

We came to the conclusion that the replacement of all obsolete valves results in the reliability increase of the whole power station. However, the replacement of all obsolete valves is economically unfeasible and it is difficult to find companies ready to invest to the project.

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GEOTHERMAL POWER ENGINEERING

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Abstract

Our world is changing and it becomes more and more real to replace traditional sources of energy by new ones. Alternative sources of energy have a lot of pluses and minuses. Alternative energy seems to be really ef-

fective and geothermal energy as a type of alternative energy looks effective too. This paper deals with geothermal energy, its advantages and disadvantages, prospects of using this kind of energy.

Key words: alternative sources of energy, geothermal power engineering, electricity.

Introduction

Developing of human needs and improving technologies compel people to produce more and more electricity annually. These reasons give a push to develop both traditional and alternative power engineering. Geothermal power engineering is a kind of alternative power engineering. A theme of geothermal energy is very popular among scientists and economists nowadays because oil, gas and coal reserves are not unlimited and people have to look for new ways to produce electricity.

Main discussion

General information

Geothermal energetics can be divided into two types: hydrothermal energetics and petrothermal energetics. People use heat of rocks in petrothermal energetics and heat of water or hot steam in hydrothermal energetics [1].

The first geothermal power plant was created in 1904 in Italy by Prince Piero Ginori Conti. Modern power stations are a lot better and more productive. The principle of their usage is based on applying geothermal coolant, steam (superheated or wet) or hot water, which comes out from the ground, with a depth of 500 to 3000 meters to produce electric power. The depth of 3000 m is not the limit of modern geothermal power stations. There is a well with the depth more than 6 kilometers in Russia, and deeper than 9 kilometers in the US. The deepest well in the world was drilled on the Kola Peninsula. Its depth is 14 kilometers. It works in a test mode for the time being.

Geothermal properties of a coolant, which serves to produce electricity, depend on characteristics of equipment. The coolant forms in a reservoir in the process of interaction with rocks [3].

Limitations of geothermal power plants

There are four main problems in this kind of energetics.

The first problem is exploring sources and drilling wells. Drilling is not a cheap process. One meter of a well often costs about 8 thousand of roubles.

The second problem is ecology. Firstly, discharged water is often drained into ponds or rivers. Sometimes this water contains dangerous components and harmful gases, methane or carbon dioxide for example. These substances always affect nature. Secondly, geothermal power plants

sometimes emit noise and it is changing the flora and the fauna of the area, where a power plant is located [1].

The third problem is depletion of sources and changings of geology in these areas. Ground sink, when people take a lot of water from the depths of the Earth.

The forth problem is corrosion of plants and scaling. Underground thermal waters contain aggressive impurities which can damage pipes and rigs [2].

Prospects for the development of geothermal energetics

Geothermal energy is a relatively new trend in the energy sector, but it has gained popularity in many countries. Commercial use of geothermal sources is common in Iceland, New Zealand, Italy, France, Lithuania, Mexico, Nicaragua, Costa Rica, the Philippines, China, Indonesia, Japan and Kenya. The United States is the largest producer of geothermal energy in the world. This country produced 16 billion KWh of electricity in 2005, and in 2009 the total capacity of 77 geothermal power plants in the United States amounted to 3086 MW [3].

The largest geothermal power plant in the world with a capacity of 140 megawatts is located in Kenya.

The Russian Federation is also developing in the field of geothermal energetics. There were 56 geothermal power plants in Russia in 2006 and thus a number of plants are growing year after year. Mutnovskaya geothermal power plant is the greatest in our country. It produces about 360 million KWh of electricity annually. Some scientists have a plan to increase the amount of generated electricity.

Geothermal energetics is really perspective because it produces enough cheap and eco-friendly electricity, it provides with the job lots of people and let people save fossil fuels [1].

Conclusion

Geothermal energetics is going to be widespread around the world because it has a lot of pluses and few minuses. It will provide people with the job for many years. Also it will help people to save money and fossil fuels. That is why geothermal energetics is so important in our unstable times.

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HYDROGEN FUEL ENERGY

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Abstract

Nowadays there are many environmental problems in the world. Atmospheric pollution is one of the major issues. Much pollution comes from different engines and vehicles. The solution lies in discovering of either a new energy resource or form of energy and this will lead to a new technological stage. This paper deals with issues facing hydrogen fuel as an alternative source of energy, its advantages and disadvantages.

Key words: hydrogen fuel, energy, vehicle, hydrogen fuel cells, environment.

Introduction

Hydrogen fuel is zero-emission fuel, which uses electrochemical cells or combustion in internal engines, to power vehicles and electric devices. It is also used in the propulsion of spacecraft and might potentially be mass-produced and commercialized for passenger vehicles and aircraft.

In 2009, about 25% of carbon dioxide emissions into the atmosphere of the Earth were made as a result of various kinds of transport [1]. The IEA estimates that by 2050 this number will have been doubled and will continue to grow as the developing countries will increase the number of private vehicles. In addition to carbon dioxide into the atmosphere of nitrogen oxides are responsible for the increased incidence of asthma; sulfur oxides are responsible for acid rain, etc.

In maritime transport cheap low-quality grades of fuel are often used. Maritime transport emits sulfur oxide is 700 times more than road transport. According to the International Maritime Organization CO₂ merchant fleet reached 1.12 billion tons per year [2].

Main discussion

Use of hydrogen fuel and its advantages