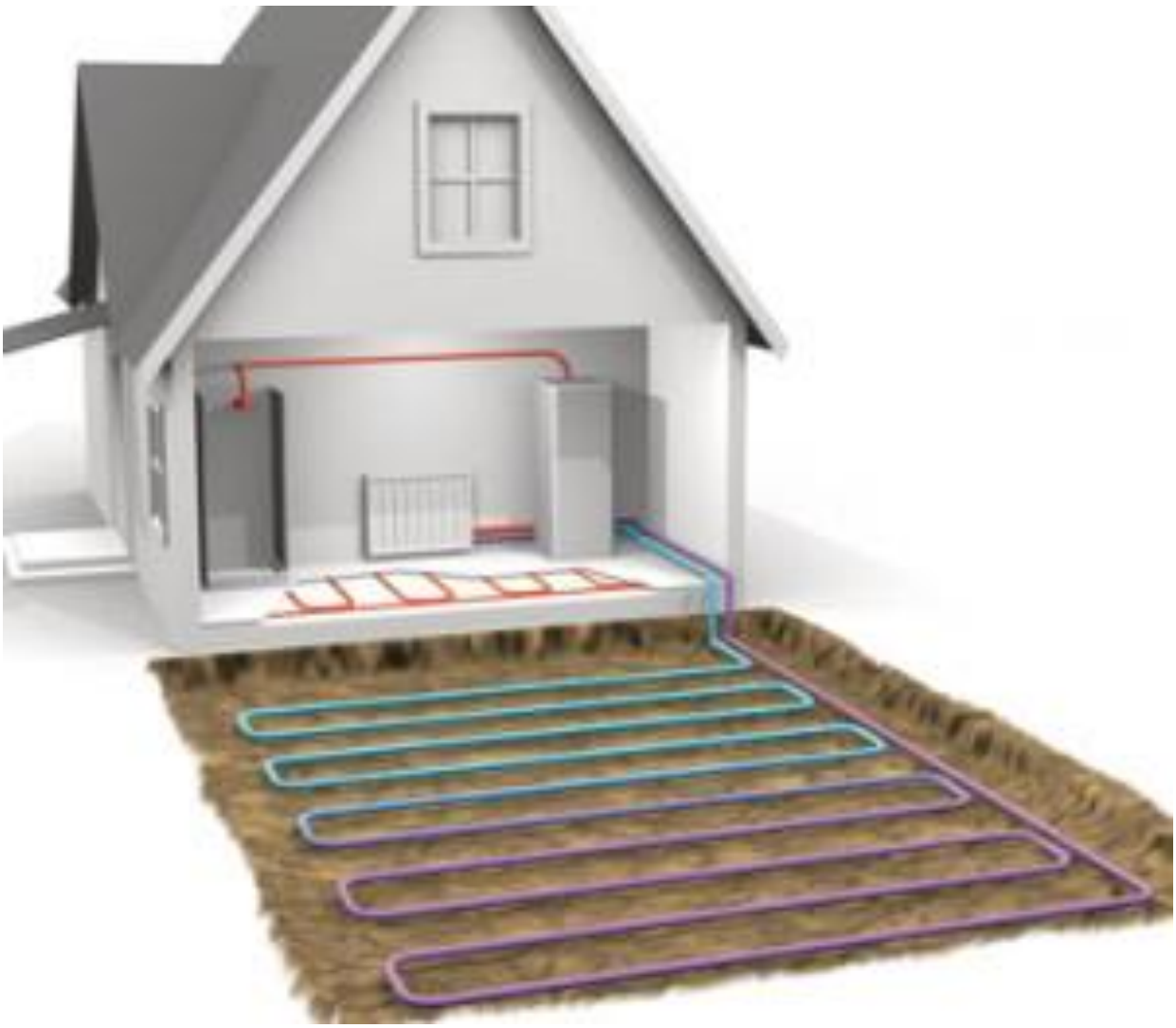
Abstract. In the following years, non-renewable energy reserves are expected to decrease sharply. In this article, the issue of heating buildings with the help of renewable hydrotherms and calculating the energy consumption required to extract the hydrotherm to the surface of the Earth is raised.

Keywords: Renewable, hydrothermal, regional, geothermal, magma, geothermal heat pump, emission.

