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ENERGY EVALUATION OF OPERATION BOILER JSC «PEAT BRIQUETTE PLANT "LIDSKIJ" WITH RESEARCH OF FUEL BASED ON "PEAT-WILLOW"

The problem of energy supply in the nearest future will become one of the most significant both at the global and local level especially for countries limited in its own resources. Rising rates of fossil energy consumption and their limited stocks force many European countries to develop national programs aimed at finding new energy sources. One such source can be wood of growing varieties providing biofuel output to 3-4 years from beginning of planting of production plantation. In our latitudes there are willows, aspens, poplars. So in Belarus within the framework of Resolution of Council of Ministers "On approval of National Programme for development of local and renewable energy for 2011–2015" dated 10.05.2011, № 586 creation of forestry organizations in addition more than 1 thousand hectares (2011–1176.2 ha) plantations of fast-growing wood and shrub species for fuel and energy purposes are provided.

The interest in fast-growing tree plantations to a large extent is caused by their high environmental potential. During growth trees provide oxygen production and carbon dioxide absorption, which is released by biomass burning in amount equal absorbed during growth. It means that carbon dioxide zero balance is realized. That’s why particular interest is the willow as a plant is able to grow under conditions of high humidity, on different types of soil including types of soils which are characterized by low levels of fertility and opposite high content of organic and mineral contaminants. Willow can be used for creation zones of purification on places of former dumpsites and industrial areas. In addition, the willow provides a minimal cost for energy in comparison with other energy crops.

The aim of study is energy evaluation of operation of boiler JSC "Peat Briquette Plant "Lidskij" with research of fuel which is a mixture of peat and wood chips of fast-growing willow with chip share from 5 to 50%.

To achieve this aim following main tasks have been solved:

- natural moisture, ash content of fractions of woody biomass and specific calorific value of dry fractions of woody biomass are defined;
- calibration thermal and aerodynamic calculation of boiler unit KE-10-14C of boiler room of "Peat Briquette Plant "Lidskij" during operation on base fuel (milled peat) and during co-firing peat with fast-growing willow for different percentages of peat-willow was done with analysis of results;
- calculation of emissions of pollutants into the atmosphere for basic and project variants was done with analysis of results.

Study results showed that increasing content of willow chips in fuel leads to increase of boiler efficiency from 83,03% for 5% chips in mixture to 84.95% for 50% chips in mixture. Fuel consumption is reduced from 0.880 kg/s for 5% chips in fuel to 0.830 kg/s for 50% of wood chips because fuel combustion heat increases.

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BARIERS OF RENEWABLE ENERGY DEPLOYMENT

Governmental policies play a crucial role in accelerating the deployment of renewable energy (RE) technologies. Energy access and social and economic development have been the primary drivers in most developing countries whereas secure energy supply and environmental concerns have been most important. RE policies have promoted an increase in RE capacity installations by helping to overcome various barriers. Barriers specific to RE policymaking, to implementation and to financing may further impede deployment of RE. A wide application of RE would require policies to address these barriers, and to help to overcome challenges such as the lack of infrastructure necessary for integrating RE into the existing system.

It is possible to classify the mentioned barriers as follows:

- Techno-economic barriers;
- Non-economic barriers (regulatory and policy uncertainty barriers, institutional and administrative barriers);
- Market barriers;
- Financial barriers;
- Infrastructure barriers;
- Lack of awareness and skilled personnel;
- Public acceptance and environmental barriers.

Techno-economic barriers relate to the direct costs of a certain technology in comparison to competing technologies.

Non-economic barriers relate to factors that either prevent deployment altogether (no matter how high the willingness to pay) or lead to higher costs than necessary. These barriers can be differentiated further:

Regulatory and policy uncertainty barriers, which relate to bad policy design, or discontinuity and/or insufficient transparency of policies and legislation.

Institutional and administrative barriers, which include the lack of strong, dedicated institutions, lack of clear responsibilities, and complicated, slow or non-transparent permitting procedures.

Market barriers, such as inconsistent pricing structures that disadvantage renewables, asymmetrical information, market power, subsidies for fossil fuels, and the failure of costing methods to include social and environmental costs.