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ALTERNATIVE ENERGY: SOME ISSUES OF GENERATING ENERGY FROM BIOFUELS

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Potential alternative energy sources today may include: hydrogen, solar energy, wind energy, tidal energy, geothermal energy and biofuels. Biofuels are produced from biological raw materials. This fuel can be liquid, solid and even gaseous.

This fuel can be in three aggregate states (three distinct physical forms) liquid, solid or even gaseous. Research has long been under way in the world to find new alternative fuels. Their types can be very different. In Germany, for example, carcasses of dead animals, waste of material, rape, fish oil and kitchen waste are used.

Scientists in more than 50 countries around the world are developing and introducing biofuels for energy. Biofuel energy is divided into biodiesel (fuels derived from oilseed crops) and bioethanol (alcohol derived from cellulose-containing waste).

For example, synthetic gasoline can be produced at a wastewater treatment plant: sewage waste is discharged into the septic tanks, where it is fermented and biogas is produced, which is usually released into the atmosphere.

On average, about 10 million cubic meters of biogas are produced by each one million inhabitants per year, and about 5 million liters of synthetic gasoline can be obtained [1].

Currently, in the structure of alternative energy in the world, biomass energy averages about 13%. In 2003, the European Parliament adopted directives «On measures to stimulate the use of biofuels and other renewable fuels in the transport sector». These directives provided for an increase in the share of biofuels to 10%. However, it should be noted that the cost of energy is more expensive than traditional.

Comparison of production costs of different fuels in table 1.

Table 1

Comparison of production costs of different fuels

Fuel type	Euro per litre of fuel equivalent
1. Biodiesel fuel from:	
- rape;	0,62
- rape oil	0,5
2. Bioethanol from:	
- sugar-cane;	0,3
- corn;	0,7
- sugar-beet	0,85
3. Biomethane (biogas)	0,74
4. Synthetic biofuels	1,00
5. Petrol	0,36

There is also interest in solid biofuels, which may be granules, briquettes that are produced from biomass through processing and compression. This fuel is used in everyday life and for the production of electricity in electric power station. Today, coal and gas are used as fuel for thermal station in Ukraine. However, we can develop the use of biofuels at stations.

The main species are briquettes and pellets, which are produced by special technologies of wood, husks and agricultural meadows. In 1930, a patent was issued on equipment allowing the pressing of sawdust into special types of brackets. In the 21st century, only 1 million pellet boilers were manufactured in the United States alone. The global pellet market is also growing, with a volume of 17,500,000 tons in 2018 and 29,000,000 tons in 2023. The expert agency Future Metrics provides such assessments. These factors indicate that fuel from biological raw materials has a huge impact on the global energy market [3].

The classic recycling scheme and biomass energy application techniques are shown in figure 1.

The prospects for the biofuels industry in Ukraine are quite high because the industry is now at low level.

In reality, the domestic industry ignores the potential of biofuels and shows indifference to the unfavorable domestic pricing policy for gasoline. The transition to alternative energy sources, even at high prices for traditional energy sources, does not occur. The producers of the goods in the output prices automatically include increases in fuel prices.

Unfortunately, most of the exported grain goes to animal feed or bioethanol production in Europe. The ever-increasing importance of biofuels in the world's energy sector pays special attention to countries with a sufficient number of sown areas. A special place here can be taken by Ukraine.

The development prospect for the national market for bioethanol and biodiesel lies in two directions: consumption primarily of biofuels domestically and production of biofuels for export [4]. One direction may be a national decision that, for example, 5% of the motor fuel should be bioethanol or locally produced biodiesel. In this way, improved gasoline production can be encouraged, as even the use of bioethanol in a mixture with conventional fuel improves the environmental performance of the latter [5].

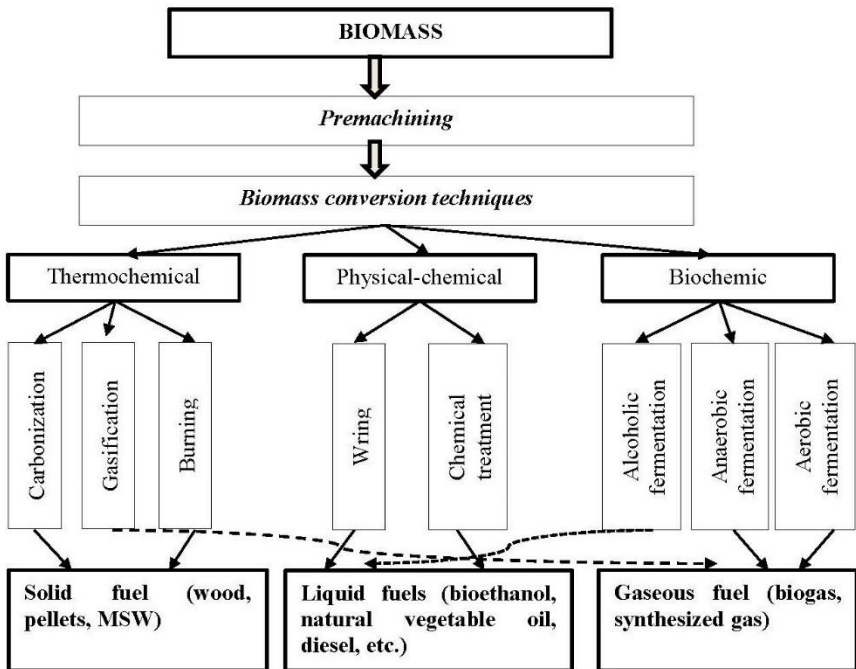


Fig. 1. Recycling scheme and biomass energy application techniques

Using the existing potential with state support and the availability of an appropriate regulatory framework will increase the profitability of the agricultural sector, and the construction of plants for the production of bioethanol and biodiesel will create new workplaces for people in Ukraine. It is important for the energy and economic sectors of Ukraine.

References:

- [1] Pantelieieva, I.V. (2018). *State of development of energy based on biotechnology*. Taurida National University. Series «Technical science». Issue 29 (68). 42 № 1. P. 85-90.
- [2] Horbunoka, N.A., Baburyna, M.Y. & Yvankyn, A.N. (2008). *The main directions in the production and consumption of biofuels in the world and the prospects for processing fat-containing raw materials and waste from the meat industry into biodiesel*. Vse o miase, № 1. P. 10-16.
- [3] *Enerlobalans*. Retrieved from <http://www.energobalans.com/index.php?page=text/file.php>
- [4] Коробко, Б. Жовнір, М. (1999). *The concept and main objectives of the sectoral renewable energy program*. Energy and Electrification, № 7. P. 33-41.
- [5] Pantelieieva, I.V., Shmatko, N.M. (2016). *The current state of economic development of micro-hydro power plants in the world*. Visnyk NTU "KhPI": Collection of scientific papers. Series: Economic sciences. Kharkiv: NTU "KhPI", 2016. № 47(1219). – P. 101-104.