

NAWTEC16-1911

High Electrical Efficiency by Dividing The Combustion Products

Ole Hedegaard Madsen

ohm@volund.dk

Babcock & Wilcox Vølund

A subsidiary of The Babcock & Wilcox Company

Denmark

Martin Bøjer, Peter Arendt Jensen, Kim Dam-Johansen

CHEC Research Centre

Department of Chemical and Biochemical Engineering

Technical University of Denmark

Abstract

Energy recovery from waste is an efficient way to reduce emissions of greenhouse gas and other gaseous, liquid and solid pollutants and thereby to contribute to a sustainable development.

Waste fired power plants are an important part of the European waste management system, and the demands made to modern waste fired power plant are very focused on high electrical output.

Lately, Babcock & Wilcox Vølund (BWV) and the CHEC research centre at the Technical University of Denmark has developed a new technology and received a world patent. The basic idea is to improve the electrical efficiency by increasing the steam data. Especially, increasing the steam temperature without the risk of superheater corrosion. The new concept is fully integrated in the boiler and from the outside the waste fired power plant has the same layout as the classic waste fired power plant.

The goal is to achieve an increase between 50 °C to 100 °C in the superheated steam temperature and a total increase of electrical efficiency up to 30 % without any influence on the normal operation.

This paper presents the basic ideas that provide a basis for the patent. The core of the technology is a combination of a new furnace design and a new control system. At the moment, test results from an operating plant support the principal idea. Furthermore, the concept will be studied in the numerical laboratory where CFD simulation will be used to evaluate the technology and to determine the potential process improvements.

The final improvement of electricity production has to be determined in the coming test period on a full scale installation, which is currently being planned.