



## Demonstration and Current Activities for Commercialization of Oxyfuel Technology toward Zero-Emission Coal-Fired Power Plants

Mizuki Nishimura  
IHI Corporation

According to the report by IEA, fossil fuels, including coal, will continue to meet most of the world's increasing energy demands over the next two decades. Coal is not exception, too, and the demand of coal is projected to increase over the next several decades. In order to support such expansion of the use of coal, it is essential to capture and storage CO<sub>2</sub> in large quantity from coal fired power stations since about 60% of coal is used in coal fired power plants. Post-combustion capture and Oxyfuel combustion have been developed to capture CO<sub>2</sub> from conventional coal fired power plants with boiler, steam turbine, and generator. IHI has been developing oxyfuel technology as one of the CO<sub>2</sub> capture technologies from coal fired power plants since 1989. For the demonstration of oxyfuel combustion technology, IHI jointly formed and participated in "Callide Oxyfuel Project" with Australian and Japanese partners in 2008. The plant used is the unit 4 of Callide A Power Station owned by CS Energy and its output is 30 MWe. In the Project, the applicability of the technology to an existing power plant, the reliability and the effectiveness for CCS were demonstrated through achievement of more than 10,000 hours oxyfuel operation and underground injection of CO<sub>2</sub> that captured from oxyfuel coal power plant. After completion of the demonstration, additional tests were carried out in the laboratory and at the pilot-scale combustion test facilities in IHI's Aioi Works. The additional test purpose is to check the performance in oxyfuel combustion atmosphere of the equipment mostly used in current power plants in order for the technology to be flexibly applied to them. For example, the vertical type roller mill and the ESP were tested. In vertical type roller mill test, it was made clear that the effect of moisture concentrated in the flue gas in oxyfuel system was not so big for the pulverization of coal. In ESP test, it was clearly found that the dust collection efficiency in oxyfiring combustion is higher than that in airfiring combustion.

