The task
Rhein Papier GmbH is an alliance partner of Myllykoski Corporation GmbH and produces approximately 300,000 metric tons of newsprint annually from waste paper at its paper mill in Hürth near Cologne.

The paper mill in Hürth has been operating since 2002. Siemens originally supplied the electrical equipment with motors, switchgear and the process control system based on the SIPAPER DCS standard, which integrates all subprocesses of papermaking. Presently, the 320-meter-long factory building houses the deinking plant (DIP) as well as the PM1 paper machine and the converting facility.

Due to the surge in energy costs and the increasing awareness of energy issues (such as CO₂ footprints) among customers and end users, Rhein Papier was actively searching for ways to save energy.

Since a substantial amount of the energy required in papermaking is needed in the form of steam for the drying process, optimizing the operation mode of the dryer section offered great potential for reducing costs. To exploit this potential, Siemens piloted the newly developed SIPAPER APC DrySec automation concept on the PM1 paper machine.

The goal of the project was to boost energy efficiency and reduce energy costs in the dryer section, and in particular to reduce the specific main steam consumption.
The solution

Optimized process control is important for the entire papermaking process. The goal is to achieve the required product quality while at the same time minimizing the costs of raw materials, additives and energy.

Siemens has developed the Sipaper APC DrySec software solution to reduce steam consumption. It is based on a physical process model that takes into account all the parameters relevant to drying. The main focus is on the air requirements, heat recovery, steam and condensate system, together with their mutual interactions and dependencies. Measured values are used to adapt the model at regular intervals to the current process conditions. Sipaper APC DrySec uses this data to calculate a coordinated set of 16 set points that result in the most energetically efficient operation mode. These values are then transferred to the process control system.

The software system thus automatically responds to changes in production parameters such as machine speed and grammage, but also to changes in dewatering in the wire and press sections.

The air flow especially in the hood can then be set to minimize the quantity of air supplied and its temperature. The system also ensures that water evaporating from the paper web is exhausted continuously without condensation in the hood.

The heat curve, or the difference in steam pressure between the individually controllable steam groups, is also adapted as another calculated parameter.

Thomas Rauch, the EMSR/Energy maintenance coordinator at Rhein Papier in Hürth, commented: “Our decision was the right one: Using SIPAPER APC DrySec to optimize the dryer section, we save more than three percent in main steam while achieving the same quality and the same mill throughput.”

The result

After an evaluation phase lasting several months, during which the paper machine was operated alternately with and without the optimization system, the result was clear:

- The specific main steam amount used in the dryer section was reduced by more than three percent at the same quality and the same mill throughput.
- The required electricity was lowered by reducing the quantity of air for hood supply air and exhaust air.
- Heat recovery in the heat exchangers for heating the hood supply air and for heating the process and hot water was more efficient.