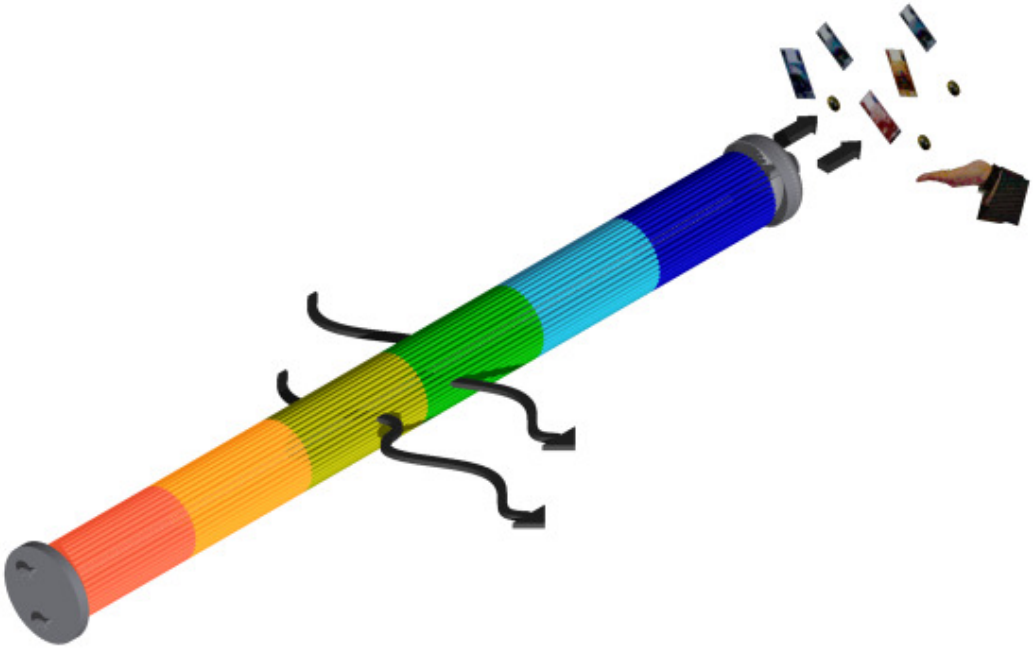


ECONOMIC IN ECOLOGY

A STEP INTO THE FUTURE !

ENERGY SAVING

by

HEAT RECOVERY SYSTEMS

- HRC -

EWK UMWELTTECHNIK GMBH

Heat Energy from Biomass

In recent years, wood has increasingly gained importance as an energy source in large parts of Europe.

Wood dust, waste wood and production residues are used more and more as a fuel for private use as well as in combined heating and power stations. Nowadays the combustion plants are of a high technical standard, making their heating comfort and emissions comparable to other heating systems.

The thermal utilization of wood is considered CO_2-neutral, which is a decisive advantage over fossil fuels.

Emissions of such combustions are dust, ash, hydrocarbons, sulphur, chlorides, furan compounds, heavy metals, dioxins, carbon oxide, NOx, ammonia a.s.o.

Pellets are a relatively new fuel. To produce pellets, the wood chips (saw dust, wood shaving etc.) are first dried, before being compacted by presses into pellets of various sizes. The waste gases escaping from the chip driers contain mainly emissions such as wood dust, organic hydrocarbons, α and β pinenes and aerosols, in addition to water vapour. The dryer exhaust air is subjectively noticed as a blue smoke plume (Blue Haze) with a relatively strong odour.

These are typical emissions, known also from the production of chipboards, OSB and MDF boards.

Air Pollution Control Systems

For precipitation of those emissions dry systems as well as wet systems, with or without catalytic reduction, can be installed.

Regarding existing fuel or production processes and local emission limits an optimal processing system has to be chosen for preservation of the environment.

Due to the special factors a dry system, based on alkaline sorption with bag house filter or electrostatic precipitator, could be the right one. In other cases sorption with scrubber or scrubber with wet electrostatic precipitator will be the better solution. Additional considerations about NO_X reduction have a high influence of required type of processing system. So the processing system has to be planned very sensitive, but always considering economical costs.

Dry sorption with high temperature electrostatic precipitator and NO_X catalyzer

Because of a strongly grown market for biomass incinerations in the past it is important to know the composition of the wood fuel, otherwise a future analyse has to be made to be sure, that the planned concept is flexible enough for future fuel supply.

Pellet drier with wet absorber, wet electrostatic precipitator and water/water heat recovery system

The fuel composition is an important point for all installations. Fuels with acid or plastic contaminations may sooner or later lead to huge costs, caused by corroded parts.

Heat ReCovery Systems (HRC Systems)

CO_2-neutral fuel is one important point for our future, but efficiency and optimal use of generated energy present a wide range of economical solutions for additional cost saving.

