

## Combined heat and power plant

# I/S Refa Kraftvarmeværk Nykøbing Falster, Denmark



The waste incineration plant I/S REFA in Nykøbing Falster about 120 km south of Copenhagen is a company owned jointly by 13 municipalities.

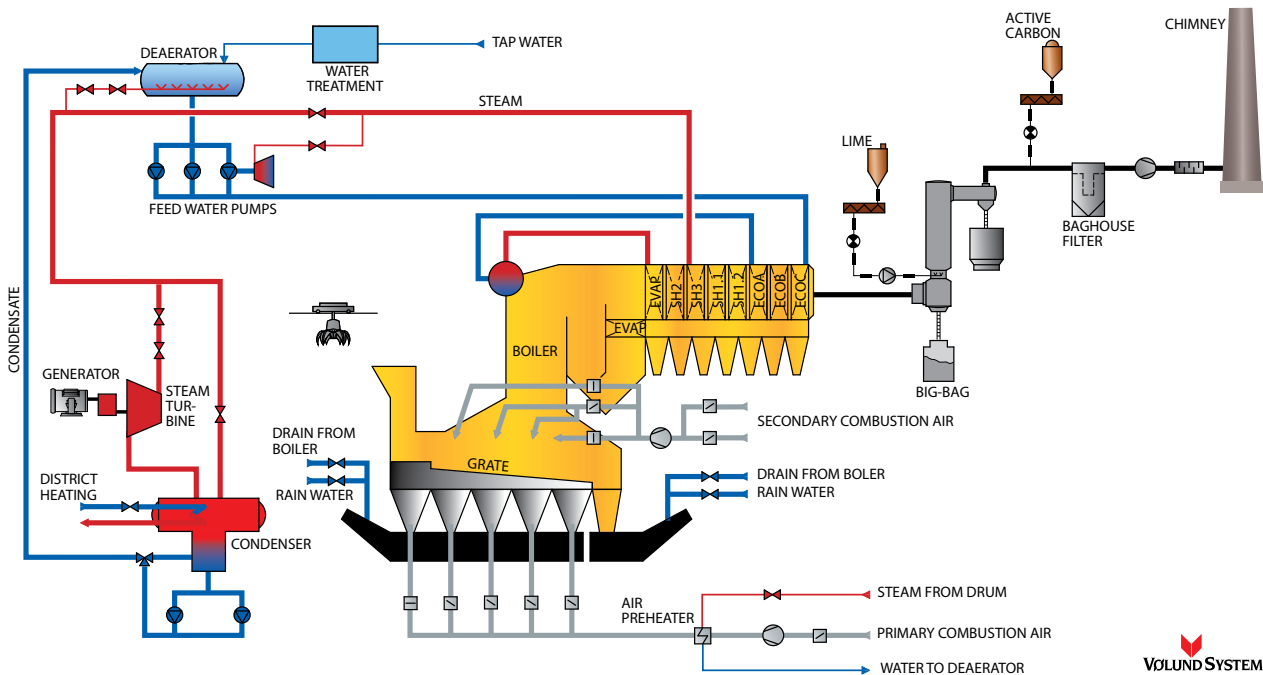
The company handles all collection and treatment of waste from the 13 municipalities and has approx. 65 employees.

### Collection of waste

The company collects and treats all kinds of waste from households and industries on the two islands of Lolland and Falster, a total of about 200,000 tons/year. Half of this amount is combusted whereas the remain is sorted for different kinds of recycling. A small portion of the waste cannot be used for combusted or recycling and is therefore taken to a dump.



# Combined heat and power plant I/S Refa, Denmark



## The combined heat and power plant

The first part of the waste-to-energy plant was built in 1983 and consists of the lines 1 and 2, each with a capacity of 4 t/h. The lines are equipped with hot water boilers for supply of district heating to the city of Nykøbing Falster. They are in operation throughout the heating season and also function as back-up for line 3. The lines were completely renovated in 1998/99.

By 1995-96 the amount of waste had grown considerably, and a third line with a capacity of 9 t/h for generation of electricity and district heating was planned. This combined heat and power line went into commercial operation in 1999 and now supplies the district heating requirement of the city in cooperation with lines 1 and 2 (740 TJ/year). In addition, line 3 supplies electricity (50 GWh/year) to the public electricity grid.

## Residual products

The bottom ash from the three lines (approx. 20,000 tons/year) is recycled in the construction industry. The fly ash (approx. 3,000 tons/year) is collected in big-bags, which are sent to Norway for use as an acid neutralisation agent at a waste-to-energy plant.

### Main data (for the third line)

Nominal capacity	9.0 t/h at 12 MJ/kg
Max. cont. capacity	10.8 t/h at 10 MJ/kg
Steam data	40 bar, 400°C
Steam generation	35 t/h
Electricity generation	6.7 MW
District heating generation	18.9 MW
Flue gas cleaning	Semidry scrubber with bag-house filter

### Flue gas values: Out of boiler (for the third line)

		Limit value acc to permit	
CO	mg/Nm <sup>3</sup>	100	
TOC	mg/Nm <sup>3</sup>	10	
Particles	mg/Nm <sup>3</sup>	30	
SOx (as SO <sub>2</sub> )	mg/Nm <sup>3</sup>	300	
HCl	mg/Nm <sup>3</sup>	50	
		Measured values	Measured values
		Nov. 2001 *	Feb. 2002 *
CO	mg/Nm <sup>3</sup>	<4	<4
TOC	mg/Nm <sup>3</sup>	<3	<3
Particles	mg/Nm <sup>3</sup>	<0,1	<0,1
SOx (as SO <sub>2</sub> )	mg/Nm <sup>3</sup>	7	<1
HCl	mg/Nm <sup>3</sup>	2	1

All values apply at 11% O<sub>2</sub> dry flue gas

\*) Mean value of two measurements

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

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