ANDRITZ
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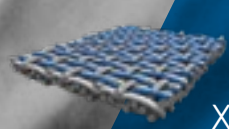
SPECTRUM

HELIOS

shines bright
at SCA Östrand // 24



New member of
the ANDRITZ GROUP:
Xerium Technologies, Inc.

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AUGMENTED REALITY CONTENT

To view videos, illustrations and picture galleries in a more direct and lively way, we added augmented reality to several articles! **Download our ANDRITZ AR APP** on our website or in the AppStore/PlayStore!

SCAN THE MARKED PAGES AND EXPERIENCE THE ENHANCED CONTENT.

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On the cover: Helios shines bright at SCA Östrand (page 24)

Engineered Success – Vision becoming reality

The common thread of "Engineered Success" runs throughout this issue of the SPECTRUM magazine.

First of all, we are delighted to bring you coverage of some major recent projects ANDRITZ has been involved in, for instance SCA Östrand's "Helios", our cover story, has seen the doubling of capacity of its softwood kraft pulp mill in Sundsvall, northern Sweden. As well, the delivery and installation of the new evaporation plant at Södra Cell's Mörrum mill, Sweden, which is assisting the Södra group in its ambitious sustainability targets.

The major projects will, of course, continue into the future. Recently, South American pulp producer Arauco awarded an order to ANDRITZ to deliver the latest technologies in woodyard, fiberline, evaporation and white liquor plant for its MAPA project in Chile, which will see modernisation and extension of its pulp mill at Horcones.

It does fill us with a certain pride when we see our customers' visions turning into reality with these large, ambitious projects. This close collaboration – along with mutual learning experiences – gives us a front-row seat and insight into what our customers need next, which is the perfect driver for our constant efforts in the area of R&D, engineering, project management and health & safety, just to mention some few areas. One of our latest developments for example is the new EvoDry™ Pulp Drying System that enhances efficiency and quality, at the same time as improving operator safety and environmental performance.

XERIUM TECHNOLOGIES – A VERY IMPORTANT ACQUISITION

As well as working hard on developing organic growth through new technology and products on the inside, we are also always looking out for complementary acquisitions on the outside. One of the most important strategic moves to take place at ANDRITZ was finalised recently with the acquisition of Xerium Technologies, a very well-known global manufacturer and supplier of machine clothing, roll covers for paper, tissue and board machines as well as maintenance and aftermarket services. You can read on page 6 more about this exciting acquisition and the range of new products and services ANDRITZ will be offering.

"ENGINEERED SUCCESS" certainly goes beyond the examples given here and presented in this issue of our customer magazine. "ENGINEERED SUCCESS" is also created through internal process optimization, introduction of new tools, continuous training of our own personnel, and fine-tuning of interfaces internally and towards external partners and customers. The results of these optimizations are proven through faster start-ups, improved project execution, reduction of materialized risks, less downtime, and overall lower cost of ownership.

Finally, we have a real treat for you in this issue. For the first time, you can experience augmented reality content by way of viewing videos, graphs, and picture galleries that bring this lively issue of SPECTRUM to life!

We hope you enjoy this issue of SPECTRUM!

Sincerely,

Joachim Schönbeck
Member of Executive Board
PULP & PAPER Capital Systems

Humbert Köfler
Member of Executive Board
PULP & PAPER Service & Units

NEWS

ANDRITZ Fabrics and Rolls – a new force in consumables and services

Xerium acquisition boosts ANDRITZ Fabrics and Rolls to full-line supplier.

One of the largest acquisition ANDRITZ Pulp & Paper has ever made was finalized in October last year with the purchase of Xerium Technologies, Inc., a leading, global supplier of consumable products and services for paper, board and tissue produces, as well as to pulp drying plants. Xerium supplies machine clothing, roll coverings, roll repair, maintenance and aftermarket services through well-known industry brands including Huyck Wangner, Weavexx, Stowe Woodward, Xibe/Stowe, Mount Hope, Robec, IRGA, JJ Plank and Spencer Johnston.

