RENEWABLE ENERGY SOURCES IN UZBEKISTAN

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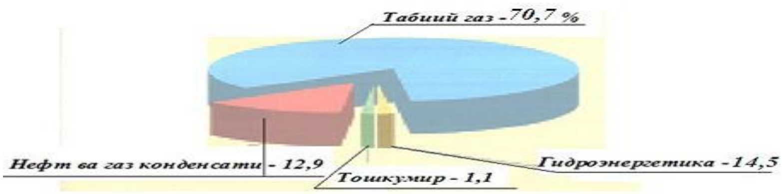
ABSTRACT

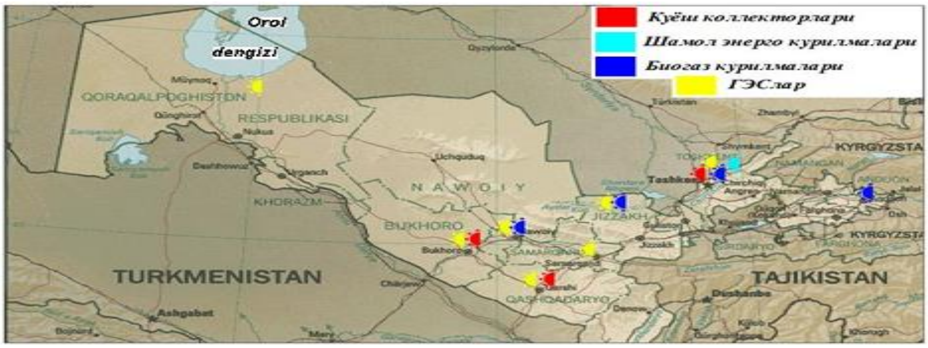
Geothermal energy. There is a huge amount of heat deep in the earth . Inexhaustible energy can be obtained from it very cheaply and without environmental damage. According to calculations, the energy obtained from heat accumulated in the earth's crust is several times more than the energy obtained from all organic fuel reserves on earth . But this heat energy is obtained only from the boiling water underground.
Wind energy. Before the advent of steam engines, wind energy was used extensively in industry and agriculture in England, Germany, France, Denmark, Holland and other countries.

Today, the development of society is determined by its energy supply. However , the daily increase in energy consumption and the use of organic fuels for its production lead to global environmental pollution and, as a result, pose a serious threat to human life. For Suning, one of the current energy issues is the use of environmentally friendly, renewable energy sources. Today, 84.7% of the electricity produced in our republic is produced in thermal power plants using organic fuels. Only 14.5% of the total energy production is produced by hydroelectric power plants



1 . Production of organic fuels and water energy in our republic
the amount of electricity produced (in percent).

Currently, a lot of scientific research, projects and commissioning works on the use of renewable energy sources are being carried out in Uzbekistan on the basis of international grants and projects.



2 . On the use of renewable energy sources .

Solar energy can be used for both heat production and electricity production. In the first case, flat concentrated solar collectors are used. Water, air or antifreezes can be used as heat carriers . In the second case, the light flux energy is directly converted into electrical energy in photoelectric converters, or conventional schemes of thermal power plants are used.

Heat production. Getting heat from solar energy is not a difficult process. Theoretically , it is possible to obtain heat up to 5600 $^{0\,C}$ using solar collectors . There are two huge solar ovens in the world: in the Republic of Uzbekistan and in France. The temperature of the solar oven in Uzbekistan (Fig. 3) is equal to t ^{0} =4000-4500 C ^{0} , in France and the temperature of the solar oven that has been started reaches - t ^{0} =3800 C ^{0} .

3 . Converting sunlight into heat energy devices:
a-traditional heliostats; b- flat heliostats; v- coming from heliostats
a device that collects solar energy and directs it to a solar oven.

