



The high temperature retrofit of subcritical units

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Under the pressure of reducing carbon dioxide and pollutants emissions, Chinese government requires that all the existing coal-fired power units shall achieve an average net efficiency higher than 39.62% (LHV) by 2020. Considering the fact that the typical annual average net efficiency level of subcritical units is about 37.22%, some are even lower than 35.1%. It seems to be overambitious to achieve this target. The high temperature retrofit of subcritical units, however, find a feasible and economic solution for this problem, mainly on 4 aspects: 1) By improving the main and reheat steam temperatures from 538°C to 600°C, both the cycle efficiency and turbine internal efficiency are greatly improved. 2) By keeping the main and reheat steam pressures unchanged, combined with innovative boiler heating surfaces retrofit, the pressure parts of the boiler and feedwater system are utilized as much as possible thus the 600°C steam temperatures are achieved with least cost. 3) Combined with other energy-saving technologies, like flue gas heat recovery technology and generalized regeneration technologies, the unit efficiency is further improved both under rated load and part load. 4) By applying special startup technology and other efficiency preservation technologies, the solid particle erosion problem is well prevented thus the unit can operate efficiently in long term. Now the high temperature retrofit is being conducted in a typical 320MW subcritical unit in Xuzhou, China. The target net efficiency under rated condition is higher than 42.36%, much better than those of all existing supercritical units and even some ultra-supercritical units. This project is expected to be a demonstration, setting a benchmark for the high efficiency retrofit of subcritical units.