With the acquisition, a new, major force in the supply of consumables and services is created. Xerium joins with existing forming fabrics product group, ANDRITZ Kufferath – a member of the group since 2008 – to operate under the new name "ANDRITZ Fabrics and Rolls". The result of the integration of Xerium means that ANDRITZ becomes a full-line supplier of Paper Machine Clothing and Roll service for the global Pulp and Paper Industry as well as other process industries.

With a combined 200 years of experience, 500 patents, and some of the leading technologies available on the market, the two powerful brands in consumables and rolls, Xerium and ANDRITZ Kufferath create a truly global division through ANDRITZ Fabrics and Rolls. Serving the industry from numerous locations worldwide, the combined entities have 3,200 employees operating out of over 30 locations, including 12 machine clothing factories and 19 roll repair and mechanical service centers located in 15 countries. ANDRITZ Fabrics and Rolls sites are located in all the major pulp and paper producing regions, with plants in North America, Europe, Latin America, China and Asia-Pacific.

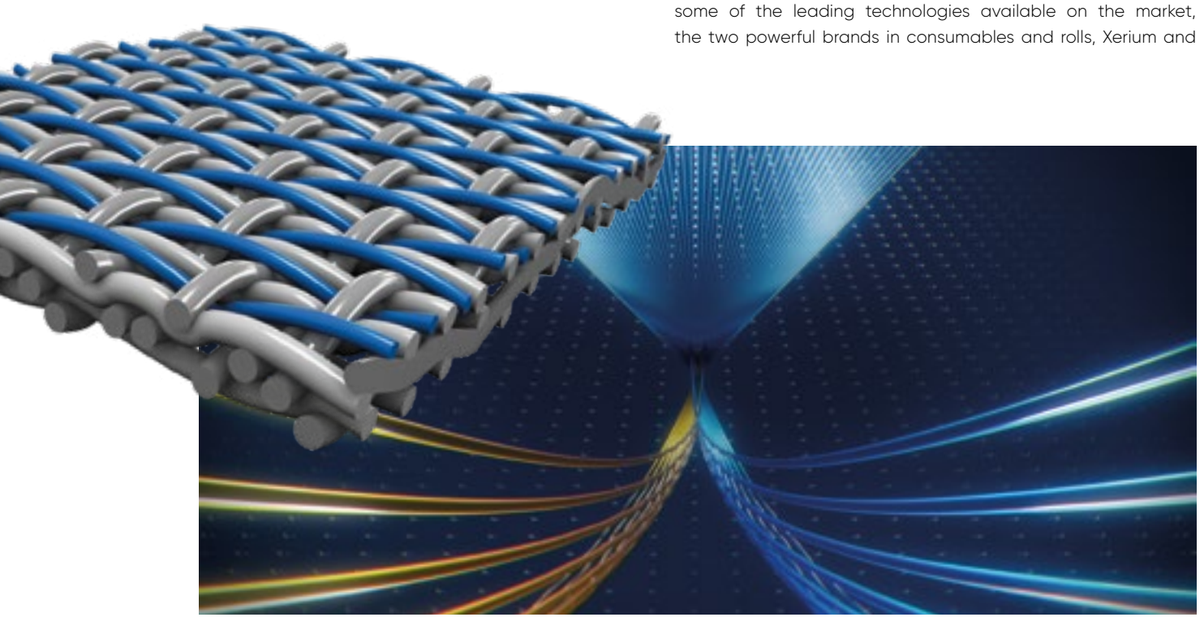
TECHNOLOGY LEADERSHIP AT THE FOREFRONT

ANDRITZ Fabrics and Rolls will continue to be a reliable partner to existing customers of Xerium branded products and services and crucially it will also continue in the tradition of being technology leader within the consumable sector. Both Xerium and ANDRITZ Kufferath have a solid tradition of innovation in their respective fields; companies under the Xerium umbrella have developed much of the latest technology seen in both clothing and roll technology being implemented today, and ANDRITZ Kufferath continues to have major successes in adding value through its Forming Fabric Technology products.

