



Installation of the Ecotube System at Megatem, Lublin, Poland

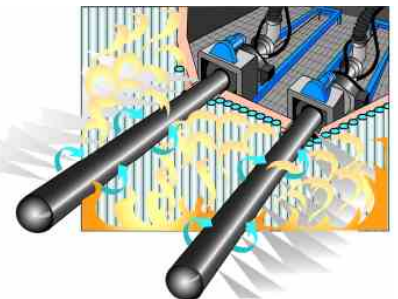


The K2 and K5 boiler units at the Megatem EC plant in Lublin, Poland, were upgraded with Ecotube-Systems in 2015 in order to reduce emissions of NO_x and also to reduce and stabilize emissions of CO. K2 and K5 are a coal fired travelling grate CHP boilers and are used primarily to supply the city of Lublin with district heating but also electricity. Due to a division wall in the centre of the furnace, one Ecotube was installed just before the furnace exit in the first pass on both the left and right hand side. The Ecotubes supply the upper furnaces with directed high pressure air jets to create a mixing and burnout zone beneath the Ecotubes. Improved mixing and turbulence in the furnace means that boiler O₂ can be reduced without increasing emissions of CO and therefore formation of NO_x from and above the boiler grate. As a last step to comply with current IED limits a small amounts of water based NH₃ solution (24,9%) is supplied via internal Ecotube SNCR injection nozzles spread across the length of the Ecotube. Primary and secondary air to the furnace is heated via air/ water heat exchangers located on the Ecotube System water cooling circuit.

In order to meet a broader boiler load span, the Ecotubes can supply the SNCR reagent either upwards or downwards depending on boiler load and current combustion conditions.

Plant:	Lublin
Plant owner:	Megatem EC-Lublin
Boilers:	K2 and K5
Purpose of installation:	NO _x and CO Reduction
Year of installation:	2015
Operating time:	5000-7000 hours/year
Steam output:	30-50 t/h
Fuel:	Coal
Pre Ecotube Emissions*	* All values correspond to mg/Nm ³ @ 6% O ₂
NO _x	350-450
CO	<200
Post Ecotube Emissions*	
NO _x	<180
CO	<100

The Ecotube system optimizes 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 creates radically improved **mixing** of the partially burned combustion products, so enabling efficient completion of combustion and significantly reduced emissions of pollutants like NO_x 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.



ECOTUBES can also supply either solid or liquid urea, anhydrous or liquid ammonia for DeNO_x or limestone for DeSO_x.

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