

# Sundsvall / Korstaverket, Sweden

VØLUND™ WASTE-TO-ENERGY TECHNOLOGY - WASTE-FIRED POWER PLANT

PROJECT CASE HISTORY



Photo: Törbjörn Bergkvist

*Plant features innovative water-cooled combustion grate and wear zones*

The contract for Sundsvall Energy's new waste-fired power plant was signed in June 2004, and the plant was officially opened in March 2007.

The new plant has a capacity of 25 tons of waste an hour corresponding to an annual operation of 200,000 tons.

The plant produces approximately 120,000 MW electricity and 300,000 MW district heating. The new plant was built next to the old plant.

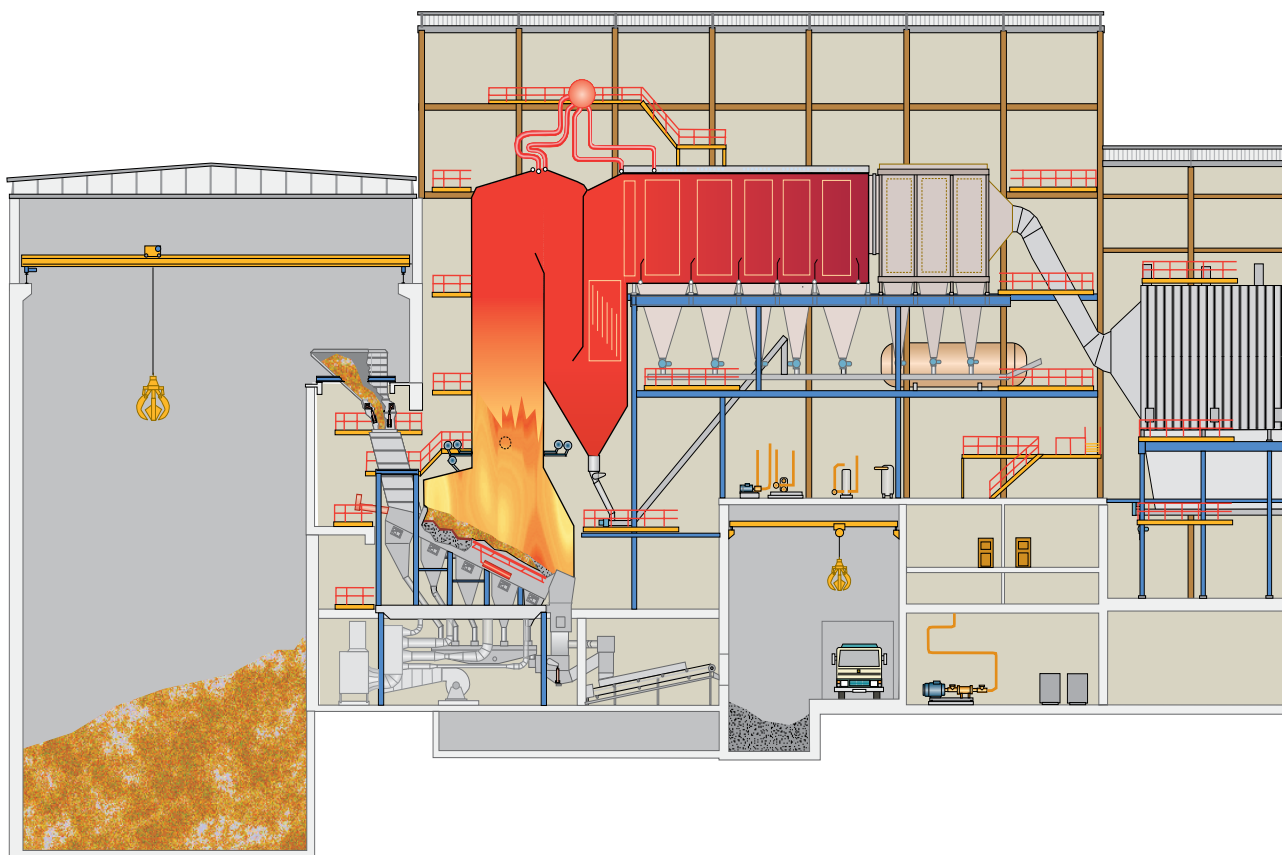
## Combustion technology

Babcock & Wilcox Renewable (B&W) supplied the Vølund™ technology grate and boiler. The combustion grate is DynaGrate®, a two-lane air-cooled and water-cooled grate designed for fuels with high heating values.

The Sundsvall waste-fired power plant is the first plant with B&W's new cast water-cooled grate bars.

The boiler is designed with three-vertical passes and horizontal convection part. The maximum use of Inconel® for boiler protection limits the use of refractory.

