Economic Evaluation of CO_2 Capture in IGCC Power Plant with Emission Credit Consideration

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Integrated coal Gasification Combined Cycle (IGCC) power plant is a technology for the power generation in which the coal is gasified to use in both steam turbine and gas turbine. Recently, IGCC is in the spotlight as a suitable plant for carbon capture by using pre-combustion which has low efficiency loss and high capture efficiency. With the rise of the emission trading scheme, the assessment of revenue and loss by carbon capturing in IGCC is needed.

The study investigates the cost-benefit of the IGCC plant with carbon capturing system compared to the IGCC without capturing. So, we simulate two processes and execute the economic analysis to calculate total cost by Aspen Plus. Selexol, which is widely used as an acid gas removal process through the physical absorption, is used for capturing H_2S and CO_2. Though there are losses from the additional cost, the revenue from the emission credit trading can exceed these losses. Finally, we can find the even-point; emission credit level which generates the economic benefit through the installation of carbon capturing system. The result would be an index of cost comparison to apply carbon capturing system in IGCC.