

Development of an integrated model for power supply and CO₂ control (IMPSCC) responding to climate change in fired-power plants

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CO₂, which has recently gained attention as a primary GHG (Greenhouse gas) because of global climate change, is emitted from the combustion of fossil fuels. Especially, electricity generation of fired-power plants, which is the most cost-effective way, occupy about 40 percent of CO₂ emissions from fossil fuel use. Thus, the economic operation of electricity generation while meeting mandated requirement of reducing CO₂ emission is an eminent issue. Therefore, the objective of this study is to develop an integrated model for power supply and CO₂ control (IMPSCC) for planning the GHG mitigation measures, such as CO₂ emission trading, Efficient energy use, and CCS (carbon capture & storage), within energy and environmental management system of fired-power plants. The IMPSCC determines where and how to much power to supply and sell for energy management system, and where and how to much CO₂ to control for environmental management system, in order to maximize the combined annualized profits while meeting the CO₂ emission permit requirement. The developed model is applied to case studies of Korean CO₂ scenarios in 2020.