CO_2 Treating System with LNG Utilization

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A novel CO_2 treating system for coal power plant is proposed. This process adapts a combined cycle with supercritical CO_2 Rankine cycle and Brayton cycle into the conventional CO_2 amine capture process. The Rankine cycle utilizes LNG as cold sink while the LNG is evaporated. By coupling the LNG evaporation process, the condensation process of the Rankine cycle can take place much lower than ambient temperature. A small fraction of the vaporized natural gas is supplied to the Brayton cycle as fuel and the flue gas generated from the Brayton cycle is directed to the CO_2 capture process for gas conditioning. Consequently, an air separation unit which is normally installed in NGCC can be avoided. The result of this study indicates power loss of the PC power plant by introducing CO_2 capture process can be compensated by power generation from the combined cycle. The combined power generation cycle can also be economically more attractive than conventional NGCC cycle by utilizing the existing PC power plant CO_2 capture process.

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