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# PRODUCTION OF SYNTHETIC MOTOR FUEL FROM HARD COAL USING VARIOUS GASIFICATION METHODS

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*The purpose of the article is to assess the feasibility of organising the production of synthesis gas from low-metamorphosed hard coal, the reserves of which in Ukraine reach 28 billion tonnes, which exceeds 60 % of the total available reserves. As a raw material base, the article considers the long-burning coal of Western Donbas, located in the Dnipro region, where powerful coal mining and enrichment enterprises operate.*

*To achieve this goal, we analysed the world's most common coal gasification technologies: the Lurgi process (countercurrent steam-oxygen gasification of coarse coal (or briquettes) in a stationary bed), the Siemens process (direct-flow steam-oxygen gasification in a pulverised coal stream), and the Texaco process (direct-flow oxygen gasification in a water-coal pulp stream).*

*For each of these processes, material balances were developed, the quality of the synthesis gas produced, the possibility of organising the production of the necessary energy resources, the level of emissions of harmful substances into the atmosphere, and the main technical and economic indicators were assessed. The calculations were performed for an enterprise with a coal capacity of 550 thousand tonnes of working weight per year.*

*Based on the calculations, the Texaco process is recommended for industrial implementation. The advantages of this process are the absence of a stage of steam production for gasification, the scarcity of the water cycle, which virtually eliminates the formation of wastewater and the possibility of using contaminated water from other sources for gasification; the highest total content of hydrogen and carbon monoxide in the synthesis gas produced; the maximum utilised capacity of production reactors and the largest number of capacities created in the world using this technology; utilisation of the heat of the gas produced to generate a large amount of electricity and heat.*

Keywords: hard coal, Western Donbas, gasification processes, gasification indicators, synthetic motor fuel.

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