

Integration of gasification and NG reforming processes for enhancing the power plant performance with CCS technology

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Integrated gasification and combine cycle (IGCC) technology is considered as the most suitable process to generate both power and hydrogen effectively with a better control on greenhouse gas emissions. In this study process, a novel idea of integrating IGCC with natural gas reforming is proposed for making the process more reliant. Two case studies have been developed and compared in terms of both process performance and economics. Case 1 is based on the conventional IGCC process, whereas, case 2 presents an idea of integrating gasification unit with the natural gas reformer. The syngas generated in the gasification process is fed to the reforming section at higher temperature that brings all the heat required for reforming process without any external heat source. Moreover, the high enthalpy steam in the syngas is used to convert an additional methane to hydrogen gas. The results showed that the case 2 design offers approximately 8 % higher process efficiency compared to case 1 design. Moreover, case 2 also offers a reduction in both CO<sub>2</sub> specific emission and the cost of electricity.