

Translation by Götaverken Miljö AB

Same volume of fuel produces more heat

After a few months of alignment work, Karlstads Energi has now started a pilot operation of its new flue gas cleaning plant at Hedenverket.

The entire project has gone very well and should continue to do so until we take over the plant, says Willy Krönström.

And the result – cleaner waste products and better utilisation of the incinerated waste.

In January the expanded flue gas cleaning plant was finally connected to the number one boiler at Hedenverket in Karlstad. This is a waste boiler and the fuel comes mainly from the household waste of several municipalities around Karlstad. At the present time the boiler produces 17 megawatts of heat every hour for Karlstad's district heating network.

Major advantages

The flue gas cleaning in the boiler at Hedenverket has previously consisted of a reactor, bag filter and SNCR plant. The expansion involves the erection of a completely new building to contain the new components, which have been

connected in between the bag filter and the stack.

The upgrade mainly consists of:

- A two-stage scrubber, where the first stage cleans the flue gases.
- The water cleaning, which cleans the condensate before its emission.
- The absorption heat pump, which extracts extra energy for the district heating network.

These components ensure two major advantages for the production of district heating in Karlstad. The first, and this is the main reason why the conversion was carried out, is a reduction in the emission of environmentally hazardous flue gases from the incineration. This means lower emissions of hydrogen chloride and sulphur oxides, plus an increased separation of heavy metals. The timing was well chosen and it will now be possible to meet, under controlled conditions and by a good margin, the more stringent EU regulations that will be introduced in December 2005.

But thanks to the new absorption heat pump, it will also be possible to achieve a significant degree of energy recovery.

- The results have surpassed our expectations, says an enthusiastic



The expansion of Hedenverket has meant the erection of a completely new building.

Willy Krönström.

Positive surprise

The condensation produces from 4 to 5 megawatts per hour. Karlstads Energi expected to be able to achieve 30 gigawatt hours a year, but during the alignment the absorption heat pump has proved to be a positive surprise and Willy Krönström now believes that the figure will be 31 or 32 gigawatt hours a year. Instead of 17 mega-

watt an hour there will now be 21 to 22. This increase corresponds to the consumption of about 700 normal sized houses, without an increase in the production costs.

- We are extracting about 25 percent more energy now, without having to put anything in, confirms a pleased Willy Krönström.

Three stages

The adjustments to the new, more severe EU requirements take place in three stages. The first was to rebuild the waste boiler, which was completed in the autumn of 2003. The grating was replaced and the boiler was extended to accommodate it.

It was also necessary to achieve a temperature in the boiler of at least 850° C and to achieve this, in those cases where the temperature cannot be maintained only on the basis of the incineration, a backup oil burner was installed. These two



Lifting the absorption heat pump, with the help of which it will be possible to extract extra energy for the district heating network.



Götaverken Miljö AB's ADIOX system, tower packing material with carbon as an extra dioxin barrier, integrated in the scrubber system.



The absorption heat pump in place. The installation has surpassed the expectations of Karlstads Energi.

measures now mean that the boiler at Hedenverket complies with the requirements of the EU directive for retention time and incineration temperature.

The second stage is the one that is in the process of being completed just now, i.e. the expansion of the flue gas cleaning and installation of an absorption heat pump. The alignment began straight away in January and continued to the middle of April. And the preliminary performance tests looked good, according to Willy Krönström.

There were some minor deviations on the condensate to the recipient, but these will be put to rights by the supplier of the absorption heat pump.

Minor problem

After the alignments in the spring it was time in the middle of April to start the six week pilot operation. But there was just one minor problem, crystallisation in the salt solution in the absorption heat pump – which is now being investigated.

- We expect to solve this soon, and worse things have happened, says Willy Krönström.

To check that the results comply with the EU requirements the measuring equipment will be supplemented, and this will be done in the autumn of 2004, which is the

final stage in the upgrading of the number one boiler at Hedenverket.

BY HENRIK ARBORÉN

INFO

Hedenverket

There are two boilers at Hedenverket. The number one boiler is a waste-fired hot water boiler with an output of 17 megawatts per hour, in addition to which there are the new 4 megawatts per hour from the condensation. The number two boiler is a bio-fired CFB boiler, which at full power produces 80 megawatts, with an attendant steam turbine of 20 megawatts plus 20 megawatts condensation.

- The number one boiler incinerates approx 7 tons of waste an hour, corresponding to 50 000 tons a year, which mainly consists of municipal household refuse.

- The cost for the conversion of the number one boiler was higher than the expected 40 million kronor, and is now expected to rise to the order of 45 million. The reason for this is that it was decided to supplement the boiler with equipment to boost the heating of the boiler on start-up.



Willy Krönström, project leader at Karlstads Energi.

Absorption heat pumps and absorption chillers

Götaverken Miljö has received an assignment to **upgrade the flue gas cleaning system** in the waste incineration plant at **Karlstads Energi**.

The plant will include highly efficient energy recovery with flue gas condensation and absorption heat pump including a scrubber system with ADIOX® to eliminate the risk of the "memory effect" and to function as "police filter" for dioxin.

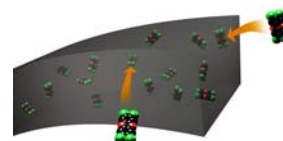


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Address: Anders Carlssons gata 14, Box 8876, 402 72 Göteborg
 Telephone: 031-50 19 60 Telefax: 031-22 98 67
 www.gmab.se