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**Life cycle assessment for
supercritical pulverized coal power plants
with post-combustion carbon capture and storage**

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Abstract

Environmental and technical aspects of four supercritical (SC) pulverised-coal processes with post-combustion carbon capture and storage (CCS) are evaluated in the present work. The post-combustion CCS technologies (e.g. MDEA, aqueous ammonia and Calcium Looping (CaL)) are compared to the benchmark case represented by the SC pulverized coal without CCS. Some important key performance indicators (e.g. net electrical power, energy conversion efficiency, carbon capture rate, specific CO₂ emissions, SPECCA) are calculated based on process modelling and simulation data. The focus of the present work lies in the environmental evaluation, using the Life Cycle Analysis (LCA) methodology, of the processes considered. The system boundaries include: *i*) power production from coal coupled to energy efficient CCS technologies based on post-combustion capture; *ii*) upstream processes such as extraction and processing of coal, limestone, solvents used post-combustion

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