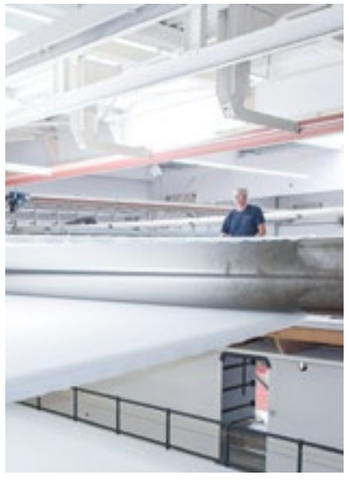
One area Xerium has also been pioneering with increasing success is in the area of real-time dynamic nip sensor technology, using its SMART™ Roll technology for remote monitoring via smartphone apps. These achievements fit well into ANDRITZ own developments in the field of IIoT products and offerings under the Metris brand.

Becoming a full line supplier means that existing customers of both Xerium and ANDRITZ Kufferath products and services can be assured of greater choice in forming, press, dryer fabrics and roll technology for all paper grades and paper machine designs from the new, global force in consumables and service, ANDRITZ Fabrics and Rolls.

ANDRITZ Fabrics and Rolls: 19 roll repair and mechanical service centers located in 15 countries



Strong global brands merged into one: ANDRITZ Fabrics and Rolls



ANDRITZ Fabrics and Rolls sites are located in all the major pulp and paper producing regions

TAKING CONTROL

Henan Tianbang Group Paper Company takes enormous pride in the quality of its fine paper products that are known and used all over China, as well as being exported around the world. When the company decided to end its dependence on market pulp and produce its own mechanical pulp, ANDRITZ was the first to be called.

Being a renowned specialist producer of fine paper products demands the strictest controls over the quality of raw materials. It also demands that costs be managed in the most effective way possible to ensure market position is advanced and maintained. China's Henan Tianbang Paper Company is one of those specialist producers that has carved something of a niche for itself in supplying paper for printing, note books, and superior quality writing paper across China and beyond. Even in an environment where the iPad and other electronic devices seem to be the fashion, Henan Tianbang is growing and gaining more market share with its dedicated products.

(Left to right): Zhang Xiuli, Sales Manager, ANDRITZ China; Gong Qunfei, Project Director/General Engineer, Henan Tianbang; Guo Quanming, Automation Manager, Henan Tianbang; Wang Yucai, Project Manager, ANDRITZ China

Mechanical pulp from the ANDRITZ P-RC APMP system

The P-RC APMP system using the very latest TwinFlo TF refiner from ANDRITZ

Since the company's formation outside the town of Huixian, Henan province, in 2008, it has been expanding and updating all areas of the mill, including installing a recycled fiber plant (DIP), supplied by ANDRITZ in 2011. The mill has also seen a new power boiler and effluent treatment plant installed in recent times to keep up with China's increasingly stringent environmental regulations.

Fan Naiwang, Henan Tianbang's owner, says of its move into producing its own mechanical pulp, "We operate two paper machines at the mill with a capacity of 150,000 tonnes a year in total and we were totally dependent on outside suppliers for our mechanical pulp, which came from some 70 kilometers away.

"This meant that we didn't have any control over the quality of the pulp we were receiving, and crucially it also meant that we had to pay the market price, which became unmanageable as prices became so volatile. We had to make a move into producing our own pulp so we could have better control."

Fortunately, the area around Huixian is home to a number of northern Chinese poplar plantations so the availability of wood was not a problem. However, there was no history of expertise at the mill when it came to mechanical pulp production, so Henan Tianbang had to start right at the beginning and dig deeply into what the requirements were.

"We did our own in-depth research on pulp making, and it soon became clear to us that ANDRITZ was the No.1 expert in the area of mechanical pulping," says Fan.

THE MOST COST-EFFECTIVE ROUTE

Henan Tianbang decided the best, most cost-effective route to take would be to look at quality second-hand equipment that could be installed to satisfy its needs. During the usual ongoing communication that took place between ANDRITZ and the Henan Tianbang mill, discussions began on what sort of solution could be provided to allow the mill to become self-sufficient in pulp. Zhang Xiuli, Regional Director, Pulping, Fiber and Recycling Division, ANDRITZ China, says, "We always keep our ear to the ground when it comes to customer requirements, and we began consulting with Henan Tianbang about a mechanical pulping solution that could suit the mill's needs. We have a vast network and history when it comes to second-hand equipment so we put some enquiries into place on a global scale."

