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А.А НАСИБЯН, студент гр. ЭТ–192 (БГТУ)
Е.А. Озерова, ст. препод (БГТУ)
г. Белгород

GEOTHERMAL ENEGRY

Geothermal energy is generated in the Earth's core. Temperatures hotter than the sun's surface are continuously produced inside the Earth by the slow decay of radioactive particles, a process that happens in all rocks. The Earth has a number of different layers. The core itself has two layers: a solid iron core and an outer core made of very hot melted rock, called magma.The mantle surrounds the core and is about 1,800 miles thick. It is made up of magma and rock.

The crust is the outermost layer of the Earth, the land that forms the continents and ocean floors. It can be 3 to 5 miles thick under the oceans and 15 to 35 miles thick on the continents.

The Earth's crust is broken into pieces called plates. Magma comes close to the Earth's surface near the edges of these plates. This is where volcanoes occur. The lava that erupts from volcanoes is partly magma. Deep underground, the rocks and water absorb the heat from this magma. The temperature of the rocks and water gets hotter and hotter as you go deeper underground.

Some applications of geothermal energy use the Earth's temperatures near the surface, while others require drilling miles into the Earth.

The three main uses of geothermal energy are:

- direct use and district heating systems use hot water from springs or reservoirs near the surface;

- electricity generation power plants require water or steam at very high temperature (300° to 700°F).Geothermal power plants are generally built where geothermal reservoirs are located within a mile or two of the surface;

- geothermal heat pumps use stable ground or water temperatures near the Earth's surface to control building temperatures above ground.

The use of geothermal heat pumps. Geothermal heat pumps are the most efficient heating and cooling systems available. They offer a single, simple system that uses the earth to heat and cool your home. A geothermal heat pump or ground

source heat pump (GSHP) is a central heating and/or cooling system that pumps heat to or from the ground.

In principle, a geothermal heat pump functions like a conventional heat pump, by using high-pressure refrigerant to capture and move heat between indoors and out. The difference is that conventional systems gather their heat- and get rid of it - through the outside air. Geothermal systems, in contrast, transfer heat through long loops of liquid-filled pipe buried in the ground.

It uses the earth as a heat source (in the winter) or a heat sink (in the summer). This design takes advantage of the moderate temperatures in the ground to boost efficiency and reduce the operational costs of heating and cooling systems, and may be combined with solar heating to form a geosolar system with even greater efficiency. Ground source heat pumps are also known as "geothermal heat pumps" although, strictly, the heat does not come from the centre of the Earth, but from the Sun.

They use the Earth as a heat sink in the summer and a heat source in the winter, and therefore rely on the relative warmth of the earth for their heating and cooling production. Through a system of underground (or underwater) pipes, they transfer heat from the warmer earth or water source to the building in the winter, and take the heat from the building in the summer and discharge it into the cooler ground. Therefore, GHPs don't create heat; they move it from one area to another.

Geothermal heat pumps are the most energy efficient, environmentally clean, and cost effective systems for temperature control.

Geothermal systems come in many styles to fit different needs and land space available.

Ground source heat pumps can be categorized as having closed or open loops, and those loops can be installed in three ways: horizontally, vertically, or in a pond/lake. The type chosen depends on the available land areas and the soil and rock type at the installation site. These factors will help determine the most economical choice for installation of the ground loop. One of the best advantages of geothermal energy is the lack of pollution created.

In addition, geothermal energy does not use fuel to generate electricity. Cold water is pumped into the ground and superheated. When the water rises back to the surface, the heat is collected and converted to electricity. This means the costs of operating one of these power plants is limited to day-to-day operations and labor.

Geothermal heat pumps are among the most energy- and cost-efficient heating and cooling systems available today. They use less electricity and produce fewer emissions than conventional systems, reduce air and water pollution, and provide a comfortable indoor environment for building occupants.

Because GHP systems have relatively few moving parts, and because those parts are sheltered inside a building, they are durable and highly reliable. The underground piping often carries warranties of 25 to 50 years, and the GHPs often last 20 years or more.

Thus, the use of geothermal heat pumps is an effective way to save energy, as well as their use reduces pollution and makes it more comfortable as our existence.

Информация об авторах:

Насибян Альберт Артурович, студент гр. ЭТ–192, БГТУ, 308012, г. Белгород, ул. Костюкова, д. 46, nasibyan_albert@mail.ru

Озерова Елена Алексееевна , ст.препод., БГТУ, 308012, г. Белгород, ул. Костюкова, д.46, BelovodEvg@yandex.ru