

**СЕКЦИЯ «ГОРНОЕ ДЕЛО, ИНЖЕНЕРНОЕ ДЕЛО,
ИНЖЕНЕРНАЯ ЭКОНОМИКА»**

УДК 621.313

INCREASING EFFICIENCY OF BIOGAS PRODUCTION

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Biogas technologies are the perspective direction for renewable energy production. Those technologies permit to decrease green houses gases emissions, to obtain electricity and heat energy for heating of productional facilities, green houses and communal sector, to produce high-value organic fertilizer (bio-humus), to partly substitute using of mineral fertilizers.

In spite of many advantages of biogas technologies, it is very essential to estimate and correct several groups of factors influenced the efficiency of biogas production in modern conditions. There are some necessary conditions must be controlled during planning and running stages of biogas plant function.

The first one group of factors is optimization of biogas plant logistic. It is very important for building and functional periods for biogas production function. In the aim of persistent function of biogas equipment, it is obviously to have enough organic raw materials resources. So, it is the best variant to place biogas plants in the nearest distance from sources of potential organic substrates resources. Optimal infrastructure of approaching roads and places of storage of organic substrates must be ensured.

The second important group of factors is assessment the quality of organic substrates used. It is essential condition to assess organic substrates in objective form for its qualities to produce methane because methane may be produced only from the organic part of the substrate and only from its dry part. So, ratio between dry organic content and general organic mass is the first and most important criteria during organic raw materials choice.

The third important group of factors in increasing biogas production is the objective assessment of installed electric capacity of biogas plants

planned for building and correction the indicator for plants in running. It depends on enough organic raw materials wastes resources and necessary infrastructure of approaching roads and other infrastructure and logistic issues.

The fourth necessary condition for effective biogas production is pre-treatment of organic substrates used. Microorganisms take place in biogas production demand strict conditions for their effective function. Otherwise biogas production process may be slowed down or stopped entirely if conditions are not suitable. It is very wrong (and impossible) result.

The fifth necessary condition. Biogas produced by anaerobic digestion of organic substrate contains many unnecessary and toxic substances. Besides CH_4 , as usually biogas may content CO_2 , N_2 , H_2S , H_2 , O_2 , volatile organic compounds, siloxanes, halogen-carbons, water vapor which is seem to be contaminants. Some toxic substances (ammonia, hydrogen sulphide) are known as inhibitors for methanogenesis bacteria function so, they greatly decrease biogas production effect. We must prepare biogas for its future using. Toxic substances mentioned above, must be under strict control and be deleted from biogas. Only previously pre-treated biogas may be used as a resource for heat and electric power production.

It may be some other groups of factors [1].

We may conclude that in purpose to increase efficiency of biogas production and ecologic advantages realizing in Republic of Belarus it is necessary to implement universal analysis of following groups of factors: 1) optimization of biogas plants logistic; 2) assessment of the quality of organic substrates used; 3) objective assessment of installed electric capacity of the biogas plants planned for building and in running; 4) pre-treatment of organic substrates used; 5) pretreatment of biogas used for heat and electric power production purposes.

References

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