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METHODS OF FORMING ELEMENTARY CONCEPTS OF MODERN ENERGY SOURCES IN STUDENTS IN THE SCHOOL PHYSICS COURSE

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ABSTRACT

The article provides and analyzes information on modern types of energy sources, technical possibilities of their use, future prospects in the school physics course.

KEYWORDS:- Alternative energy sources, solar photovoltaic device, wind generator, biogas device, electricity.

INTRODUCTION

It is known that the use of alternative energy sources dates back to very long periods of history. From ancient times the solar and wind energy has been used by mankind to a certain extent in their way of life. For example, it has been widely used in windmills to grind grains (wheat, barley, corn, etc.), and to dry fruits and melons in the sun. This work is now being done with the help of advanced modern tools and equipment. New directions and areas of alternative energy sources are developing. Examples of alternative energy sources include wind energy, solar photovoltaics, bioenergy, geothermal energy, salinity energy, ocean and sea wave energy. Many other types of alternative energy sources have also been discovered in the future, and some scientists and experts predict that mankind will use them as a new type of energy source in all fields, even in space. The most evolving alternative energy forms currently available are solar, wind, bioenergy and geothermal. Here is a brief overview of their convenience, advantages over other traditional forms of energy, and the physical mechanisms of energy generation.

Solar energy. Solar photovoltaics is one of the fundamental laws in physics, the field of conversion of solar radiant energy into electrical or thermal energy based on the law of internal photoeffects. In this case, photo-converters, photo-elements of various types and mechanisms are made from materials that absorb sunlight well. Solar Optical Radiation Energy An average of 1370 joules of energy fall on $1m^2$ of the Earth's surface has been identified. It is expected that in the future the further development of the use of solar energy in human life, the creation of new modern structures and the widespread introduction of its use as an energy source in all areas is expected to develop [1-3]. Solar photovoltaic cells or solar panels systems based on them are used in the

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conversion of solar optical radiation energy into electricity.

According to theoretical estimates, the global use of solar energy is estimated to account for 30-35% of the world's electricity and heat generation by 2030. The basis of solar photovoltaic devices is a solar battery, which charges the battery at the expense of energy of light photons coming from the sun. Solar batteries are currently made from 17-20 percent single crystal or polycrystalline silicon based solar cells. Scientists in this field are constantly conducting research around the world to further increase the efficiency of solar cells, especially silicon-based solar cells.

Wind energy. The use of wind energy in the human way of life has existed since ancient times. For example, windmills, sailing ships, wind control of balloons, and so on. At present, modern wind power devices have been developed, which are divided into mini and large wind power devices according to their capacity. Large wind power plants are mainly installed in wind farms. It is also sufficient that in the operation of large wind generators, the wind speed should be around 25-35 m /s on average. According to the best practices in the world, such wind parks are built in areas far away from the usual settlements. Such geographical areas are more common on Earth, mainly near the seas and oceans. There are also areas where mountains, hills and foothills are constantly windy. In such geographical areas, the construction of large "wind parks" and their use as an energy source is more efficient, cheaper and more convenient. However, such high-capacity "wind parks" wind generators generate a very large dose of noise. This can have a huge negative impact on humanity and the creatures of nature. That is why such large-capacity wind parks are built in geographical areas at a certain distance from populated areas inhabited by wildlife (nature reserves, forests, etc.). At present, many types of new designs of wind generators have been developed, and it is advisable to select and use them in different geographical areas. As an example, let's give some information about the use of mini (small) power wind generators. The advantages of mini wind generators are, firstly, that they are very easy and convenient to move from one place to another, and secondly, they have the ability to generate energy even at low speed wind effects. The disadvantage of mini wind generators is that they are not able to provide a large power consumer with an energy source. It is convenient to use mini wind generators as an energy source in mountains, deserts and hills, which are often disconnected from the power supply. This is because there is a possibility of migration in these areas [4-5]. In any case, it is necessary to constantly monitor their technical condition. This is because wind generators can malfunction when the wind blows at very high speeds, causing the wind turbine to overheat and the generator to overheat. Especially high-power wind generators are much more dangerous. When manufacturing and installing small wind turbines, their technical condition should also be checked, and the suitability or non-compliance of the hardware should be thoroughly checked. If these aspects are precisely accounted for, if their wind-blown geographical regions are chosen correctly, the electricity generated by wind generators is the cheapest and most convenient for mankind.

Bioenergetics (biomass, biogas production). Another type of alternative energy source is Bioenergetics. The use of this type of energy is currently mainly related to agriculture and animal husbandry. Bioenergetics is the field of production of natural biogas from natural raw materials based on the processing of these products in special devices. At present, in developed countries, plant species that emit

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large amounts of natural biogas in the production of this type of energy are grown in special fields, which are used as raw material reserves in modern biogas plants to generate natural biogas and electricity.

Modern biogas appliances are now widely used to supply homes with natural gas and electricity. In addition, there is a great potential for the production of natural biogas on the basis of local livestock fertilizers. It is planned to introduce the use of natural biogas in some livestock farms of the country. There is an opportunity to create biogas production even in rural homes. To do this, a large plastic or iron container (to carry out the processing of raw materials used in the production of biogas), another relatively smaller container (biogas formed in the first large container is poured into this container). Through the second vessel, it can be used directly by connecting it to a gas stove or to devices that generate electricity. The second vessel is fitted with a gas pressure gauge, which clearly indicates whether the gas pressure in the vessel is rising or falling. One-third of the large container is filled with natural raw material, one-third of the raw material is mixed, and a certain amount of water is left to rot, and the rest is left empty. In the empty part of the vessel, gas is formed and the natural biogas formed in the second vessel begins to flow. Various catalysts or chemical compounds can also be used to accelerate the decomposition of gaseous raw materials. The main part of biogas consists of methane gas. This means that the production of biogas and its use as heating and electricity is a cheap and convenient, technically safe type of alternative energy even in rural areas. In general, the use of alternative energy sources is environmentally friendly, energy efficient and safe.

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