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**Research area: General aims**

Energy // Energy use

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**Key words:**

Energy use, heat integration, water circuit, process optimisation

**Title:****Development directions for the integration of waste heat in paper mills****Background/Problem area**

Due to the high proportion of the production costs and environmental reasons energy savings play an important role in the German pulp and paper industry. Up to now energy consumption optimisation studies did not pay much attention to the heat balance of the water circuit. There are huge heat flows leaving the paper mill with waste water and exhaust air. One possible measure for the reduction of the energy consumption is the integration of this waste heat into the water circuit. Thus, the energy efficiency is increasing. In addition it is possible to increase the productivity due to higher process temperatures and to keep the effluent temperature limit.

**Objectives/Research results**

The project aims at generating systematic development directions for the integration of waste heat in paper mills water circuits with respect to the reduction of the specific energy consumption, an increase of the productivity and compliance with the effluent temperature limit.

The production processes of three representative paper mills producing the main paper grades (woodfree paper, packaging paper and wood containing papers) were characterised by determination of heat inputs, heat sources and sinks, energy consumption, analytical parameters, relevant flows of water and stock and further production related data. The current status of these mills has been evaluated and simulation models have been set up and calibrated to the current state using the programme IDEAS.

Based on the current heat flows, concepts for heat integration in these representative paper mills have been generated. Targets of the developed concepts were: Use of existing waste heat, increase of the process temperature and compliance with effluent temperature limits. Therewith either a reduction of the energy consumption or an increase of the productivity can be achieved. The developed case scenarios have been tested by using the simulation models.

Based on the current cost status an enquiry shall determine future cost scenarios and future technical innovations. The promising concepts will be evaluated economically according to the results of enquiry. Emphasis will be placed on energy savings, investment costs and attainable increase in production.

Based on the achieved results development directions for optimum heat integration in paper mills will be derived. Therefore the optimisation potential will be quoted. Dependant on this results and possible future scenarios, measures for a stepwise optimisation of the heat balance will be developed. Parallel, changes in process temperature will be predicted. As a further result of this project a standardised and simplified method for the optimisation of the heat balance of paper mills shall be developed.

**Application/Economic benefits**

Using the development directions the papermaker is able to identify optimisation potentials and obtains measures to improve the heat balance of his mill. Thus, he is able to reduce the specific energy consumption and the energy costs. In addition he can increase the productivity and keep the effluent temperature limit.

**Project period: 01.02.2006 – 31.01.2008**

**Remarks**

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