The Aspects of Solar and Geothermal Energy Conversion

U.U. Iskandarov

Senior teacher of the Department of Telecommunication Engineering of the Fergana branch, Tashkent University of Information Technologies
E-mail: usmonaliiskandarov7@gmail.com

ABSTRACT

In the article analyzed kinds various energy solar and geothermal energy sources and converters. The development of industry, technology and technology, the growth of energy resources, and environmental problems, determine the effect of energy capacity on the level of life conditions. The fact is that energy capacity is often the cause of the development and growth of growth technologies and more societal relations.

Keywords: solar energy, geothermal energy, sources, converter, energy capacity, life condition, society relation,

Introduction

The article reviews solar and geothermal energy converters. The development of industry, technology and technology, the growth of energy resources, environmental problems and humanity gives an impetus for the search for new types of energy sources (IE). The events of Chornobyl and Fukushima and the problems of delayed minerals and silts (irrigated lands) with platinum of hydroelectric power plants allow you to know the future risk of such sources. Therefore, it is necessary to look for new types of energy sources. Electric energy is taken directly or by intermediate transformation from another type of energy. Modern energy converters are based on the production of energy from solar energy, geothermal, chemicals, the energy of organic fuels, the energy of the course of oceans, rivers, waterfalls, winds, petrol resources (heat of dry rocks) and atomic energy. Each of the above converters has a kind of scientific and technological approach. There are five main sources of energy:

- solar radiation;
- movement and attraction of the sun, moon and earth (gravitational attraction);
- The thermal energy of the Earth's nucleus, as well as chemical reactions and radioactive decay in its bowels, are nuclear reactions - chemical reactions of various substances.

Table 1.1 shows possible resources of energy sources [2.10,4].

Table 1. Energy sources

Types of Energy	Resources, $\frac{TWt \cdot h}{year}$		
	theoretical	technical In the world	In the CIS
The energy of the sun			
On the upper level of the atmosphere of the Earth	183000	-	-
On the surface of the Earth, including:	75913	5708	536
On the surface of the land	26370	2283	217
On the surface of the oceans	49543	3425	320
The energy of the wind	1982	21	3.4
Geothermal energy(to a depth of 10 km)	34	0.4	0.02
Source as open hot water and hot gases	1256	137	6.8
hydrothermal resources	34247	2853	137
Wind-geo-thermal resources			
The energy of the world's oceans	39954	399	90
The gradient of salinity	11.5	0.6	0.14
thermal (temperature gradient)	8	0.14	0.023
shore and beach	3	0.8	0.2
surf	0.9	0.023	0.006
sea wind waves	2.5	0.09	0.023
Biomass energy			
on the land	41	4.6	0.37
In the oceans	22	1.7	0.14
Organic waste	2.3	1.4	0.08
Hydropower energy		1.7	0.23
Large watercourses	3.7	0.85	0.06
Small water flows	1.7		

In the world today, many countries are building solar power plants, the basis of which is a photoelectric converter or reflector. A photoelectric converter i.e. "Solar Battery" are several united photocells - semiconductor devices that directly convert solar energy into direct electric current.

In 1839, Edmond Beckerel opened a photo gal effect. After about 50 years, Charles Fritts assumed that this effect can be achieved using a device made of selenium and gold, with an efficiency of about 1%. In 1954, Silicon Solar Battery was invented in the United States, which issues an efficiency of 6%. And four years later, it became the main source of electricity in spaceships, to power spacecraft. In the 70s, efficiency increased to 10%, but there was no talk of “ground” use since the cost of batteries was too large. Only in 1989, it was possible to achieve 30% of efficiency. Most often, solar panels are made of thick-skinned silicon, there are polycrystalline and monocrystalline elements and the most advanced - thin -film technologies, known as CIS. They are 100 times thinner than the above and scorch the appearance of the sun even beyond the horizon or cloud.

Most of all, solar panels are used in Germany - 36%, 1000 megawatts are produced per year. The USA and Spain follow them [11,2,9,13,14].

In Russia, the first geothermal power plant (Paujetskaya) with a capacity of 5 MW was launched in 1966 in Kamchatka. Such stations were built in the United States, in the Valley of large geysers (California), in New Zealand, Italy, Japan, etc. This type of power plant is

