Updated Overview of a Manufacturer’s Efforts to Commercialize Oxy-Combustion for Steam Power Plants

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A comprehensive updated overview of Alstom’s development and commercialization of Oxy-Combustion technology for CO₂ capture from fossil fired power plants will be given.

Alstom’s current development has completed extensive pilot testing establishing a firm foundation for large-scale demonstration plants (150 – 400 MWe) and subsequent commercial plants (450-1100 MWe). Oxy-Combustion technology builds upon proven coal-based power generation and is complementary with conventional boiler and steam power plant technology, including its evolution towards ultra-supercritical steam conditions, at very large sizes (>1000 MWe), and with advanced environmental controls. Alstom is a leader in the evaluation and commercialization of Oxy-Combustion with efforts on several technology platforms [Pulverized Coal (PC), Circulating Fluidized Bed (CFB), and Chemical Looping Combustion (CLC)] addressing all major components and their design and operational integration. Alstom has led 15 MWth PC and 3 MWth CFB pilot programs, was supplier of the 30 MWth boiler, firing system and ESP for Schwarze Pumpe, and the supplier for the boiler modifications of the 30 MW Lacq project. Alstom has developed and pilot tested air pollution control equipment [Electrostatic Precipitator (ESP), Fabric Filter (FF), Flue Gas Desulfurization (FGD), and flue gas condenser (FGC), and gas-processing unit (GPU)] relevant to the oxy combustion process applied to steam power. Alstom has completed comprehensive engineering and economic studies, and defined the optimized integration of oxy power plant components. The validity of the Oxy-Combustion process is now verified. Since September 2008, the full Oxy-Combustion PC boiler island capture chain, including the air separation unit (ASU) and the GPU, has been demonstrated at the Vattenfall 30 MWth Schwarze Pumpe oxyfuel pilot plant where Alstom is a partner and a major equipment supplier. Considerable “know-how” has been acquired, and it is time for oxy-fuel technology to demonstrate commercial size integrated oxy-fired steam plants for future Carbon Capture and Sequestration (CCS) market. The most recent results of the 15 MWt oxy-boiler, AQCS, and GPU systems testing at Alstom’s US Power Plant Laboratories will be given. Additionally, updated oxy-combustion power plant systems integration and

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optimization results will be explained and economic evaluations of the cost of electricity for coal power generation with CO2 capture compared to other power generation options will be presented.