Kawasaki Heavy Industries, Ltd.

Waste Heat Recovery Power Plant

Z4

Features

- The power plant which uses a boiler to recover waste heat gas discharged from various plant into the atmosphere and generates electricity in a steam turbine.
- It can generate electricity without any additional fuel, contributing to energy saving in a factory. Significant energy saving and reduction of CO2 mission can be expected in cement plants and steel mills, where energy consumptions are extremely high.
- Joint Crediting Mechanism (JCM) can be used, contributing to GHG emission reductions or removals in JCM partner countries.



Cement waste heat recovery power plant (Conch Cement in China)

Basic Concept or Summary

Technical outline of cement waste heat recovery power plant is as follows:

- Waste heats are recovered in PH (Preheater) boiler and AQC (air quenching cooler) boiler and power is generated in steam turbine. (Heat recovery from only one heat source in either the PH or the AQC is also possible.)
- PH boiler recovers waste heat generated in PH. Dust is continuously removed by installing dust removal equipment because a lot of dust is included in PH gas.
- AQC boiler recovers waste heat generated in AQC.



System configuration of cement waste heat recovery power plant



E25

Coke oven waste heat recovery power plant (ArcelorMittal Tubarao in Brazil)



Sinter cooler waste heat recovery power plant (Wuhan Steel in China)

Effects or Remarks

- Cement waste heat recovery power plant in 5,000t/d contributes to the energy saving of about 9,000kW at generator terminal, equivalent to about 30% of the electricity used in the plant, and about 35,000 t/y of reduction of CO₂ emission. (depends on the conditions.)
- The J-Credit Scheme, etc. in Japan and JCM in JCM partner countries can be applied.

Installation in Practice or Schedule

Japan

- 14 units of cement waste heat recovery power plant were delivered since its first unit was delivered to Gifu Plant of Sumitomo Osaka Cement in 1980.
 - 5 units of sinter cooler waste heat recovery plant were delivered to JFE Steel and others.
- Overseas
- ♦ A joint venture company with Conch Group in China was established in 2006, which mainly engages in design, procurement and construction of cement plant waste heat recovery power plant. More than 270 units were delivered to Chian, Germany, South Korea, Turkey, etc. together with the J/V.

A new type PH boiler, VEGA[®] boiler was co-developed by Kawasaki and the J/V and the first unit was delivered in 2017.

The innovative boiler has a compact design that leads to the reduction of initial investment cost and brings the improvement of dust removal performance.

The world's highest level with a 43,500kW cement waste heat recovery power plant delivered to Donghae Plant of Ssangyong C&E in South Korea in 2018. It can cover about 30% of electricity consumption in the plant, while also contributing to the 17,000 t/y reduction of CO₂ emission.



Cement waste heat recovery power plant (Ssangyong C&E in South Korea)



First VEGA® boiler (Huaibei Cement in China) VEGA is a registered trademark of Kawasaki Heavy Industries, Ltd and Anhui Conch Kawasaki Engineering Co., Ltd. in Japan, U.S.A., European Union. China and South Korea.

Coke oven waste heat recovery power plant delivered to ArcelorMittal Tubarao in Brazil. The power plant recovers high temperature waste heat gas of over 1000 deg. C and it is the first unit of the waste heat recovery power plant of its kind except for United States. The power output at generator terminal is 196MW (98MW X 2).



Coke oven waste heat recovery power plant (ArcelorMittal Tubarao in Brazil)

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