# Semi-analytical Method for Determining Optimal Stripper Pressure in $CO_2$ Capture and Liquefaction Process Using Monoethanolamine (MEA)

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Operation pressure of distillation column is one of the keyvariables for optimizing the required energy in a carbon capture and storage (CCS)chain. It affects the steam drag point in power plant, the regeneration energyin capture process and the compression energy in liquefaction process. A newsemi-analytical method for determining optimal stripper pressure for CCSprocess using MEA as an absorbent is proposed based on the integratedsimulation model. Total required energy is represented as a function of thepressure based on the equivalent work. The results show that the compressionwork can be reduced at high pressure and the total energy can be represented asa decreasing function of the stripper pressure. The evaluated optimal pressuredecreases as the terminal pressure increases, showing the crucial condition fordetermining operation pressure of stripper depends on the terminal pressure ofliquefaction process. It is also shown that a general analytical solution foroptimal pressure including both the capture and the liquefaction process cannotbe evaluated by differentiation based on Abel Ruffini theorem.