# Process Alternatives of an IGCC process with CCS technology

우사마, Umer Zahid, 한종훈†
서울대학교
(chhan@snu.ac.kr†)

Power generation industries have been relying on coal for the last many decades due to its abundance in nature and already existing infrastructure. Most of PC power plants operating in the world exhibits higher thermal efficiencies, however, their efficiency tends to decrease tremendously if CCS technology is employed on large scale. On the other hand, pre-combustion capture process (IGCC) tends to have higher efficiencies with the current CCS technology but their capital and operating cost is much higher compared to PC power plants. Therefore this study introduces some IGCC process alternatives to increase both power generation capacity and economics of process. Case 1 and Case 2 includes WGS reactors where excess air and recycled CO2 is used to control the combustion temperature respectively. In Case 3, WGS reactors are removed and the resulting syngas is combusted using high purity oxygen making it similar to an oxyfuel process where the burner temperature is controlled by recycled CO2. The results showed that Case 1 and case 3 are highly competitive in terms of power generation capacity where lowest CAPEX and OPEX requirements in case 3 makes it the most suitable design option.