



# CLEAN FACTS 2023

## the Sävenäs waste-to-energy plant

### COMBUSTION

Line P1	
Commissioned	2001
Output	43 MW
Combustion capacity	16 tonnes/h, 10,8 MJ/tonne
Grate supplier	Martin
Steam boiler	40 bars 400°C
Steam production	58 tonnes/h

Line P4 and P5	
Commissioned	1994-95
Output	2 x 54 MW
Combustion capacity	2 x 22 tonnes/h, 10,5 MJ/tonne
Grate supplier	von Roll
Steam boiler	40 bars 400°C
Steam production	2 x 73 tonnes/h

Line P7	
Commissioned	2009
Output	39,1 MW
Combustion capacity	14 tonnes/h, 11,2 MJ/tonne
Grate supplier	Martin
Steam boiler	40 bars 400°C
Steam production	52,7 tonnes/h

Waste bunker	
No. of tipping sites	14
Actual useable volume	22,000 m <sup>3</sup>
No. of waste cranes	2
Lift capacity	14 tonnes each
Grab volume	10 m <sup>3</sup> each

Slag bunker	
Actual usable volume	1,500 m <sup>3</sup>
Slag crane	1
Lift capacity	8 tonnes
Grab volume	3,2 m <sup>3</sup>

### STEAM AND ELECTRICITY

Steam turbine	ABB Vax MT 17 41,6 MW
Generator	ABB 47,7 kVA

Turbine condenser	
<i>When turbine operation</i>	
Condenser output at full load	115 MW
<i>During by-pass (heat production only)</i>	
Maximum condenser output	170 MW

Back-up condenser	
Heat output	170 MW

### HEATING AND ELECTRICITY TO APARTMENTS AND DETACHED HOUSES

Our energy production doesn't just go to homes but also to business and industrial premises. For the sake of clarity, for comparisons we have chosen apartments as the measure of capacity throughout.

The average Swedish apartment is 65 m<sup>2</sup> and requires 9,600 kWh/yr in heating and 2,700 kWh/yr in electricity.

The production of the Sävenäs waste-to-energy plant 2020 of 1,538 GWh heating and 276 GWh electricity is the equivalent of district heating for more than 150,000 apartments and electricity for more than 100,000 apartments.

## FLUE GAS CLEANING

### Electrostatic precipitator lines P1, P4 and P5

Rothemüle

Collection efficiency, particles > 99,5 %

Max particle content after electrostatic precipitator  
(in normal state, dry gas and 11 % O<sub>2</sub>) 25 mg/N m<sup>3</sup>

### Electrostatic precipitator line P7

Collection efficiency, particles > 99,5 %

Max particle content after electrostatic precipitator  
(in normal state, dry gas and 11 % O<sub>2</sub>) 25 mg/N m<sup>3</sup>

### Wet flue gas cleaning with condensing P1, P4 and P5

Two-stage scrubber, acid and alkaline stages with Adiox fillers and condenser reactor with direct condensation and cooling with absorption heat pumps.

### Wet flue gas cleaning with condensing P7

Hot water economizer, spray scrubber for HCl and heavy metals, alkaline scrubber for SO<sub>2</sub> with direct condensation stage, wet electrostatic precipitator (venturi type), condensing scrubber connected to absorption heat pumps.

### DeNO<sub>x</sub>-facility P1, P4 and P5

SNCR (non-catalytic reduction) and flue gas recirculation

Reduction agent 25 % ammonia

### DeNO<sub>x</sub>-facility P7

SCR (catalytic reduction) and flue gas recirculation

Catalyzer in 3 layers

Reduction agent 25 % ammonia

## FLUE GAS EMISSIONS

Substance mg/m <sup>3</sup>	Annual average 2022	Environmental permit (average over 24 hrs)	EU-Directive (average over 24 hrs)
Particles	0,8	-	10
TOC	0,4	-	10
NH <sub>3</sub>	0,8	10	-
HCl	0,5	-	10
CO	23	-	50
NO <sub>x</sub>	61*/22**	80*/50**	-
SO <sub>2</sub>	2,1	-	50
HF***	0,004	-	1
N <sub>2</sub> O***	5,3	10	10
Hg***	1,4	30	50
Dioxins***	0,008	-	0,1 (ng/m <sup>3</sup> )

All values are expressed as normal m<sup>3</sup> dry gas at 11 % O<sub>2</sub> mg/ m<sup>3</sup>.

\* Lines P1, P4 and P5 \*\* Line P7 \*\*\* Measurement twice a year

### Bag house filter P1, P4 and P5

Flue gas flow line 1 90 000 Nm<sup>3</sup>/h

Flue gas flow lines 4 and 5 115 000 Nm<sup>3</sup>/h

### Chimney

Height above ground level 126 m

Flue gas speed Approx 15 m/s

No. of gas flues 4

Diameter of gas flue 1,6 m

Material P1, P4 and P5 Corten steel

Material P7 Fibreglass-reinforced polyvinyl ester

### Absorption heat pumps

*Flue gas condensation*

Refrigerating capacity 4 x 4 MW (Thermax)  
2 x 6 MW (Weir-Entropie)

*Process cooling*

Cooling output 1 x 1,5 MW (Thermax)

*Cooling of cleaned condensate*

Heat output 1 x 1,5 MW (Carrier)  
Total 80 MW

### Cooling tower

Refrigerating capacity 3 x 20 MW

Cooling medium External air + water

