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Advantages, Disadvantages and Prospects of Geothermal Energy Use

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Abstract: *article mostly defines the advantages disadvantages and prospects of geothermal energy use. Every year, the extraction of hydrocarbon fuels gets more difficult: "high" reserves are almost depleted, and drilling deep wells necessitates not only new technology but also significant financial investments. As a result, because energy is primarily derived by refining hydrocarbon fuels, it is likewise growing more expensive.*

Keywords: *electricity, new technologies, geothermal, energy, thermal energy, sources.*

INTRODUCTION

It gets hotter as it travels further into the ground. This is a widely accepted axiom. Oceans of heat exist in the Earth's belly, which humanity can use without harming the ecosystem. Geothermal energy can be used directly (thermal energy) or converted into electrical energy using modern technologies (geothermal power plant).

There are two types of geothermal energy sources: petrochemical and hydrothermal. Hydrothermal energy employs the high temperatures of groundwater, while petrothermal energy uses changes in soil temperature at the surface and subsurface.

Although dry high-temperature rocks are more frequent than hot water sources, their application for energy generation comes with its own set of challenges: water must be pumped into the rocks, and then heat must be recovered from the hot water. rocks. Superheated water is promptly "supplied" by hydrothermal springs, from which heat can be collected.

MAIN PART

Low-temperature heat at shallow depths is another possibility for collecting heat energy (heat pumps). The heat pump works on the same concept as industrial devices that operate in heating zones; the only difference is that this type of equipment uses a particular cooler with a low boiling point as a heat carrier, which makes it more efficient. Redistributing heat at low temperatures can provide thermal energy.

Furthermore, the issue of preserving the environment from the detrimental consequences of industrialization is growing more pressing. And this is already clear: if existing energy sources (hydrocarbon fuels) are maintained, humanity will face an energy catastrophe as well as environmental destruction [15].

As a result, technologies that allow for the generation of heat and energy from renewable sources are critical. These technologies also include geothermal energy, which uses heat from the earth's interior to generate electrical and/or thermal energy.

Heat pumps can provide enough energy to heat modest buildings and cottages. Although such devices are not employed in the industrial generation of thermal energy (because to the low temperatures), they can be used in the organization of autonomous power supply in private residences, especially where power lines are difficult to establish. They've proven their worth. However, a temperature of around + 8 ° C in the soil or groundwater (depending on the type of equipment used) is adequate for the heat pump to operate efficiently, i.e. a shallow depth is suitable for the device (depth rarely exceeding 4 m).

The type of energy derived from a geothermal source is determined by its temperature: low and medium temperature sources are primarily used for hot water delivery (including heat supply), whereas high temperature sources are used to generate electricity. Heat from high-temperature sources can also be used to create energy and hot water at the same time. The water temperature in the heating zones can greatly surpass the boiling point of water (in some situations, the overheating approaches 400 ° C - due to the increase in pressure at depth), making energy generation particularly efficient [15].

The fact that geothermal energy sources are primarily renewable, that is, virtually inexhaustible, is of significant interest. However, hydrocarbon fuel, which is currently the primary source of numerous types of energy, is a nonrenewable resource with a projected scarcity. Furthermore, geothermal energy production is far more environmentally beneficial than traditional hydrocarbon-based processes.

There are advantages to geothermal energy when compared to other methods of energy production. This indicates that geothermal energy is independent of environmental factors such as temperature, time of day, season, and so on.

Wind, solar, and hydropower, as well as geothermal energy fueled by renewable and nonrenewable energy sources, are, however, extremely environmentally sensitive. For example, the efficiency of solar power plants is directly proportional to the level of ground insulation, which varies significantly depending on not only latitude but also time of day and season. Other forms of alternative energy are in the same boat. The efficiency of a geothermal power plant, on the other hand, is solely determined by the temperature of the heat source and is unaffected by the time of year or the weather outside.

Due to limited thermal zones, deep drilling challenges, and other factors, it is unlikely that industrial geothermal energy will be able to replace current conventional energy sources. Other forms of alternative energy can be found all over the world. Geothermal energy, on the other hand, plays and will continue to play an essential role in various energy generation methods (electricity and/or heat) [15].

The possibilities for geothermal energy based on heat redistribution from low-temperature sources, on the other hand, are significantly brighter. Thermal zones with very hot water, steam, or dry rock are not required for this sort of geothermal energy. Heat pumps are becoming increasingly popular, and they are frequently used in the construction of modern cottages and "active" homes (houses with autonomous energy sources). Geothermal energy is still being actively developed in "small" forms such as wind and solar energy, as well as to offer autonomous electricity to individual dwellings or households, according to current trends (Vorgan Sofiya).

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Iceland - a country in the northern part of the country located in particularly active tectonic and volcanic zones - is commonly associated with the usage of geothermal energy around the world. Almost everyone recalls the powerful explosion of the volcano's eyepiece. (EyjaFjalllajökull.2010)

Iceland's geothermal energy reserves, which include hot springs that emerge on the surface and even geysers, are examples of such geological characteristics.

More than 60% of all energy consumed in Iceland now comes from the ground. Geothermal energy accounts for 90 percent of heating and 30 percent of electricity generation. We should also mention that the rest of the country's electricity is provided by a hydropower plant, which uses renewable energy sources, making Iceland environmentally friendly [16].

The following are the primary applications for using the earth's crustal heat. Water or a mixture of water and steam can be used for hot water delivery and heating, power generation, or all three at the same time, depending on their temperature. For electricity generation and heat delivery, the high temperature heat of the region around the volcano and the dry rocks are preferable. The station's design is determined by the geothermal energy source employed.

The fundamental benefit of geothermal energy is that it can be utilized for hot water and heat supply demands, to create electricity, or in the form of geothermal water or a mixture of water and steam (depending on their temperature) for three uses at once. As a result, geothermal energy (together with other ecologically friendly renewable energy sources) can play an important role in addressing the following pressing issues:

Provide people with reliable heat and electricity in regions where centralized electricity is unavailable or prohibitively expensive.

Provision of a guaranteed minimum power supply to the people in places where centralized power supply is unstable due to a lack of electricity in power systems, and the prevention of harm caused by accidents and limits, among other things.

Reduction of harmful emissions from power stations in places where environmental circumstances are difficult [16].

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