relatively easy to operate, but not economical. A geothermal power station with a capacity of 1000 MW produces into the atmosphere T of gases per year, pollutes m^3 of water and requires
a significant area (up to 20 km^2 per station). The construction of geothermal power plants is justified where thermal waters are closest to the surface of the Earth (e.g., in the district of volcanic activity, where there are geysers).
The first solar power plant in Russia with a capacity of 100 kW was launched in September 2010 in the Belgorod region. In 2010, 2 % of Germany's electricity was obtained from photoelectric installations.
Uzbekistan has great potential for the development of alternative energy sources in the country (AES), experts note. A national concept for the development of renewable energy sources (AES) has been developed. The main idea of this concept will be the wide introduction of alternative sources of energy into everyday life and their development based on foreign experience.
According to experts, the potential of renewable energy sources in Uzbekistan is about 51 billion tons. e., technical potential - 182.32 million tons. e., which is 3.1 times higher than the current annual volume of primary energy resources. So, by type of renewal, the potential of hydropower is 9.2 million tons. e., of which large rivers are 8 million tons. e., small rivers, reservoirs and channels - 1.2 million tons. e., solar energy - 50.973 billion tons. e., wind [7] - 2.2 million tons. e., geothermal waters - 0.2 million tons. e. Another unaccounted source of renewable energy is Petrothermal resources (heat of dry rocks), the potential of which reaches 6.7 trillion tons.
Today, in the world, photoelectric elements are installed on various vehicles: boats, electric cars and hybrid cars, aircraft, airships, computers, cellular, phones, etc. The company Solatec LLC sells thin-fashioned photoelectric elements for installing a Toyota Prius hybrid car. Fine-film photocells have a thickness of 0.6 mm, which does not affect the aerodynamics of the car. Photo elements are designed for charging batteries, which allows you to increase the mileage of the car by 10 %. As early as November 20, 1980, Steve Ptachchet flew on the Solar Impulse aircraft, which is only solar energy [7,8,9,11,15].
In 2010, a sunny manned plane lasted 24 hours in the air. Unmanned aerial vehicles (UAVs) on solar energy can stay in the air for extremely long - months and years. Samsung went on and released a serial non-book on sunny batteries - NC215S. Photoelectric generators, and photocells belong to the class of renewable "eco" power sources. Most photoelectric converters (PEC) are made of silicon. The first phone that can recharge from solar elements - Samsung E1107, will provide an hour in the sun up to 10 minutes of conversation. And calculators and computer, keyboards can generally work forever, having such a battery. Over the year, around 2500 MW of energy is produced all over the world around the world, which is equivalent to two blocks of a conventional nuclear power plant.
Semiconductor materials from which produce solar elements and batteries:

- based on crystalline silicon (hard, the efficiency of 12-20%-decreases with heating-0.45%/℃ counting from + 25 ℃, spectrum 0.5-1.0-(visible + infrared) amorphous silicon (flexible batteries, efficiency 5-10%, spectrum 0.2-0.7-"ultrophylette + visible") arsenide Galia (hard, heavy modules with an efficiency of 10-25%, maintain performance to temperatures + 150 ℃, spectrum 0.5-0.9.9 - "visible", expensive);
- Sulphide-cadmium (thin-film-flexible, efficiency of 5-10%-stable to temperatures +100 ℃, spectrum 0.2-0.7-"ultraviolet"). Fast company employees in the future assign a large role in solar energy [4].

Currently, only 0.04% of all electricity produced in the world is produced through solar panels. Until 2040, the slow development of solar energy will take place, and after 2040 it will begin rapid development. In the future, the sun will become the main source of electricity on Earth [4,6,5, 10]
Geothermal and hydrothermal energy is environmentally friendly energy.

Geothermal energy is the natural heat of the planet, Earth. Its number is enormous. The temperature of the land of the earth with depth rises, usually by 20-40 ℃ per kilometre, and from depths of 4-5 kilometres, the temperature exceeds 100 ℃.

Russia is in large geothermal resources by Kamchatka and Kurils (where there are, also, superficial hydrothermal springs), Primorsky Territory, Western Siberia, North Caucasus, Krasnodar and Stavropol Territory, and Kaliningrad region. A cheap, reliable, environmentally friendly geothermal heat supply can replace most existing systems operating based on fuel oil, coal and gas boilers, and long -outed technologies. Geothermal resources will save consumed hydrocarbon fuel and make cheaper heat based on innovative, environmentally friendly technologies.

Conclusions

Geothermal power plants are already operating in many countries: For example, in Kamchatka, the capacity of which is more than 400 million kWh of electricity and this is far from the limit. Economic efficiency and reliability, along with environmental safety are the main factors due to which geothermal energy is increasingly used in many countries. Currently, geothermal power plants operate in 25 countries and produce more than 50 GW/year, increasing volumes every year. In seismic areas, the operation of nuclear power plants can have tragic consequences. In the conditions of the seismicity of the region, real, modern and environmentally friendly technology is geothermal energy [8], for which there is no fuel in the form of imported fuel oil and diesel fuel, but only the heat of the bowels from underground wells or from geothermal springs on the surface of the Earth. The cost of electricity is not expensive. In addition, this is an environmentally friendly production that allows excluding carbon emissions and other harmful gases that cause a greenhouse effect. Solar and geothermal power plants are promising directions of energy development in the XXI century.

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