A natural step for Mälarenergi – a great boost for the people of Västerås

A project is underway to modernise the heating plant in Västerås. This involves the purchase and delivery of new products. It is a solution that is good for our resources which can no longer be reused. The plant will also be able to recycle and recover energy from the waste which will significantly reduce our emission. In Sweden, we are good at recovering energy from waste.

Unit 6 will supply around half of the total district heating. A project is currently ongoing to modernise the plant and replacing them with a robust and reliable facility named “Unit 6”. The new Unit 6 is a co-incineration plant with an ability to prepare its own fuel. It is also one of a kind in the world – a natural step for Mälarenergi.

The co-incineration plant provides the possibility to recycle and recover energy from the waste which creates significant environmental benefits.

Mälarenergi strives to utilise renewable and non-renewable fuels such as peat. Thanks to a co-incineration plant, we can continue to supply reasonably priced district heating.

In Sweden, we are good at recovering energy from waste. Around 75% of the waste fuel is considered to be renewable.

The waste hierarchy is a model prepared by the EU, showing the order in which different methods should be applied to treat waste. Reduce consumption is the highest level and is given top priority in national legislation.

Timeschedule of the modernisation project.

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
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<tbody>
<tr>
<td>2012</td>
<td>Foundation work, excavation, piling for the building foundations and site access.</td>
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<tr>
<td>2013</td>
<td>Second half of 2013: Erection of the stack. Installation of process equipment and integration between new and existing plant. Turbine, generator and condenser for construction workers</td>
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<tr>
<td>2014</td>
<td>Autumn 2014: Plant in operation</td>
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</tbody>
</table>

The new combined heat and power plant Unit 6.

Västerås, Sweden
From your rubbish bin to our bunker

A “mixed bag” becomes sorted material
The waste is prepared for conversion into fuel
Nothing is wasted here
The fuel is incinerated in the boiler
The water does the work
The steam is used to generate electricity and heat
Environmental hazards captured
The flue gas is cleaned to remove environmentally hazardous substances
All the way to your radiator
The electricity and heat reach the households

Combustible waste from households and industries is delivered to the fuel reception station at the plant. Here, the waste is weighted and checked before the delivery to the first bunker to await preparation. Above the bunker, there are two large grabs that are used to mix the waste to ensure it is as homogenous as possible. However, it is important that you continue to sort waste at source in your home – it is essential that we only burn waste that is intended for incineration.

The grabs transport the waste to the crusher – “Tyrannosaurus” – which exerts huge pressure to chop the waste into credit card sized pieces. Any metal waste is then removed and sent away for recycling. The remaining waste is transported past a large windshifter. Heavy materials such as stone, glass and ceramics are sorted out and are transported for recycling or use as landfill material. The combustible waste is transported to a second bunker, where it is now “prepared” fuel.

Two grabs mix the fuel and load it on the conveyor belt that leads to the boiler.

The fuel arrives in the silo from where it is fed into the boiler. The boiler is a Circulating Fluidized Bed (CFB), which means that incineration takes place together with hot, fluidized sand. This results in an even and efficient combustion. In fact, it allows recovery of up to 90% of the energy in the fuel. The temperature in the boiler is very high – around 900 °C. It is important to maintain a high temperature to environmentally hazardous substances. The hot flue gas heats the water to make steam, which is led to the turbine while the flue gas is led away for treatment.

The hot steam turns the turbine rotor. The turbine drives the generator that supplies electric power through the transformer. The steam also heats water pipes, generating district heating for the distribution network. Finally, the steam cools and converts back into water and returns to the boiler. In our control room, which is staffed around the clock, we monitor and adjust production depending on the outside temperature (cold winter, hot summer, etc.).

The task of the flue gas treatment is to convert the environmentally hazardous substances in the gas into a solid material that is easier to handle. This is achieved by adding activated carbon, lime and water, which form particles with the acidic gases and heavy metals in the flue gas. A giant fabric filter is used to remove these particles, which are transported away as hazardous waste. The residual flue gas is cleaned once more using water to bind remaining pollutants. At the same time heat is recovered and distribute to the district heating network. The water is reused in the initial step of the flue gas treatment process, and a small volume is released to Lake Mälaren. The remaining flue gas is then tested for environmental quality before being sent through the stack.

When you, as an electricity customer, purchase electricity from your power company, the electricity is transmitted through a transformer station to your home. The district heating runs through pipes in the ground to the heating substation that you use to heat the water in your hot water pipes and radiators. All year round. 24 hours a day.