

*L. Varizhuk, Master student*  
*Z. Shelest, PhD in Biology, Ass. Prof., research advisor*  
*N. Kurnosova, PhD. in Phil., Ass. Prof., language advisor*  
*Zhitomir state technological university*

## **RENEWABLE ENERGY SOURCES AND THEIR POTENTIAL IN UKRAINE**

It is considered that a comprehensive use of the renewable energy sources (RES) which have huge resources is one of the most perspective directions of power production development in the 21st century.

RES (resources that are replaced by natural process and can be used forever) include tidal, geothermal, hydro, solar and biomass energy. In Ukraine there are favourable natural conditions for developing RES production. Wind power is an important part of overall RES for the future. Modern wind mills have become very efficient at transferring the energy of wind to electricity. Due to favourable wind conditions an intensive wind development has taken place in Ukraine. At present, there are eight wind power stations in the Crimea, Priazovye and in the Carpathian region.

Power generation projects also include hydropower generation. Nowadays, hydropower supplies about one-fourth of the world's electricity. Ukrainian hydroelectric power plants produce about 30 TW/h. Small-scale hydroelectric plants on small rivers were found to be more perspective in terms of production cost. They make only a small contribution because of the lack of suitable sites, high production costs and irregular output that varies daily.

The use of solar energy can be divided into two main directions: to generate heat, and to generate power. The annual technically achievable energy potential of solar energy is equivalent to 6 million. t. of conditional fuel. In Ukraine the average annual quantity of the total solar radiation coming upon 1 sq.m of surface ranges from 1070 kW h/sq.m in its northern part to 1400 kW h/sq. m and in the south.

Biomass power is used in bio-energetics in burning, pyrolysis, gasification, an anaerobic fermentation with formation of methane, production of alcohols and oils to receive engine fuel. In Ukraine biomass is mainly used to produce heat and/or hot water by burning. The technical potential of biomass use ranges from 126 to 162 TW / h or 195 TW/h. It is believed to be more cost efficient and less detrimental to the environmental.

The main sources of geothermal energy are: Earth normal superficial heat at the depth from several tens to hundreds meters; hydrothermal systems; the parogidrothermal systems; petrogeothermal zones or dry rocks heat; magma. In Ukraine the most wide-spread and developed is geothermal energy in hot water reservoirs. It's technical potential is roughly estimated at 100 TW/h.

Ukraine has enough RES to supply all its needs forever; however, the challenge is to develop the capability to effectively and economically capture, store and use the energy when needed.