Timetable	2004				2005				2006			
	1	2	3	4	1	2	3	4	1	2	3	4
Ground works												
Construction												
Process installation												
Trial run												

Elsam Engineering

LILJEWALL arkitekter ab

RAMBØLL

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CERTIFIERAT ISO 14001 SEMKO-DEKRA

JÖNKÖPING ENERGI

JÖNKÖPING ENERGI PRESENTS A NEW ENERGY SOURCE

Heat and power in Waste-to-Energy Plant Torsvik

In June 2006, the new heat and power plant will be put into operation. The energy produced corresponds to heat and power for about 15 000 small houses. This is a new local energy source – our production system is renewed through waste recovery.

The road to the plant has been quite long and winding. For a long time, different strategies have been studied to keep district heating deliveries competitive and reliable. At the same time, national and European waste handling strategies are changing. Recycling of materials and energy is preferred to waste deposits. The municipality of Jönköping solves two problems – waste becomes an energy resource.

Huge building project

The process from decision to environmental permit almost took us three years. In April 2004, when we received the final decision, the ground works had already started. In two years time, this huge construction project is to be completed and the complex technology put into operation.

Waste reduces oil use

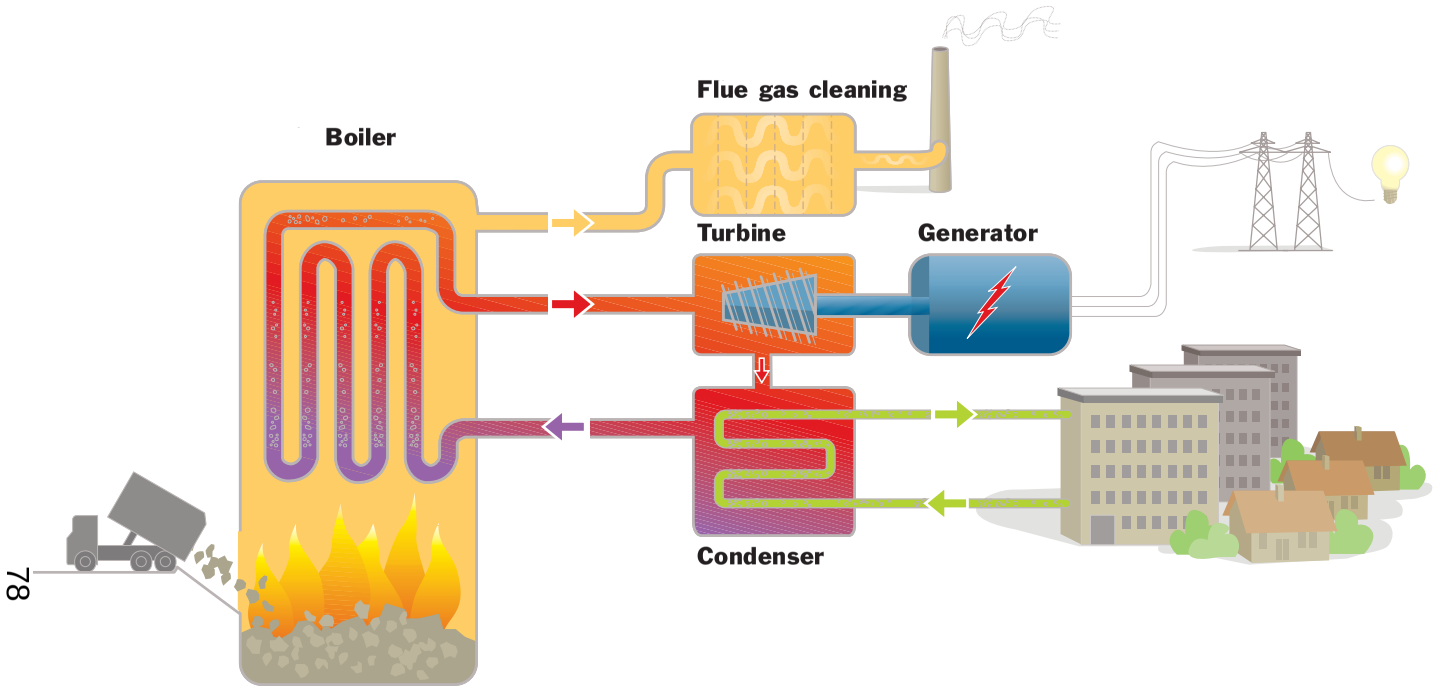
Waste-to-Energy Plant Torsvik will be our new base in district heating production. The existing Munksjö heat and power plant will still be an important part of the system. Many of the smaller, oil-fuelled units will turn into back-up units, though. Thus, our dependency on oil as a fuel will be significantly reduced, and so will the greenhouse gas emissions.

Electricity generation

Waste-to-Energy Plant Torsvik will also be an important electricity supplier. In a larger perspective, this reduces the Swedish import of fossil power.

Waste into heat and power

Basically, the new Waste-to-Energy Plant works like our older steam boilers at Munksjö Heat and Power Plant. Waste as a fuel is new for us, though. Have a look at the picture below, showing the principle for heat and power production.



The boiler

The boiler consists of a furnace, where the actual incineration takes place, and a steam boiler, in whose walls are tubes filled with water. The water is boiled to steam by the hot flue gas. The slag that's left of the waste is collected. After scrap metals are removed, the slag gravel may be used as road construction material.

The turbine and condenser

The steam runs a turbine. Electricity is generated in a generator on the same axle. In the condenser the heat energy from condensing steam is transferred to the district heating water.

