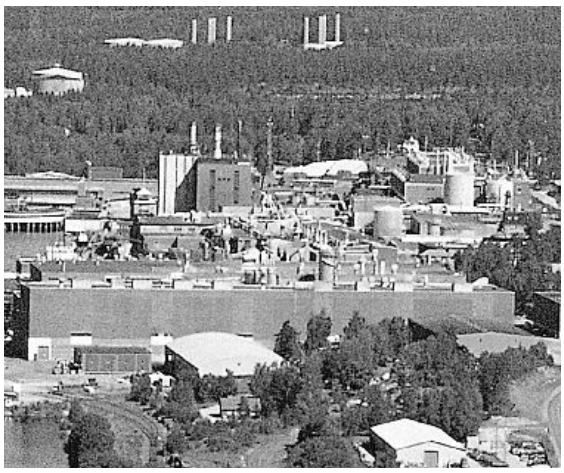
Installation of the Ecotube system at Hallsta Paper Mill, Sweden

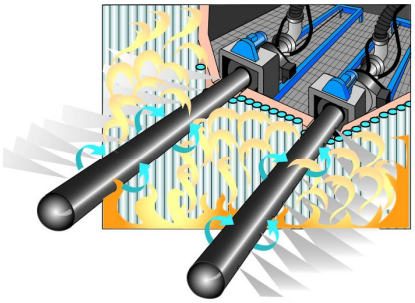


The installation at Hallsta Paper Mill is the third biomass-fired boiler to be equipped with Ecotubes. The HP3 unit at Hallsta comprises 2 cylindrical shaped furnaces which is an old type of combustion device, today only existing at a couple of mills in Sweden. The brick insulation on the inner walls makes the furnaces suitable for burning wet bio-fuels like bark. The partially burned gases from each furnace enter the boiler through a short gas throat. The boiler is also equipped with 4 fuel oil burners operating at peak loads, during slag removal and as back-up if the bio fuel system should fail. The boiler can produce approx. 40-60 MW_{th} steam on bio fuels. The Ecotube system in Hallsta works both as a combustion optimisation tool (reducing NO_x and CO) and is also equipped to supply anhydrous ammonia (NH_3) to reduced NO_x even further. An important advantage for the customer has been the cost reduction achieved by using anhydrous ammonia instead of the more traditional ammonia (25%) water solution that dominate the market today.

Plant:	Hallsta Paper Mill
Plant owner:	Holmen Paper AB
Boiler:	HP3
Purpose of installation:	NOx-reduction
Year of installation:	2000
Operating time:	> 8000 hours/year
Heat output of the boiler:	40-60 MW_{th}
Fuel:	Bio fuels and oil burners for back-up
Pre Ecotube Emissions	
NO_x	130
CO	< 500
Post Ecotube Emissions	
NO_x	60
CO	< 400

All values correspond in mg / Nm^3@ 6% O_2

The Ecotube system optimises the combustion process in boilers. Ecotubes are retractable lances which penetrate the boiler furnace wall and are equipped with injection nozzles. The Ecotube system supplies a small proportion of the combustion air under high pressure through the high velocity nozzles. Injection of high velocity air streams create radically improved **mixing** of the partially burned combustion products, so enabling efficient completion of combustion and significantly reduced emissions of pollutants like NOx and unburned components – CO, VOC (Volatile Organic Compounds), particles etc. Improved mixing enables the boiler to run at a lower air/fuel ratio, thus resulting in a higher thermal efficiency. Another important feature is the opportunity to increase thermal output of the boiler.



ECOMB AB
Box 2017
SE-151 02 Södertälje
Sweden

Tel. +46 8 550 12 550
Email. info@ecomb.se
Homepage: www.ecomb.se