

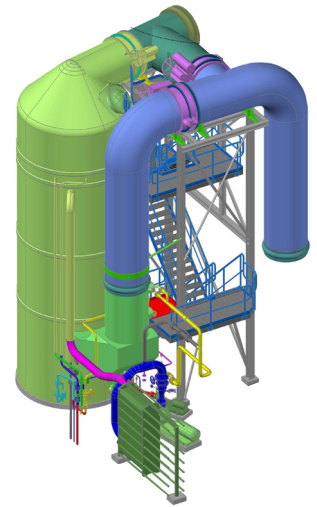
Increasing demand for energy recovery solutions

Five ongoing energy recovery assignments

Götaverken Miljö is presently carrying out energy recovery installations to:

- **Öresundskraft / Filborna** plant in Helsingborg, Sweden – flue gas condensation, absorption heat pump for increased energy recovery as well as a water treatment plant.
- **Landskrona Stad**, Sweden – a scrubber condenser for flue gas condensation.
- **Ekokem**, Finland – a combined flue gas cleaning and condensing plant. Götaverken Miljö's first plant supply to Finland.
- **Tekniska Verken in Linköping**, Sweden – a wet scrubber for increased flue gas cleaning with integrated energy recovery at the Gärstad plant.
- **Eksjö Energi**, Sweden – a flue gas cleaning plant with integrated energy recovery.

The scrubbers are equipped with ADIOX[®] material for dioxin removal and prevention of memory effect. The deliveries to Filborna, Landskrona and Ekokem represent joint reference plants for Götaverken Miljö and B&W Vølund.



Scrubber condenser to Landskrona

On November 1st, Götaverken Miljö handed over an energy recovery plant to the customer **Aars Fjernvarme** in Denmark after a successful start-up. Götaverken Miljö got an interview with managing director Jan Clement.



Jan Clement

What are your expectations of the new equipment?

– We have installed a wet scrubber, that condenses the flue gases from our waste incineration in order to utilize the heat to improve our energy recovery. As an extra bonus we get a better flue gas cleaning with an additional reduction of all acidic gas components. That means we stay well prepared for expected future emission requirements. A trial run and performance test are planned for in December and we have no reason to doubt that the guaranteed condensing effect will be fulfilled. We expect that the flue gas condensing plant will add another 4-5 MW heat to the district heating. When so, also our economical goal with the investment will be fulfilled, says Jan Clement.

What is your opinion of the collaboration with the supplier and how the delivery has been executed?

– Götaverken Miljö has carried out the installation in a very professional way and the contracted time schedule has been kept. The mechanical installation is neatly performed and the equipment is of very good quality. The process equipment is well-arranged and this will make it easy to carry out future service and maintenance. The commissioning went smooth and easy and was performed by qualified staff, although some of our staff members sometimes had difficulty in understanding the Swedish language, says Jan Clement with a smile.

– We are very satisfied with how Götaverken Miljö has carried out the installation. We can only praise the supplier's employees, who have been very qualified and professional in their work. And this applies from the initial contact through final delivery of documentation, Jan Clement sums up.



The wet scrubber condenser at Aars Varmeværk when lifted into the building in June 2011.

Leading experience in energy recovery solutions

– Götaverken Miljö was established in 1988 and was originally a dedicated heat pump supplier, says Per Lindgren, manager Sales, Götaverken Miljö. Among our early references you can find the world’s largest turbo compressor heat pumps, supplied to Göteborg Energi. Later we moved on to absorption heat pumps and we delivered our first ones in 1989 to Renova in Gothenburg. All these heat pumps are still in operation. Today we consider ourselves as specialists when it comes to using absorption heat pumps linked to wet flue gas cleaning and flue gas condensation to increase energy recovery.



Per Lindgren

Energy recovery is smart and environmentally friendly

– We notice an increasing interest from our waste-to-energy customers to invest in equipment to make use of surplus heat from waste incineration, providing additional heat to city-wide district heating networks. The energy is recovered either by

- ”direct condensation”, where a heat exchanger is positioned in the circulation water loop of the scrubber condenser. The heat is transferred ”directly” to the district heating system on the other side of the heat exchanger. The temperature in the district heating system will limit to what degree energy recovery is possible,

or

- ”condensation with heat pump”, where a heat pump is connected to a heat exchanger in the circulation cooling water loop and the district heating systems is connected to the other side of the heat pump. This enables lowering the flue gas temperature down to 30°C.

– Normally 20-25% of heat can be recovered. When combined with wet flue gas cleaning including for example ADIOX® dioxin removal packings, a very safe, efficient and cost-effective flue gas treatment is obtained. Besides the economical gains, there are substantial en-



Absorption heat pump at Vestforbrænding, Denmark.

vironmental benefits. Emissions that cause acidification and climate changes are cut. Toxic and harmful substances, which affect ecosystems and public health, are reduced or eliminated. That is, a solution that drives sustainable development.

Future requirements for higher efficiency

– The waste-to-energy industry is largely dependent on standards of EU’s BAT reference (BREF) document. We expect this standard to set even stricter requirements in respect of higher efficiency and lower emissions in the future. Götaverken Miljö and B&WVølund offer a waste-to-energy solution providing complete equipment from crane to stack. The NextBAT® is the Scandinavian contribution to the next generation of best available technology. to ensure the smallest possible impact on the environment.