The flue gas cleaning

The flue gas cleaning process includes several stages, which minimize the concentration of flue gas pollutants. The flue gas may then be let out through the 120-metre-tall stack. The air pollution control residues are placed in a specially constructed and controlled landfill site. The moist from the flue gas is condensed and cleaned in an in-house wastewater treatment plant. Even this heat energy is transferred to the district heating water.

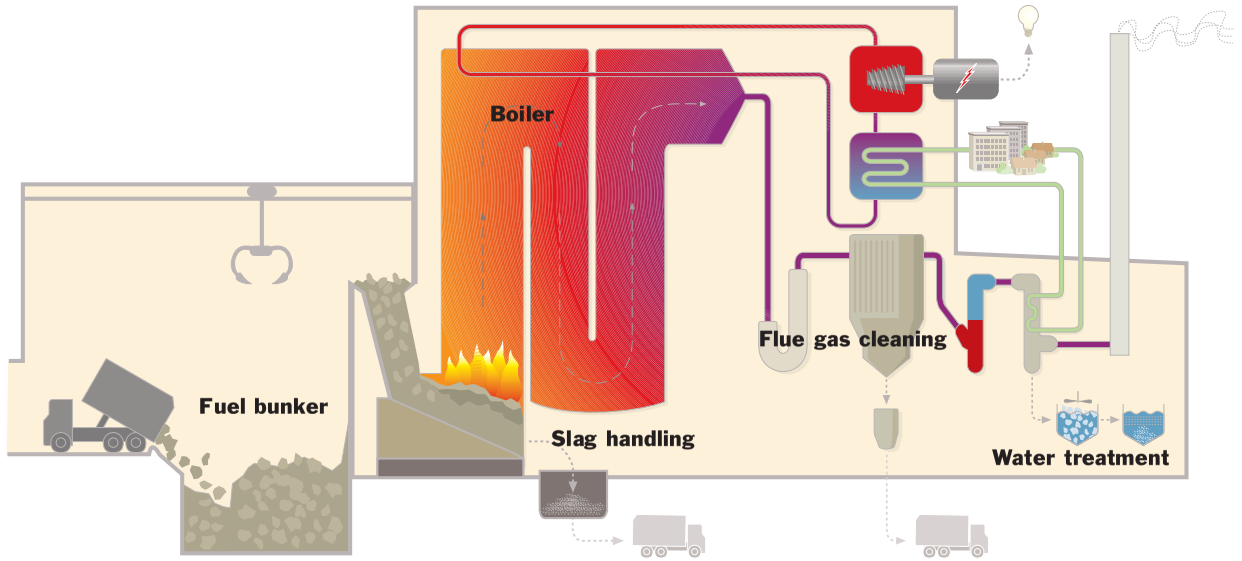
To the customers

The Waste-to-Energy Plant is connected to the district heating grid of Jönköping through a 10-km-pipe.

The total pipe length in the system exceeds 200 km. By incinerating 20 tons of waste per hour (130 000 tons yearly), Waste-to-Energy Plant Torsvik will deliver heat and electricity enough for 15 000 family houses. This is equivalent to a yearly amount of 340 GWh of heat and 80 GWh of electricity.

In Sweden, there are almost 30 waste-to-energy plants. Sweden's developed district heating grids and great demand for heating are excellent conditions for efficient combined heat and power production.

Below is a more detailed process layout for the boiler and the flue gas cleaning, along with technical facts about the respective process parts.



Fuel bunker	
Unloading	1 side tipping, 7 tipping at the rear
Total volume	17 000 m^3 below tipping level
Grab claw travelling cranes	2
Boiler	
Capacity	20 tons/h
Grate type	Reciprocating type grate
Grate area	64,3 m^2
Input	61 MW
Minimum load	42 MW
Steam pressure	41 bar (a)
Steam temperature	380°C
Steam flow	21,5 kg/s
Incinerating temperature	>850°C
Contractor	FISIA BABCOCK ENVIRONMENT
Flue gas cleaning	
NID-reactor	Addition of slaked lime and activated carbon, fabric filter with 1204 bags, total area 3371 m^2.
Scrubbers	Acid scrubber för separation of HCl and NH_3. Neutral scrubber for separation of SO_2.
Residue silo	330 m^3, for temporary storing of residues from fabric filter.
Contractor	ALSTOM Power
Flue gas cooler	Transfers heat from flue gas to bolier´s primary and secondary air.
Contractor	FISIA BABCOCK ENVIRONMENT
Flue gas condenser	
Output	15,5 MW heat in two stages, direct transfer and through absorption heat pump.
Flue gas temperature (out)	36°C
Contractor	ALSTOM Power
Condensation water treatment	
Buffer tank	Iron(III)sulphate and NaOH is added to precipitation tank.
Precipitation tanks	Precipitation of heavy metals content. Sulphide chemical added between tanks.
Sand filter	DynaSand filter, which separates particles and precipitates.
Carbon filter	Final polish step
Contractor	ALSTOM Power
Steam turbine	
Type	Intermediate pressure turbine
Nr of revolutions	8484 rpm
Generator brand	ELIN Motoren GmbH
Generator power	12,9 MW
Contractor	B+V Industrietechnik GmbH
Turbine condenser	
Condenser output	35-62 MW
Brand	Serck Como
Contractor	B+V Industrietechnik GmbH
Cooler	
Output	25 MW
Slag handling	Slag quenching, conveyor to separate slag storage building, magnetic separation.