УДК 681.3

ENERGY EFFICIENCY AND ENVIRONMENTAL FRIENDLINESS OF THE SUGAR PRODUCTION IN UKRAINE

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Sugar production might have a negative impact on ambient air, soil and water resources. The using in high-temperature technological processes of sugar production fuel, electricity, and pulp storage result in the emissions of greenhouse gases [1]. In addition, in the sugar industry limestone is used; the process of its decarbonization causes to CO_2 emissions. These processes are carried out in the following main departments of the sugar plant: diffusive, juice-cleaning, evaporating and crystallization. The pulp is a by-product of sugar production. When it is stored in landfill pits, landfill gas releases containing methane.

Increasing the efficiency of using energy resources with obtaining maximum output and reducing the yield of pulp allow reducing fuel consumption at the heat plant and improve the environmental friendliness of the sugar production. Modernization of equipment and control systems will reduce carbon dioxide emissions from the combustion of natural gas or coal, the use of electricity from the Ukraine's unified power system, the consumption of limestone and the formation of methane.

Implementation of biogas facility to reprocess pulp is promising. Using the biogas obtained will also reduce the need for energy sources. In addition, increasing purity of diffusion juice will decrease the need for limestone. Further energy efficiency measures include improving thermal insulation, implementation preheating diffusion juice, installing frequency converters, etc. These ways ensure emission reduction of toxic SO_x, NO_x, CO and particulate matter (combustion products) as well [2].

The analysis revealed the following possible effects of sugar production on the environment: impact on the water bodies through wastewater discharges with high biochemical oxygen demand (BOD); impact on the ambient air through emission of pollutants and greenhouse gases; impact on the soil and biodiversity is slight.

The analysis showed that the implementation of efficient smart automated process control systems for sugar plant management might significantly improve energy efficiency, which in turn has considerable environmental benefits.

References

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