

## **BIOFUELS: POTENTIALS AND SOLUTIONS**

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Diesel pollution is typical for all-natural environments - air, soil and water. It occurs in different ways, but has the same effect on the change of population mortality - it increases with the growth of petroleum fuel consumption. One possible solution to this problem is biofuel.

Biofuels may be used in cars, trucks, airplanes, and marine transportation as an alternative to traditional petroleum fuels. It can be used to generate electricity and heat on farms and industrial plants. Sometimes biofuels can be used to heat and power buildings.

The most popular types of biofuels are biodiesel and bioethanol.

Ethanol can be obtained from biomass by hydrolysis and fermentation of sugars. To extract sugars from the biomass, it is pretreated with acids or enzymes to reduce the size of the feedstock and restore the structure of the plant. Cellulose and hemicellulose are broken down by enzymes or dilute acids to sucrose, which is then digested into ethanol.

Biofuel feedstocks include vegetable oils: rapeseed, soybean, peanut, palm, sunflower, olive, and animal fats. Thus, the source of biofuels is a renewable resource, and the plants that serve as feedstock for biofuels improve the structural and chemical composition of soils in crop rotation systems.

Plant-based biofuels are the cheapest and most accessible renewable sources of energy. Plants provide a large increase in biomass, ten times higher than the consumption of fossil fuels, but unlike petroleum, plants absorb carbon dioxide from the air to grow, so burning biofuels does not cause the greenhouse gases accumulation in the atmosphere [1].

Biofuels can be used either blended with conventional fuels or in pure form to replace these fuels. For example, biodiesel can be added to conventional diesel fuel or used instead of it in certain proportions, and bioethanol replaces gasoline.

The potential reduction of greenhouse gas emissions is one of the main reasons, especially in Europe, for using biofuels as an alternative to conventional transportation fuels. In other countries, biofuels are supported to a greater extent because of their potential to increase energy security, i.e. to reduce dependence on energy imports.

According to the International Energy Agency, there was a significant increase in biodiesel and renewable diesel production in 2021 compared to 2019. This growth is driven by demand for renewable diesel in the US and biodiesel in Asia.

In Belarus, biomass accounts for 97% of renewable energy sources. Mainly, it is wood, and about 3% is solar and wind energy. Fuel pellets made from local fuel have become a promising area [2]. Biofuels play an important role in agriculture and energy sector. Biofuels are produced in the country from agricultural crops such as rapeseed, sunflower, and others. Biofuels are used to produce biodiesel, electricity and heat.

In addition, a program of the Belarusian government encourages the production and use of biofuels as part of sustainable development and reducing dependence on petroleum products.

Despite the benefits, biofuels have disadvantages. Growing plants for biofuel production can be competitive with food production and can increase food prices. It requires large areas of land, which can strain and destroy ecosystems. Growing plants for biofuel production uses large amounts of water, which can result in water scarcity and conflicts over water. In addition, growing plants for biofuels may require the use of fertilizers and pesticides, which can lead to soil and water pollution. Biofuel production can cause soil erosion processes.

However, despite all the advantages, the production and use of biofuels requires careful analysis and consideration of their potential negative impacts on the environment, social welfare and economy.

## References

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