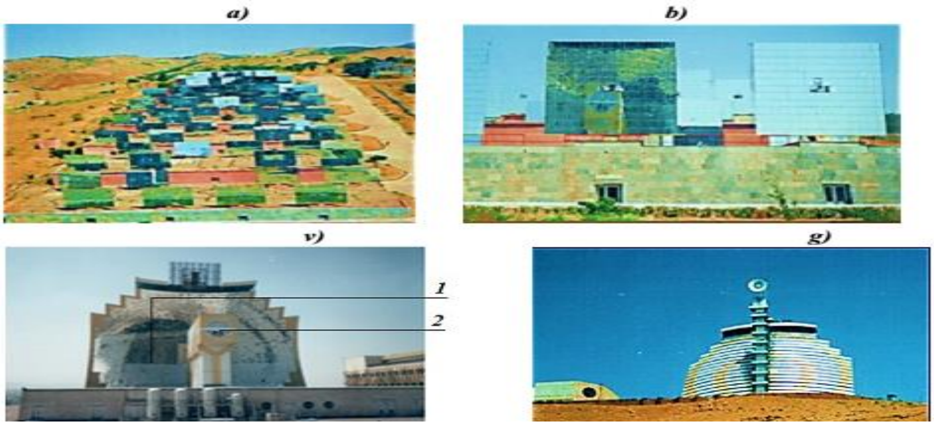


Figure 4. Solar furnace in the Republic of Uzbekistan: area of flat heliostats of a-solar furnace; close-up view of β-heliostats; v- tower of heliostats (1) and solar furnace (2) that collect sunlight falling on the heliostats; General view of g-solar furnace.

The amount of energy transmitted by a wind energy device is fundamentally different from the amount of energy generated by air flow. Because part of the energy of the air flow is wasted in the blades of the wind wheel, reducers and generators. The amount of wasted energy is accounted for by the coefficient of wind energy utilization. The power of the wind energy device can be calculated by the following formula, defining the surface of the field perpendicular to the wind with the diameter of the wind wheel.

$N_{candle.ener.gun.} = 0.00386 \times q \times V \times D^2 \times x_{par.} \times \bar{e}_{red.} \times \bar{e}_{gen.}$

Here: D-wheel diameter, m;

$\eta_{red.}$ and $\eta_{gen.}$-useful work coefficients of reducer and generator;

$x_{par.}$-airflow energy wasted in the wings.

According to calculations, the efficiency of wind turbines can be as high as 48%, while the overall efficiency of wind turbines is even lower.

Perpendicular to the wind, mainly the blades of the wind turbines are located. The power of the wind turbine is not determined by the number of blades, but by the diameter of the impeller

The word geothermal comes from the Greek words geo-earth and thermy-heat, and it is called geothermal energy-earth heat energy. There is a huge amount of heat in the ground. Inexhaustible energy can be obtained from it very cheaply and without environmental damage. according to calculations, the energy obtained from heat accumulated in the earth's crust is several times more than the energy obtained from all organic fuel reserves on earth. But this heat energy is obtained only from the boiling water underground.

There are huge reserves of heat underground. Inexhaustible and inexhaustible energy can be obtained from it very cheaply and without environmental damage.

According to calculations, the energy obtained from heat stored in the earth's crust is several times more than the energy obtained from all organic fuel reserves on earth. But this heat energy is obtained only from the boiling water underground. These waters are divided into two.

1. Thermal (hot) waters - their temperature is up to 100 ^{o}C.
2. Parahydrothermal waters - their temperature exceeds 100 ^{o}C.

In Central Asia, there is a reserve of geothermal waters with a temperature of 40-200 ^{0}C and a total flow consumption of 0.55 mln.m^3/day.

At present, geothermal water is used only in public utilities (house heating and hot water supply), greenhouses, and for medical purposes.

Waters with high temperature and low mineralization are valuable for providing energy and heat. Because there is less mineralization, there is less rusting of the equipment and less deposits of salts on their walls. In the earth's crust, hydrothermal waters are located very deep (below 1000 m, below the potable waters). According to calculations, the temperature of underground water increases by 1 ^{o}C every 30-40 m. In some places, they can be located at a depth of 200-300 m (Kamchatka, Kuril Islands). In rare cases, they are also found in the form of hot steam springs. In Kamchatka, there are more than 100 high-temperature thermal waters protruding from the earth's surface. In 1984, only 1800 MVT of energy was obtained from geothermal waters, of which: America-500; Italy-420; Mexico-75; Japan-70. The extraction of electricity from geothermal waters began mainly after the beginning of the energy crisis on Earth and the peak of the vision for obtaining ecologically clean energy.

a) b)


Figure 8. Parahydrothermal (a) and thermal (b) water sources.

Hydrothermal power plants are similar to thermal power plants, except that thermal power plants do not have a steam boiler, and geothermal power plants do not need fuel, so they do not need transportation to operate. Below is a diagram of a geothermal power plant. Today, the total capacity of geothermal power plants in the world is 10,751 megawatts.

Summary.

Today, the development of society is determined by its energy supply. However , the daily increase in energy consumption and the use of organic fuels for its production lead to global environmental pollution and, as a result, pose a serious threat to human life. For Suning, one of the current energy issues is the use of environmentally friendly, renewable energy sources.

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