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CO_2 CAPTURE AND ITS INFLUENCE ON ENERGY AND ECONOMIC EFFICIENCY OF A COAL FIRED POWER PLANT

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Abstract

Currently**,** conventional energy sources i.e. fossil fuels represent the main segment as regards electricity generation. Thus, their contribution to global CO_2 emissions is considerable. This study considers carbon capture and storage (CCS) as a promising solution for the environmental problems we are now facing. Based on previous research, post-combustion capture (PCC) has been recognized as being the more appropriate technology for CO_2 capturing from the existing power plants. The main purpose of our study was to investigate the correlation between the efficiency of carbon dioxide capturing and its influence on the reduction of electricity production efficiency and levelized cost of electricity at the new unit VI of the thermal power plant of TE Šoštanj, Slovenia. A zero-dimensional model was used for appropriately considering the flows of mass and energy within the PCC system as a function of carbon dioxide capture efficiency and a rather simple cost model was applied for predicting the additional levelized electricity cost due to PCC system implementation. By changing the efficiency of the capture system, as well as the evaluated prices of carbon emission coupons, our results show the possible economic eligibilities of the PCC system in the future.

Key words: carbon capture and storage, CO_2 reduction, economic efficiency, energy efficiency

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