It wasn't long before a solution was found in the shape of some previously owned Hymac equipment at a site in the USA. An added advantage is the fact that ANDRITZ had acquired Hymac in 1997, and therefore had extensive experience of the technology involved, as well as blending it in with its own, latest technology in pulping.

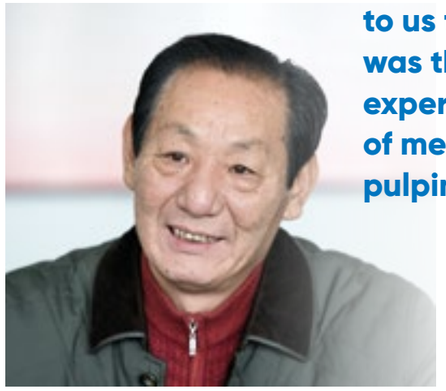
THE BEST OF BOTH WORLDS

In July 2016, a decision was made to install a variety of previously owned Hymac equipment that would go along with some of the very latest ANDRITZ pulping technology. The line would be designed based on ANDRITZ's own P-RC APMP technology, a proven and vastly successful mechanical pulping technology with more than 34 installations globally, 30 of those in China.

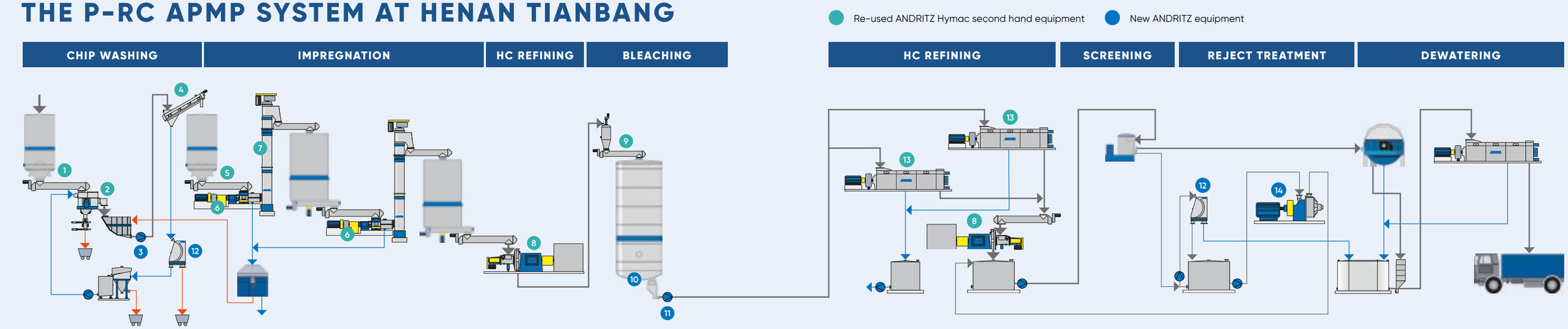
Zhang says, "This was the perfect solution for Henan Tianbang as it got the best of both worlds; the cost efficiency of using previously owned equipment and the very latest from ANDRITZ in technology and process design."

FAN NAIWANG
Owner, Henan Tianbang Group Paper Company

"We did our own in-depth research on pulp making, and it soon became clear to us that ANDRITZ was the No. 1 expert in the area of mechanical pulping."



THE P-RC APMP SYSTEM AT HENAN TIANBANG



GONG QUNFEI
Project Director/General Engineer, Henan Tianbang

"Start-up went with virtually no hitches at all as there was a lot of pre-planning carried out by ANDRITZ before the installation to make sure all the various components fitted perfectly well together."

THE ANDRITZ P-RC APMP SYSTEM

The advanced and patented P-RC APMP (Pre-conditioning Refiner Chemical Alkaline Peroxide Mechanical Pulping) technology applies chemicals – Sodium hydroxide (NaOH), and hydrogen peroxide (H2O2) – in impregnation and after the primary refiner. The HC bleaching tower is located right after the primary refiner, but before secondary refining and screening. A dewatering and washing stage is added after the HC bleaching tower to provide high consistency for the 2nd stage refiner and to remove detrimental substances. The rejects from the screens are treated in a new low-consistency refiner to remove shives to a minimum and improve fiber quality. At the end of the process, a pulp screw press dewaters the pulp to high consistency and reduces COD to a minimum before the pulp is loaded to trucks.