*continued ►*

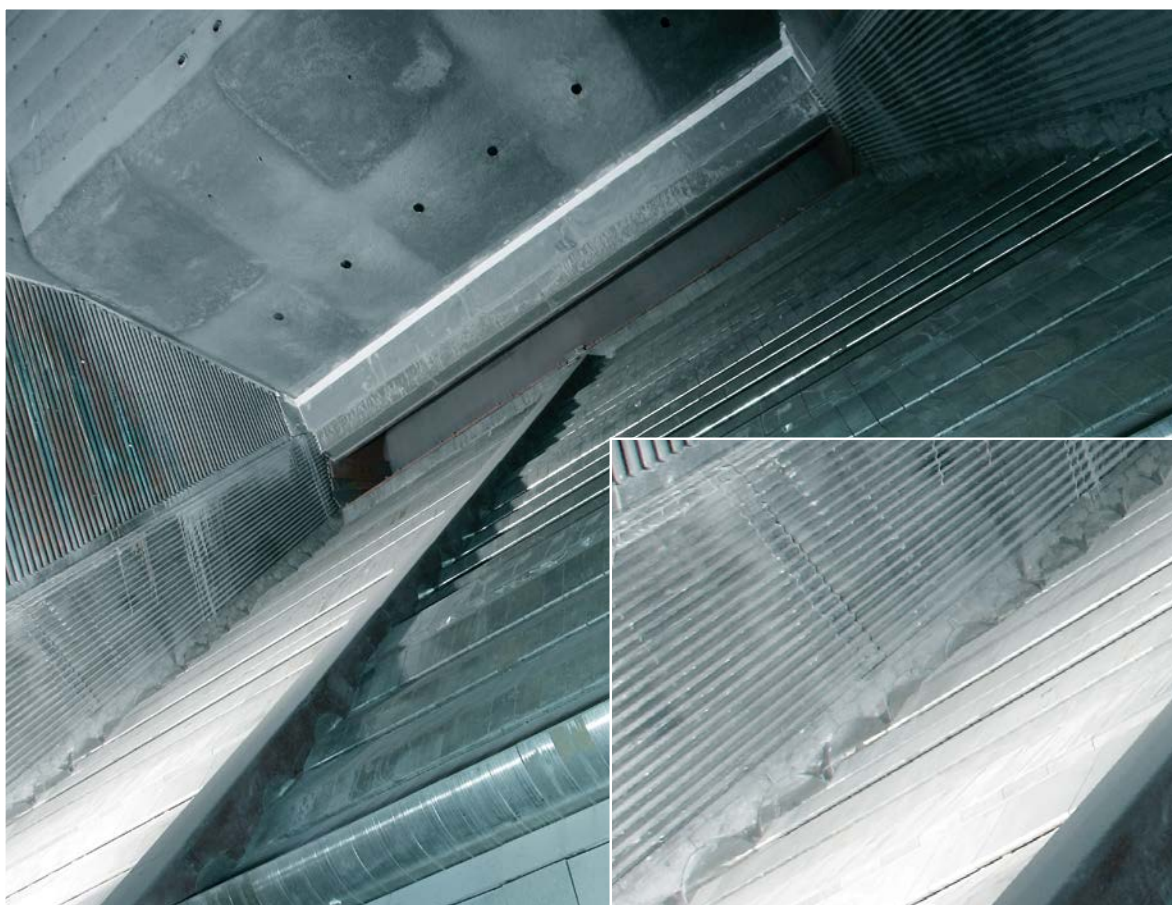


### *Water-cooled wear zone*

The Sundsvall plant is equipped with a water-cooled wear zone. The wear zone reduces uncooled refractory lining and thereby the built-up of slag.

#### **Advantages of the water-cooled wear zone:**

- A water-cooled wear zone absorbs approximately 80-120 KW per m<sup>2</sup>. A typical system can receive 1.5-2.8 MW of extra energy - energy which is absorbed as radiant heat.
- There are no slag deposits as the wear zone is relatively cold, 120-250° C. The system therefore retains its active grate area throughout the operational period.
- Operational stoppages due to slag removal are not required. Heat absorption in the wear zone is 5-10 times higher than in the boiler's two radiation passes.
- Heat absorption in the wear zone reduces the furnace temperature and therefore allows increased heating value and maintains waste capacity.
- The water-cooled wear zone replaces the refractory lining in the system's most heavily used area and experience shows that a water-cooled wear zone has a longer life than refractory lining.
- It is possible to build in a water-cooled wear zone during a standard maintenance stoppage.
- The water-cooled wear zone works actively as an expansion segment between boiler and grate.



