

### Design Optimization & Profitability Analysis of MCFC/Turbines Hybrid Systems

윤좌문\*, 김성훈, 백승호, 김태희, 이기풍, 이태원  
두산중공업  
(choamun.yun@doosan.com\*)

Fuel cell technology is drawing attention for clean and efficient electricity production from fossil fuels. Among several types of fuel cell, MCFC (molten carbonate fuel cell) has large scale and high-temperature (about 650°C) operation characteristics, which provides the possibility of cogeneration with other types of power generator such as gas turbines & steam turbines. Optimized models of MCFC/Turbines hybrid systems were developed by combining gas turbines and steam turbines with MCFC. MCFC was modeled based on that developed in Doosan Heavy Industries & Construction and commercialized models were adopted for other components, i.e., gas turbine, steam turbine, HRSG (heat recovery steam generator), and etc. Profitabilities of the developed models were compared with that of NGCC (natural gas combined cycle) because all these system use natural gas as raw material. The comparison reflected profit change by government subsidy policy, uncertainty in market & raw material price. This study will contribute to improving competency and flexibility of MCFC applications in the uncertain market.