

NEW TECHNOLOGIES AND RENEWABLE ENERGY SOURCES

PhD Zorka Jugović
Visoka strukovna medicinska škola
Belgrade, Serbia

Mag Zoran Jevremović
Fakultet tehničkih nauka
Svetog Save 65, Čačak, Serbia

PhD Danijela Pecarski
Visoka strukovna medicinska škola
Belgrade, Serbia

ABSTRACT

Modern lifestyles involve increasing use of energy in order to achieve ever greater efficiency and comfort, and therefore the use of energy is increasing every day. At present, most of the energy needs of mankind are settled using very harmful fossil fuels, and in the future, these fuels will have to be replaced by cleaner energy sources in the form of renewable energy sources or nuclear energy. As can be seen from the paper, the available energy has more than enough to cover all possible future energy needs; only it is necessary to find ways of pure and safe exploitation of various energy sources, of course, with the gradual reduction of the influence of oil lobbyists, which on every occasion mines all sources of energy which they do not control financially.

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1. RENEWABLE ENERGY

Renewable energy sources can be divided into two main categories:

- traditional renewable energy sources such as biomass and large hydropower plants,
- to so-called "new renewable energy sources" such as solar energy, wind energy, geothermal energy, etc.

From renewable energy sources, 18% of the world's total energy is obtained (2006), but most of this energy is derived from the traditional use of biomass for cooking and heating - 13 of 18%.

From the large hydroelectric power plants, additional three percent of the energy is obtained. Therefore, when we exclude traditional renewable energy sources, it is easy to calculate that so-called "new energy sources" produce only:

- 2.4% of the total world energy.
- 1.3% of waste is spent on heating water installations,
- 0.8% on electricity production and
- 0,3% on biofuels.

This share in the future should be significantly increased because non-renewable energy sources are getting smaller and their detrimental effect is more and more pronounced in the last few decades.

The Sun delivers 15,000 times more energy to the Earth than mankind thrives at the present stage, but in spite of this, some people on Earth are freezing. From this it can be seen that renewable sources can and must begin to be better exploited and that we do not need to worry about energy after fossil fuels.

The development of renewable energy sources (especially wind, water, solar and biomass) is important for several reasons:

Several technologies, especially wind power, small hydro power plants, biomass energy and solar energy, are economically competitive. Other technologies depend on market demand to become economically viable compared to conventional energy sources. The process of accepting new technologies is very slow and it always seems to be getting away for just a bit. The main problem for the installation of new plants is the initial price. This raises the price of energy received in the first

few years to a level of complete unreliability in relation to other commercially available energy sources.

The most interesting renewable energy sources (wind energy, solar energy, water energy and bioenergy) have been explained on several occasions. Sun's radiation is the main driver of most renewable energy sources, but there are several sources that do not originate from it. These are geothermal energy and energy that can be obtained from tides and tides.

2. GEOTHERMAL ENERGY

Geothermal energy refers to the use of heat from the interior of the Earth. To use this energy, many technologies have been developed, but we can simplify two basic ways: directly and indirectly. Direct use means the use of hot water that comes out (or pumps out) from the underworld. It can be varied: from use in spas, heating houses or greenhouses, for individual processes in the industry (for example, pasteurization of milk). Indirect use of geothermal energy means getting electrical current.

The principle of operation here does not differ significantly from the conventional thermal power plants on coal or oil - the only difference is the way water vapor is obtained. Depending on the water temperature (or steam) in the underground, several different technologies have been developed. The advantage of this energy source is that it is a cheap, stable and durable source, there is no need for fuel, as a rule there are no harmful emissions, except steam, but sometimes there may be other gases.

Weaknesses arise from the fact that there is little space on Earth where the water in the underground is not located at too great a depth - such areas, so-called. geothermal zones are associated with volcanism or boundaries of lithosphere sheets. As these are often and earthquake areas, the construction of the plant itself requires increased costs. They are often distant from inhabited areas, so energy costs are generated, and sometimes they are protected so construction is not allowed (e.g. NP Yellowstone). Among the leading countries are the United States, the Philippines, Mexico, Japan.

