

## **USC Technology and Biomass Application to Achieve CO2 Reduction**

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### **Abstract**

Generally, coal fuel is used for large power plants because of the significant reserve world wide, and of the relatively low cost compared with gas and/or petroleum fuel. On the other hand, coal fuel releases more CO<sub>2</sub> than other fuel in the combustion process. From the view point of preventing “global warming”, it is strongly required to reduce CO<sub>2</sub> emission from fossil fuels. To fulfill this challenge, improvement of thermal efficiency of power plants will be a key solution. And to co-firing renewable biomass fuel with coal will be also an effective way to reduce CO<sub>2</sub> emission from fossil fuels.

In Japan, where significant amount of energy source depends on imported coal, Ultra Supercritical Pulverized Coal-fired (USC-PC) power plant, which improves thermal efficiency, has been developed and operated successfully since 1993.

The steam condition of foregoing USC-PC units in Japan reached 610degC and their operating performance are satisfied with expecting value. And IHI is presently engaged in the design and manufacture of an USC-PC boiler with 620degC steam temperature. This plant is named “Isogo New No.2 unit” planned to be constructed in Yokohama City and is scheduled to start commercial operation in 2009. Moreover, IHI has commenced making investigation of next step of 700degC to advance further steam cycle efficiency.

As well as steam condition development, use of renewable biomass fuel will contribute not only to save fossil fuel but also reduce CO<sub>2</sub> emission. IHI conducted biomass co-firing test with coal at the pilot scale facilities, and successfully got results of good performance with low NO<sub>x</sub> emission. According to this result, biomass co-firing is applied to an existing coal fired plant named “Saijo power station”, which is located in Shikoku area in Japan. The power station having output capacity of 250MW, and attains 3% by weight biomass co-firing with minimum installation of additional equipments.