Economic feasibility review for a 600MWe oxy USC-CFB power plant

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Generally, fossil fuel power plants generate substantial amounts of carbon dioxide emissions into the atmosphere, which are considered to be the main cause of climate change. To reduce CO2 emissions in the power generation sector, oxy-fuel combustion can be a promising solution. Also, ultra-super critical (USC) steam cycle can produce more electricity with the same amount of fossil fuel and contribute to reduce the emission of CO2 and pollutional substances such as sulfur oxides, nitrogen oxides, and fine dust. Therefore, an oxy-fuel circulating fluidized bed (CFB) power plant with USC steam cycle have been developed in the world. However, the aforementioned high-efficiency and environment-friendly technologies of power generation require additional equipment installation and technologies, which increase the initial investment cost. This study focuses on the economic feasibility analysis by comparing the cost benefits of the 600MWe oxy-fuel USC CFB power plant with a conventional USC CFB power plant. Its economic feasibility was evaluated in terms of net present value (NPV), benefit/cost ratio (B/C ratio), and internal rate of return (IRR).