3. TIDAL ENERGY

The tide and tide energy come from the gravitational forces of the Sun and the Moon. For now, there are still no major commercial reach on the exploitation of this energy, but the potential is not small. This energy can be obtained where the seas are extremely pronounced (for example, there are places where the difference between the tide and the tide is greater than 10 meters).

The principle is simple and very similar to the hydro power plant principle. At the entrance to a bay, a dam is set up and when the water level rises, it passes through the turbine to the bay. When the dam is filled, the dam closes and the water level is falling. Then, by the same principle, water is discharged out of the bay. In a simpler case, water is passed through turbines only in one direction, in which case turbines are simpler (one-way, not two-way). The main problems with such exploitation of tidal and tidal energy are instability (it is necessary to wait for the water level to rise sufficiently or fall sufficiently) and a small number of sites suitable for exploiting such a form of energy.

4. WAVE ENERGY

Wave energy is a form of transformed solar energy that creates constant winds in some parts of the Earth. These winds cause constant corrugations in certain areas, and these are places where the use of their energy can be exploited. The big problem with such energy exploitation is that the power plants should be built on the open sea, because the waves are weak in the vicinity of the coast.

This significantly increases the cost of construction, but the problems of transferring this energy to the users also arise. The results in the current phase came to prototypes and demonstration devices.

The amplitude of the wave must be large enough to make the conversion more efficient.

5. WIND ENERGY

Wind energy utilization is the fastest growing segment of energy production from renewable sources. In the last few years, wind turbines have been significantly improved. The best example is the German turbine market, where the average power of 470 kW in 1995 increased to 1280 kW in 2001. This increase in power was achieved by correspondingly increasing the size of wind turbines.

Currently they are developing turbines that will be able to generate power between 3 and 5 MW. Some manufacturers have already presented their prototypes in this power class (the German company Enercon should produce a 4.5 MW turbine). In the texts we will most often find the term

windmill because of the spread of this expression in our country. Wind power plants, wind turbines, electric wind turbines and the like are still used.

Due to the initial economic inefficiency and the lack of wind, the installation of windmills is a privilege affordable only by rich countries. At present, the price of a wind turbine is higher than the price of a thermal power plant per MW of installed power (wind turbine costs about 1000 €/kW installed capacity, and the thermal power plant 700 €/kW), but with the development of technology this difference is getting smaller.

The total energy consumption in the world is estimated at around 410×10^{15} (Quadrillion Btu) in 2000, which is 1.2×10^{14} kWh per year. Total installed power of wind farms by the end of 2000 was envisaged at 17415 MW, with an average annual operation of 2,500 hours of power plants, which gives 0.044×10^9 kWh of annual available amount of energy. Therefore, the share of vertices in total energy consumption is very small.

Germany is the current leader in the production of wind power from 8750 MW, which is more than one-third of the total installed wind power in the world. The number of installed windmills in Germany is the result of the German government's policy that promotes the installation of new capacities through incentive measures. Therefore, in 2001, the total installed capacity increased by 43.7%. In Spain, Denmark and Italy, the installed capacity is also growing. Of the total electricity production, Denmark receives 14% of the wind and continues to build new capacities at an accelerated pace. Denmark's intention is that by such an approach, by 2030, 50% of household energy needs will be met with the use of wind energy. In the US, 6.374 MW wind turbine is currently installed. So little installed power in the economically strongest country of the world is a result of traditional US reliance on fossil fuels. In Serbia, there are no major achievements in this area.

6. ENERGY OF THE SUN

The Sun is our closest star and, directly or indirectly, the source of almost all available energy on Earth. The solar energy comes from nuclear reactions at its center, where the temperature reaches 15 million °C. It is a fusion, in which helium is formed by the coupling of hydrogen atoms, with the release of a large amount of energy. Every second in this way, helium exceeds 600 million tons of hydrogen, with a mass of some 4 million tons of hydrogen converted into energy. This energy, in the form of light and heat, is expanding into space, so one of its little parts comes to Earth.