*The heat absorption from the wear zone can be used in various ways:*

**Directly connected to the boiler circuit:**

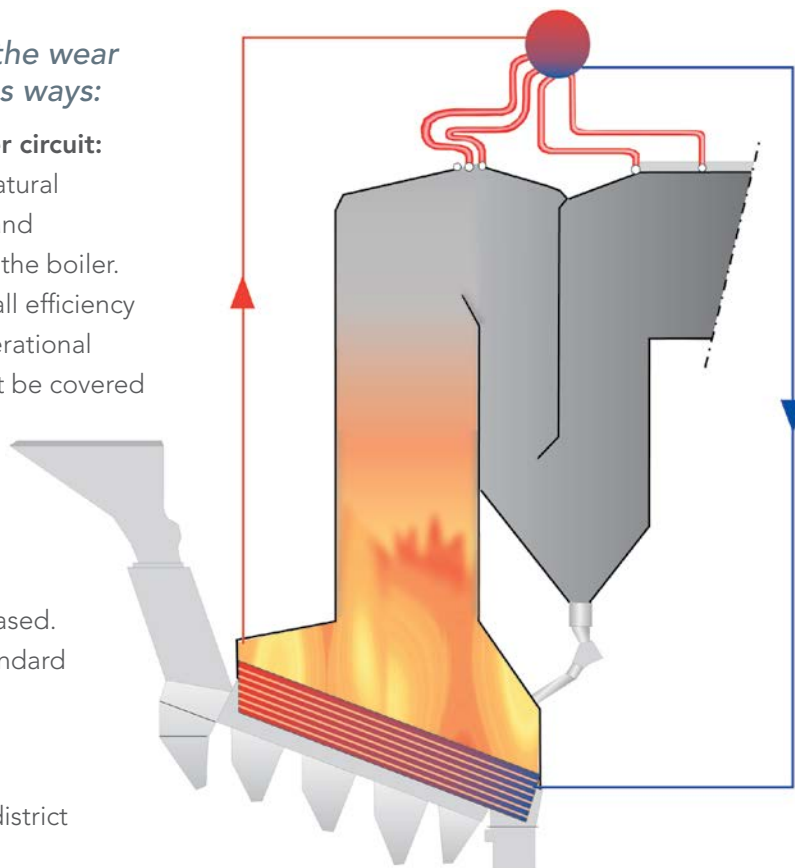
The wear zone is connected in natural circulation with the boiler drum and constitutes an integrated part of the boiler. This coupling increases the overall efficiency of the plant. Due to the high operational temperature, the wear zone must be covered with Inconel.

**Indirectly connected:**

The heat absorption is used for air or condensation preheater so that the plant's efficiency is increased. The wear zone is executed in standard black boiler pipe.

**Externally connected:**

The heat absorption is used for district heating.



*A direct connection setup is used at the Sundsvall plant*



The Sundsvall waste-fired power plant is the first plant with B&W's new cast water-cooled grate bars

| Plant design data                     |        |             |
|---------------------------------------|--------|-------------|
| Process parameters                    | Values | Units       |
| Nominal capacity, waste               | 20     | t/h         |
| Max. continuous capacity              | 25     | t/h         |
| Steam pressure                        | 45     | Bar         |
| Steam temperature                     | 420    | °C          |
| Feed water temperature                | 130    | °C          |
| Energy input                          | 60     | MW, nominal |
| Boiler outlet<br>flue gas temperature | 180    | °C          |

| Flue gas values:<br>Out of boiler |     |                    |
|-----------------------------------|-----|--------------------|
| CO                                | 30* | mg/Nm <sup>3</sup> |
| TOC                               | 2*  | mg/Nm <sup>3</sup> |
| NO <sub>x</sub>                   | 300 | mg/Nm <sup>3</sup> |

All values refer to 11% dry O<sub>2</sub>

\*) The CO and TOC values refer to a daily average

The plant limit values comply with the EU directive on waste incineration



## Babcock & Wilcox

Dybendalsvaenget 3  
2630 Taastrup  
Denmark  
Phone: +45 76.14.34.00

[www.babcock.com/renewable](http://www.babcock.com/renewable)



The information contained herein is provided for general information purposes only and is not intended nor to be construed as a warranty, an offer, or any representation of contractual or other legal responsibility.

Vølund is a trademark of The Babcock & Wilcox Company or its affiliates.

Inconel is a trademark of Huntington Alloys Corporation, a subsidiary of the Special Metals Corporation.



RENEWABLE | ENVIRONMENTAL | THERMAL

Established in 1867, Babcock & Wilcox is a global leader in renewable, environmental and thermal technologies and services for power and industrial applications.

For more information or to contact us, visit our website at [www.babcock.com](http://www.babcock.com).