Waste Heat Recovery Power Plant

Features

◆ Exhaust gas heat which is discarded from various plants into the atmosphere at 250°C-350°C is recovered by a boiler to generate electricity in a steam turbine.
◆ Power generation is possible without additional fuel contributing to factory energy saving. This is introduced in large cement plants and steel factories where energy consumption is particularly large.
◆ Joint Crediting Mechanism (bilateral credit system) can be used in cement waste heat power generation, contributing to the reduction of greenhouse gas emissions by JCM partner countries.

Basic Concept or Summary

◆ Explain the technical features of waste heat power generation equipment for cement plants.
◆ Heat is recovered from PH and/or AQC boilers on each cement plant line, and power is generated by a single steam turbine.
◆ Heat is recovered from the raw material pre-heater exhaust gas by PH boilers. (The boiler inlet gas temperature is 300°C-350°C) Because the exhaust gas contains a large amount of dust, a dust remover is installed to constantly remove dust.
◆ AQC boilers recover heat from exhaust gas from the Air Quenching Cooler. (The boiler inlet gas temperature is 250°C-350°C)
**Effects or Remarks**

- 9,000 kW of power generation output, that is about 30% of the electricity used throughout the cement plant of daily output 5,000 tons, was saved, contributing to an annual reduction of about 35,000 tons of CO₂.
- Application is possible for Japan’s domestic J-credit system and for the JCM system in overseas JCM partner countries.

**Installation in Practice or Schedule**

**Domestic**
- 13 units of cement waste heat power generation equipment have been delivered since the first unit was delivered in 1980 (Sumitomo Osaka Cement Gifu Plant).
- Delivered 5 units of sinter cooler waste heat power generation equipment to JFE Steel and others.

**Overseas**
- For cement waste heat power generation equipment, a joint venture was established in 2006 to lead design, procurement, and construction with CONCH Cement China. Including this company’s performance, more than 250 units have been delivered to China, India, Vietnam, and Germany, etc. Together with this joint venture we also developed a new PH boiler (VEGA Boiler™), with the first machine delivered in 2017. This innovative boiler has a compact design that reduces initial investment and offers improved dust removal performance.
- In 2018, we delivered the world’s largest 43,500kW output waste heat power generation plant at the Ssangyong Cement South Korea Tokai plant. This covered about 30% of factory power consumption, contributing to a reduction of about 170,000 tons of CO₂ per year.

- We delivered a waste heat recovery power generation equipment for a coke oven, which was constructed in the ARCELOR—MITTAL—TUBARAO Ironworks in Brazil. This is one of the largest plants in the world as an waste heat power generation equipment for high-temperature exhaust gas exceeding 1000°C from coke oven and this is the first plant outside of the United States. There are two units of 98MW power output.

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