

# Advanced low-carbon technologies of the waste (local fuel and energy resources) utilization

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Biofuel using is one of the main directions for the development of carbon-free energy. Biomass includes peat, wood and agricultural waste and various types vital activity waste. Biomass is a CO<sub>2</sub>-neutral product. During the growth period, plants absorb carbon dioxide from the atmosphere, the same amount of these gases is released when biomass is burned. Waste biomass represents a significant resource for the carbon neutral energy production. Gasification and pyrolysis processes are currently used to convert biomass into gas fuel. Despite the fact that technologies for producing gas fuels from biomass were developed about 200 years ago, due to certain limitations, these technologies have not received wide industrial application. In JIHT RAS a new technology for converting biomass into gas fuel was developed. The gas produced by this technology consists, on average, of 90% of CO and H<sub>2</sub> and meets all the requirements for fuels for carbon-neutral energy, i.e., its characteristics are analogous to the using of hydrogen as a fuel. Using the developed approaches, processing of various types of biomasses can be carried out. As it was shown according to the performed estimates, from an economic point of view the use of energy gas obtained by the developed technology for the generation of electric and thermal energy is more profitable in comparison to traditional ways using fossil fuels.