

**Title:** Supercritical Carbon Dioxide (sCO<sub>2</sub>) Brayton Cycle for Coal Power Generation

**Abstract:** Improving the thermal efficiency of coal-fired power plants is key to reducing emissions and fuel consumption. This proposal outlines a techno-economic feasibility study of retrofitting existing steam-based power cycles with a Supercritical Carbon Dioxide (sCO<sub>2</sub>) Brayton cycle. The research will involve thermodynamic modeling to determine potential efficiency gains, materials compatibility analysis for high-temperature and high-pressure conditions, and a cost-benefit analysis to evaluate the viability of sCO<sub>2</sub> cycles as a next-generation power technology for the coal sector.