

Thermal power plant flue gas waste heat storage peak load regulation

What is the energy distribution of thermal energy storage under flue gas TES?

Maximum flue gas thermal energy storage working condition. Fig. 8 shows the energy distribution of thermal energy storage/release under flue gas TES. It can be found the maximum energy storage power is 403.37 MWth, the maximum energy release power is 279.65 MWth, and the heat storage/release ratio is 1.44:1.

What is the temperature of flue gas discharged from coal-fired power plants?

The temperature of flue gas discharged from coal-fired power plants in front of the desulfurization tower is 120-140 °C, which contains a lot of heat. A lot of heat energy would be lost if the exhaust gas discharged directly, and thus, it will reduce the economic effects.

How efficient is thermal energy storage for a 1000 MWe s-CO₂ CFPP?

The results indicate that, to achieve efficient load regulation from 0% to 100% for a 1000 MWe S-CO₂ CFPP, the priority configuration for thermal energy storage is CO₂ TES, followed by flue gas TES and electrical heating TES, with powers of 285.17 MWth, 342.80 MWth, and 329.95 MWth, respectively.

How is flue gas temperature controlled in a power plant?

The flue gas temperature is controlled by the operating load of the power plant, generally 120-140 °C, and the circulating water flow rate is controlled by the opening of each valve in the pipeline.

Can a flue gas waste heat Cascade recovery system improve efficiency?

Recovering flue gas waste heat is beneficial to improving the unit efficiency in power plants. To obtain the change rules of performance parameters of a flue gas waste heat cascade recovery system (FWCRS) under variable working conditions, an expt. bench was designed and built.

What is the maximum thermal energy storage power for a CFPP?

First, for a 1000 MWe S-CO₂ CFPP, the maximum thermal energy storage powers for flue gas TES, CO₂ TES and electric heating TES are 403.37 MWth, 285.17 MWth and 815.58 MWth, respectively. Under maximum thermal energy storage conditions, the efficiencies of the power cycle are 35.13%, 45.71% and 48.59%, respectively.



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