

CASE STUDY

Rice mill replaces inefficient boiler with energy efficient IBR boiler, achieves fuel saving of 26%

Background

Burdwan district (West Bengal), the 'rice bowl of Bengal' has more than 500 rice mills in operation. A large number of rice mills are using smaller capacity boilers of 4 to 5 tonne per hour (tph) capacity. Saturated steam is used for processing paddy. These boilers use rice husk, the byproduct in rice production, as the main fuel to meet the thermal needs. Different studies have indicated that the boilers used are quite old and inefficient leading to higher level of fuel consumption for specific steam generation. The low thermal efficiency in boiler operation in the rice mill cluster may be attributed to the following factors:

- Low level of boiler loading due to capacity mismatch
- Poor boiler insulation
- Absence of waste heat recovery (WHR) systems such as economizers
- Low condensate recovery and operating practices
- Ineffective operating practices and manual control on firing

Baseline

A rice mill with a processing capacity of 60 tonnes rice per day (tpd) was operating a rice husk-fired steam boiler of 4 tph capacity, 6 hours per day and 280 days per year. The thermal efficiency of the boiler (i.e. heat in steam to heat input by fuel) was estimated to be 61%, which was quite low as compared to energy efficient boilers. The factors contributing to the low thermal efficiency of the boiler were absence of WHR system and monitoring and control system, and poor operating practices. During 2024–25, the mill replaced the inefficient boiler with an energy efficient IBR boiler leading to significant fuel saving and better working environment.



Old inefficient boiler



Energy efficient boiler

Energy efficient boiler

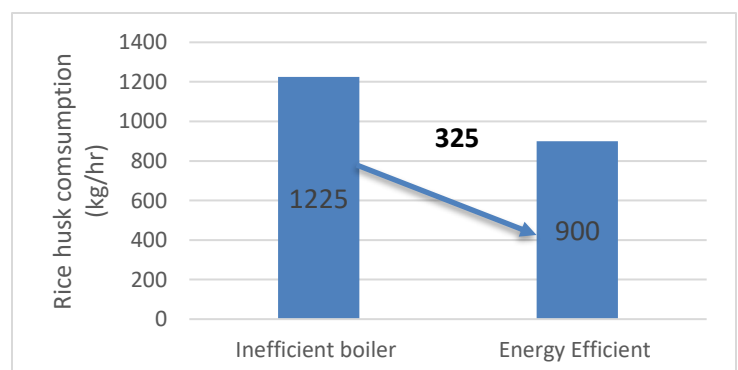
The rice husk-fired energy efficient boiler system is equipped with an economizer, which is used to preheat boiler feedwater to about 70 °C as against the old system which was using feedwater at ambient conditions. It is further equipped with better control system to monitor boiler operating parameters such as steam pressure, steam temperature, fuel firing rate, etc.

Specifications of energy efficient boiler

Parameter	Unit	Value
Boiler capacity	tph	4
Steam generation	kg/hr	3,500
Rice husk consumption	kg/hr	900
Boiler Efficiency	%	78

Energy Savings

Adoption of energy efficient boiler has helped the rice mill in improving the thermal efficiency of the boiler to about 78%. The mill is achieving a fuel saving of about 26% with the new boiler. This is equivalent to 1092 tonne per year of rice husk (316 toe).



For more details, please contact

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