Introduction. Geothermal energy systems derive from the infinite amount of energy stored as heat in the water in the Earth's crust. The most vivid and visual example of this is "Geysers" and "Hot springs". From them, a great energy consisting of boiling water, steam and gases is released into space. Geothermal energy is a renewable energy source. Because it is a product of huge and infinite natural heat stored in the Earth's core. In fact, the word "Geothermal" comes from the combination of two Greek words Geo "Earth" and Thermal "Heat". The word "geothermal" means "heat generated from the earth". Geothermal energy can be used directly or indirectly as an alternative energy source for heating buildings.

Geothermal heating systems can be used in the design of buildings in a city or settlement. Geothermal energy systems are efficient, environmentally friendly, convenient and economical. Because they consume 80-90% less energy than traditional heating systems. Since the geothermal energy system does not use any renewable fuel to produce heat, it produces less greenhouse gas emissions than conventional heating boilers and completely eliminates the source of toxic carbon monoxide inside the building (1-photo).



1-photo. Geothermal heating system

Hydrothermal vents close to the surface of the earth are mainly used in world practice (Geyzers 2-photo).

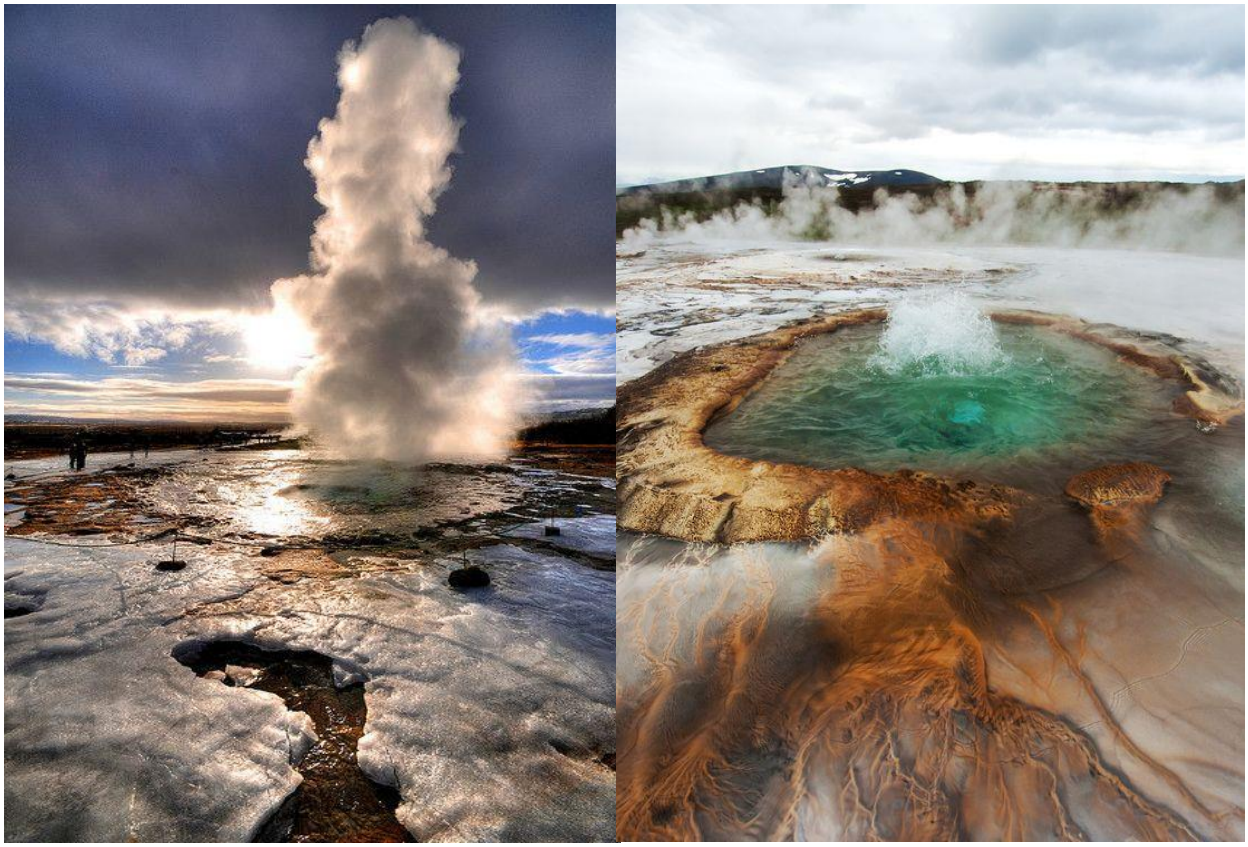
Geothermal energy is an alternative natural energy resource based on hot water sources in the earth's crust. Because it takes heat from the Earth's core. The heat from the core is so great that it melts the rock into a hot liquid called magma. It is lava that flows as a result of a volcano.

