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FOLLOW THE MODERNISATION PROJECT UNIT 6 AT
www.malarenergi.se/fornyelseprojektet

MälarEnergi

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

A project is currently ongoing to modernise the combined heat and power (CHP) plant in Västerås. It involves Mälarenergi phasing out the oldest parts of 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 because of the fuel flexibility.

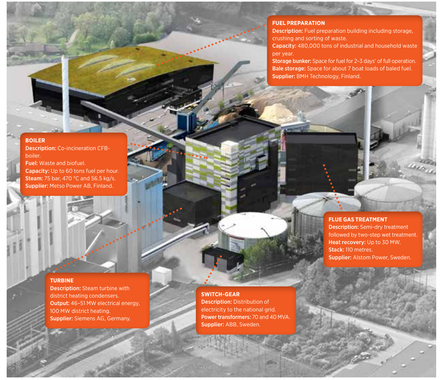
Mälarenergi started supplying the town with district heating back in the 1960s, and today fully 97 % of Västerås' properties are heated using district heating from our CHP plant.

In order to be able to maintain reliable supplies of electricity and heat – and to keep prices low in line with the directive from our owners – we need to modernise our CHP plant. We are doing this with a new facility that is both flexible and environmentally sound.

Unit 6 will supply around half of the total district heating needed in Västerås, and both waste and biofuel can be used to fire the new boiler. Building a boiler that can burn more than one type of fuel provides us with great flexibility to accommodate changes in the fuel market, which means that we can continue to supply reasonably priced district heating.

When the new co-incineration plant is taken in operation we estimate that carbon dioxide emissions will decrease as a result of phasing fossils fuels such as peat.

Mälarenergi strives to utilise renewable and resource-efficient fuels as far as possible. The new co-incineration plant will allow us to utilise resources which can no longer be reused in making new products. It is a solution that is good for our customers – and for the environment.

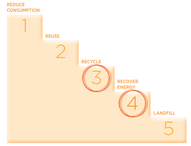


Waste shall not be wasted!

"The waste hierarchy"
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 environmental goals and waste treatment plans. In Sweden, we are good at recover energy from our waste, which creates significant environmental benefits.

The co-incineration plant provides the possibility to recycle and recover energy from the waste which no longer can be reused. The plant will also be designed to allow careful sorting of the waste to remove materials that should not have been delivered to the plant. These materials will be sent for recycling rather than incineration. This means that our plant will also serve as a kind of recycling station.

Waste has a relatively good heating value of 3–4 MWh/ton. Both oil and coal have higher heating value than waste or other biofuels, but as they are fossil fuels, we are working hard to phase them out from our production. Around 75 % of the waste fuel is considered to be renewable.



Fuel	Heating value
Oil	10–11 MWh/ton
Coal	7–8 MWh/ton
Waste	3–4 MWh/ton
Peat	3–5 MWh/ton
Biofuel	2–3.5 MWh/ton

Timeschedule of the modernisation project.

2012

Spring and summer 2012:
Site preparation and excavation, piling for the construction of the fuel preparation building, boiler building, flue gas treatment building and turbine building. Establishment of construction and office trailers for construction workers and contractors.

Second half of 2012:
Foundation work, establishing roads and site access.

2013

First half of 2013:
Construction of the boiler building, flue gas treatment building, fuel preparation building and turbine building. Process equipment installed in the boiler building and flue gas treatment building. Construction of fuel storage and fuel transport system.

Second half of 2013:
Installation of process equipment and integration between new and existing plant. Turbine, generator and condensers in place. Erection of the stack.

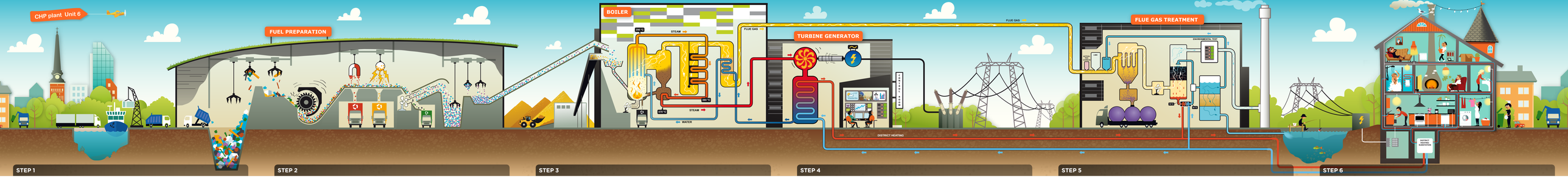
2014

First half of 2014:
Commissioning of the plant, finalisation of fuel preparation. Testrun of the plant.

Autumn 2014:
Plant in operation and official opening.

The new combined heat and power plant Unit 6.
Västerås, Sweden.

MälarEnergi



STEP 1

From your rubbish bin to our bunker

How the waste arrives at the plant

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.

STEP 2

A “mixed bag” becomes sorted material

The waste is prepared for conversion into fuel

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.

STEP 3

Nothing is wasted here

The fuel is incinerated in 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.

STEP 4

The water does the work

The steam is used to generate electricity and heat

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.).

STEP 5

Environmental hazards captured

The flue gas is cleaned to remove environmentally hazardous substances

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.

STEP 6

All the way to your radiator

The electricity and heat reach the households

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.