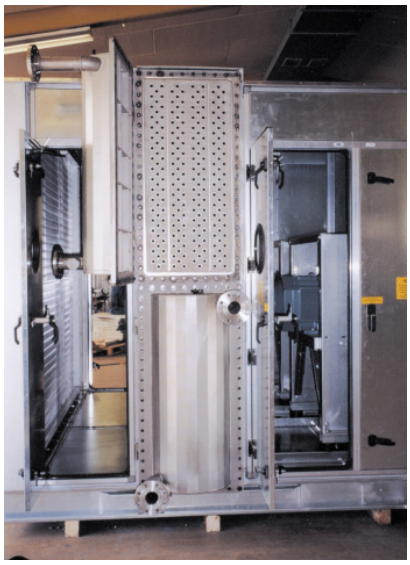
At biomass power plants energy is normally used at high efficiency, but sometimes small amounts still could be recovered. On the other hand a lot of energy being generated from all kinds of drying processes for food or biomass is led directly into the atmosphere, and here we lose a lot of usable energy.

For such industrial applications EWK is developing since 1995 heat exchanger units as additional parts to connect to different types and processes of waste gas cleaning systems.

Because of their geographical position countries in Northern and Eastern Europe have of course a distinct location advantage because of lower outside temperatures and wood resources. Anyway, unused energy sources can be used in other countries as well. A minor portion of this energy can be taken out of the system without condensation, but recovering the main portion of the energy will cause condensation. And this condensation has to be treated as well.

Environmental protection normally entails costs. The targeted application of usually minor additional investments can help to achieve high savings in operating costs. With the full utilization of the energy potential in such wet absorber or wet electrostatic precipitator systems, even the investment costs can be recovered.

Cleaning the waste gases from chip dryers by a WESP system offers the possibility, for example, of heat recovering and putting to use a large part of the thermal energy used in the drier. Water/air heat exchangers, for example, can preheat the combustion air of the drier or generate warm air for workshop heating. Water/water heat exchangers allow the direct incorporation into the district heat system.

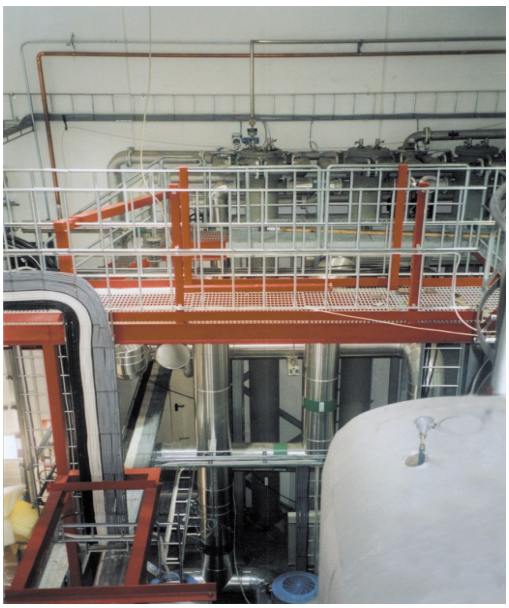


Water/Gas Heat Exchanger

Water/Gas Heat Exchanger for preheating of combustion air: 80,000 m^3/h • 1.4 MW

Especially to transfer large amounts of heat energy water-/water heat exchangers are used.

Simple inspection and maintenance of the heat exchangers due to pre-chambers



Water/Water heat exchanger for heat extraction and feeding into the district heat system: 5.8 MW • 75 °C

At SBE Svensk BrikettEnergi in Ulricehamn, for example, more than **5.8 MW of thermal energy** or more than 50% of the drier output are recovered as useful heating energy by the multi-step condensation cooling. 2 x 2 pairs of water/water heat exchanger extract the thermal energy in two steps from the waste gas flow and transfer it into the municipal district heating system. With the selected concept it was possible to achieve a supply temperature of more than 75 °C on the secondary side.

The condensate generated by the heat extraction is cleaned in a biological treatment plant and discharged.

Because of the possibility to feed energy into the district heating system, the complete investment costs for the flue gas cleaning and heat recovery system were recovered within a short period of time, even when taking the operating costs into account.

In 2009 EWK installed a new designed waste gas cleaning system for two chip driers and press exhaust in Austria. The customer's production location is situated in a wide valley surrounded by picturesque countryside, one of Austria's beautiful holiday areas. This was the key factor for EWK and the customer to install a unique system with three independent WESP working sections and a combined heat recovery system as water/gas heater for devaporisation of the steam plume and for district heating. The heat recovery load is calculated up to a maximum of 24 MW (!). In a first step 3.7 MW are meant for depluming and 12 MW are planned for district heating.

In the state of final installation more of approx. 75 % of produced heat for drying process is recovered and reused!

During the first winter period approx. 400 consumers could be connected to the new "green energy line", which in turn reduced the emissions and CO_2 output enormously in this valley.

An energy distribution company was founded (a partnership between customer and city), which is responsible for distribution and availability. To obtain a sufficient outlet temperature for the district heating a special adsorption heat pump is installed, which brings the temperature from the heat recovery system up to 104 °C. In emergencies a separate gas fired boiler keeps the heat supply uninterrupted.

Water/Water Heat Exchanger
3 x 4 MW • 72 °C outlet for district heating

EWK UMWELTTECHNIK GMBH

EWK Umwelttechnik GmbH
Kantstrasse 5
D-67663 Kaiserslautern / Germany
Telefon: +49 (0)631 / 35 77-0
Telefax: +49 (0)631 / 35 77-111
Internet: www.ewk.de
E-Mail: umwelt@ewk.de