

Techno-economic analysis for CO₂ reforming of landfill gas in a membrane reactor for various H₂ production capacities

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A membrane reactor (MR) was employed for CO₂ reforming of landfill gas (LFG) as a new method to produce H₂ at various production capacities. Aspen HYSYS[®], a commercial process simulator, was selected to develop the reforming system and economic analysis was performed based on process simulation results. Itemized cost estimation based on capital and operating costs, sensitivity analysis to determine influential economic factors, and probability analysis using a Monte-Carlo simulation method to compensate uncertainty in premature technology were used extensively to evaluate a proposed process. In addition, cash flow diagram was constructed for H₂ production capacities of 30 and 300 m³ h⁻¹ to assess economic feasibility for CO₂ reforming of LFG in a MR. It was found that a MR can provide an economically feasible option for H₂ production depending on discount rate and H₂ production capacity.