



# **23 European Symposium on Computer Aided Process Engineering: Heat Exchanger Network Design and Economic Analysis for Coal-fired Power Plant retrofitted ... (Computer Aided Chemical Engineering)**

*Salihu Adamu Girei, Meihong Wang, Aminu Alhaji Hamisu*

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Addition of CO<sub>2</sub> capture unit to an existing power plant to satisfy environmental regulations has adverse effects on the energy efficiency of the power plant. Heat integration through proper design of heat exchanger network (HEN) remains the most effective way to reduce this energy penalty as well as reducing CO<sub>2</sub> emission. Pinch technology remains the most widely used techniques due to its physical insight. This paper aims to present HEN design and economic analysis for power plant retrofitted with post-combustion CO<sub>2</sub> capture. The benchmark presented is based on the recent work of Khalilpour and Abbas (2011) (i.e. ). Improvements to Khalilpour and Abbas (2011) include: (1) the use of cost and economic data to evaluate achievable trade-offs between energy, capital and utility cost. This is to determine the optimal minimum temperature difference; (2) redesigning of HEN with the newly determined minimum temperature difference and (3) its comparison with the HEN design presented in . The results show that the energy penalty imposed on the power plant with CO<sub>2</sub> capture plant can be reduced through heat integration of HEN, thus utility cost savings was maximized and the cost of addition of HEN was recovered within a short payback period of about 2.8 years.

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