The basic principles of direct exploitation of the Sun's energy are:

- solar collectors - hot water preparation and room heating
- Photovoltaic cells - direct transformation of solar energy into electricity
- Focus on solar energy - use in large power plants.

Solar collectors convert solar energy into the heat energy of water (or some other liquid). Water heating systems can be either open, in which the water to be heated passes directly through the collector on the roof, or closed, in which the collectors are filled with a non-freeze liquid (e.g. antifreeze). Focusing on solar energy

The focus of solar energy is used to drive large generators or heat generators. Focusing is achieved by a plurality of lenses or more often with mirrors arranged in a plate or in a tower configuration. Many configurations use a computer-controlled mirror field to focus the sun's radiation on the central tower, which then runs the main generator. So far, demonstration systems have been designed with an output power exceeding 10 MW. These new systems also have the ability to work overnight and in bad weather by storing hot liquids into a very efficient container (some type of thermal bottle). "Dish" systems monitor the movement of the Sun and thus focus on solar radiation. There is also a Trough solar radiation focusing system, which can be very effective. Such power plants can be very strong: in California, a 354 MW power plant has been installed. When there is not enough energy from the sun, systems that focus on solar radiation can be switched to natural gas or some other source of energy without major problems. This is possible because we use the Sun to heat the fluid, and when there is no Sun, we heat the liquid in no other way. The problem of focusing is the large space required for the power plant, but this is solved by making the power plant, for example, in the desert. In the deserts, the strength of the sun's radiation is the most pronounced. The big problem is the price of the mirror and the focus system.

7. BIOENERGY

Biomass is a renewable source of energy, and it is made up of numerous plant and animal products. It can be converted directly into energy by combustion and thus produce water steam for heating in industry and households, but also to receive electricity in small thermal power plants. Fermentation to alcohol is the most developed method of chemical conversion of biomass. Biogas produced by fermentation without the presence of oxygen contains methane and carbon and can be used as a fuel, and other modern methods of using biomass energy include pyrolysis, gasification. The main advantage of biomass in relation to fossil fuels is the lower emission of harmful gases and wastewater. Additional benefits are the disposal and utilization of waste and residues from agriculture, forestry and timber industry, reduction of energy imports, investments in agriculture and underdeveloped areas, and increased security of energy storage. It is projected that by the middle of the century, the share of biomass in energy consumption will be between 30 and 40 percent.

8. BIOFUELS

Lately, biofuels are increasingly becoming a substitute for traditional fossil fuels, and most politicians speak of it as a perfect renewable source of energy that anyone can produce and thus reduce dependence on energy imports. Although the story of the decrease in the dependence on energy imports is present, a little more detailed study of the origin, properties and ways of exploiting biofuels results in the conclusion that biofuels are extremely dangerous for the development of humanity.

Namely, the production of biofuels is actually a direct conversion of food in oil, so additional demand for some foods could increase the price of food and thus directly affect the increase in global hunger, as higher prices mean lower availability of this food to poorer countries.

9. CONCLUSION

Modern lifestyles involve increasing use of energy in order to achieve ever greater efficiency and comfort, so the use of energy is increasing every day. At present, most of the energy needs of mankind are settled using very harmful fossil fuels, and in the future, these fuels will have to be replaced by cleaner energy sources in the form of renewable energy sources or nuclear energy. As can be seen from the paper, the available energy has more than enough to cover all possible future energy needs; only it is necessary to find ways of pure and safe exploitation of various energy sources, of course, with the gradual reduction of the influence of oil lobbyists, which on every occasion mines all sources of energy which they do not control financially.

Due to its increasing impact on everyday life and on the quality of life, energy has become the main strategic resource of developed countries. In the past, various wars have been triggered by lack of water, food shortages, direct danger, religious incentives, or a simple increase in territory.

This occupation and the increased need of the developing countries to the rest of the world brought about a significant increase in the prices of all oil products, which later indirectly affected the prices of almost all products. New and renewable energy sources will likely become primary sources of energy in the future, and thus the wars for energy become a past, and the world itself should become a more peaceful place.

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