The closer the magma is to the Earth's surface, it cools and forms a solid mantle that surrounds the core.

As it rises from the center of the Earth to the outer surface of the planet called the Earth's crust, the temperature of the Earth decreases. This heat is the source we use as geothermal energy, because the use of this heat is environmentally friendly, free, non-polluting and renewable, and there is a constant upward flow of heat from the inner core to the Earth's surface.

Hydrotherms used in the use of geothermal energy are not released to the surface. On the contrary, the heat is extracted from the hydrothermal fluid. As a result, the heat-carrying medium-water cools down and is returned to the Earth with the help of pumps to be heated again. One way to capture this heat energy is by using a geothermal heat pump. The main

function of a geothermal pump, like a refrigerator, is to exchange the cold temperature on the surface of the Earth with the hot temperature in the Earth's crust.



2-photo. Geyzers

It uses geothermal heat pumps to transfer hydrothermal vents. Pumps, in turn, are electricity consumers. The following geothermal reservoirs have been identified in the Bukhara-Khiva region.

№	Field and mines	Well №	The depth where the water is, m	Geothermal water density, kg/l	Geothermal water pressure, 1/10 MPa	Tempera-ture, ^{0}C
1.	Ilim	3	2987-3003	1,06	319,99	114
2.	Noviy Guzar	1	3192-3284	1,075	346,57	113
3.	Chilgumbaz	1	3041-3035	1,04	583,15	113
4.	Kamashi	8	3320-3312	1,07	571,92	124
5.	Yangi Karatepa	7	3572-3569	1,06	485,00	116
6.	Mangit	3	3596-3590	1,065	471,30	121,5
7.	Vost Ayzovot	1	3660-3550	1,06	351,62	120
8.	Chatirtepa	1	3523-3510	1,059	375,13	128
9.	Jambulak	2	3760-3748	1,14	513,13	115
10.	Buzaxur	3	3486-3478	1,065	389,16	126
11.	Kuruksay	2	3157-3340	1,06	459,73	110
12.	Mavlyanku-duk	1	3522-3504	1,075	357,58	123
13.	Oxir	1	3182-3166	1,07	576,12	116

In the article, the electricity consumption of the hydrothermal pump for extracting the existing hydrothermal power from the Ilim mine to the surface of the Earth is calculated as follows.

According to the physical properties of liquids, when a liquid with a certain pressure is dug at a certain depth, it rises to a certain height and stops at such a height that the pressure exerted by the liquid at the bottom of the height is equal to the pressure of the geothermal water at the bottom of the earth.

Based on the above information, we determine the height of existing geothermal waters in the territories of the Republic of Uzbekistan, which rise by their own pressure when they are dug. In this case, the pressure exerted by the standing liquid on the bottom of the pit is determined based on the formula P=ρgh. The height of the liquid rise is equal to $h = \frac{P}{\rho g}$

Therefore, the geothermal fluid in the Ilim mine is $\boldsymbol{h = \frac{P}{\rho g}}$ according to the formula, from the ground

$$\boldsymbol{h = \frac{P}{\rho g}} = \frac{319.99 * \frac{1}{10}\ MPa}{1{,}06\ \frac{\text{kg}}{\text{l}} * 9{,}8\ \text{m}/s^2} = \frac{319.99 * 10^5 Pa}{1060\ \frac{\text{kg}}{m^3} * 9{,}8\ \text{m}/s^2} = 3080m$$

rises to a height.

If we consider the depth of the existing water in the mine to be 3003 meters, the geothermal water rises to a height of $3080 - 3003 = 77$ meters above the surface of the Earth

Conclusion / recommendations.

Based on the above calculations, it can be concluded that:

The geothermal water that can be released from the Ilim field of the Bukhara-Khiva region of the Republic of Uzbekistan rises to the surface of the earth under its own pressure and rises to a height of 77 meters. Therefore, electricity is not required to extract geothermal water to the surface of the earth.

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