Commissioning and start-up of the line took place between the middle of September and the end of October 2017, with very few reported challenges. Gong Qunfei, Project Director and General Engineer, Henan Tianbang says, "We were very impressed with the knowledge that ANDRITZ had, particularly when it came to installing and commissioning the 20-year-old Hymac equipment. A lot of the information ANDRITZ engineers were using came from the original manuals that came with the equipment. It was amazing how they used their knowledge and expertise to make the old and new work together.

"Start-up went with virtually no hitches at all as there was a lot of pre-planning carried out by ANDRITZ before the installation to make sure all the various components fitted perfectly well together."

FREEDOM AND PROFIT

The mill is now totally self-sufficient for its mechanical pulp needs, and crucially the quality of the pulp for the paper machines reached the required standards virtually at the start-up. Wang Yucai, Project Manager, ANDRITZ China says, "The pulp quality parameters such as freeness, brightness, shive content, and fiber length are all comparable to, if not better than, the previous mechanical pulp being used from the market.

"But what this P-RC APMP system has given the Henan Tianbang mill is freedom when it comes to adjusting the pulp quality as as need for the differing types of products they are producing on their paper machines."

Zhang comments, "Although the Hymac equipment is 20 years old, ANDRITZ designed the system using the latest P-RC APMP technology, which is very 21st century. It´s making a huge difference now to the bottom line at the mill as it it is no longer dependent on market pulp and on the high price that comes with it."

The owner of the mill, Fan Naiwang, concludes, "This project was extremely important to the Henan Tianbang Group Paper Company, and we were really impressed with the local ANDRITZ Chinese engineers and service people working on the project. I made daily checks on the progress of the project, and whatever time of day or night I called in, there was always diligent work taking place.

"And we are really pleased with the outcome. We are running at a capacity of 50,000 tonnes per year, but we are confident that we can raise that to 60,000 tonnes, or perhaps beyond that in the future."

Hymac 20-year-old technology was implemented into the latest ANDRITZ P-RC APMP system for the Henan Tianbang

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THE TECHNOLOGY MIX

ANDRITZ HYMAC SECOND-HAND EQUIPMENT LIST

- Chip bin discharger
- Chip washer
- Chip dewatering screw
- Pre-steaming bin discharger
- Plug screw feeders
- Impregnator
- High-consistency refiners
- Chemical mixing conveyor
- Pulp screw presses

ANDRITZ NEW EQUIPMENT (ALL MANUFACTURED IN CHINA)

- Chip pump
- Bleaching tower discharger
- Medium-consistency pump
- Micra screens
- Low-consistency refiner
- Basic engineering of whole system
- Commissioning and start-up service

CETI: WORKING AT THE CUTTING EDGE

Major, definitive research into nonwoven raw materials, applications and production models and methods are all in a day's work for the European Center for Innovative Textiles (CETI) in France. The latest ANDRITZ state-of-the-art air-through bonding nonwoven technology is right at the heart of the center's globally renowned research.

"We work in a challenging environment," says Pascal Denizart, CEO of CETI. "We have to get into the heads of the final users – find out about their needs, wants, and desires – what they'll be looking at next in terms of touch, feel, and raw material preferences. We have to get ahead of the curve, predict the trends, and create the products."

Denizart was talking to SPECTRUM on a visit to CETI's spectacular and futuristic research and prototyping center dedicated to nonwoven and new textile applications. The center is located in Tourcoing and Roubaix near Lille in northern France and was previously known as "The City of a Thousand Chimneys," due to the huge number of textile mills and factories once located here.

"R&D on raw materials, the search for new and more sustainable fibers, and prototyping new and better production methods for our clients and customers are all in our DNA here at CETI. Being sited in the European Metropole of Lille with its history steeped in textiles and fabrics reinforces our mission to be at the forefront of all the applications we are working on," adds Denizart.

A MAJOR TECHNOLOGY PARTNER

ANDRITZ has been a major technology partner with CETI since it was launched in 2012, supplying the latest nonwoven technologies from its own sites in France and Germany, including equipment for needlepunch, spunlace, carding, and air-through bonding. One of the latest additions to CETI's nonwovens production arsenal is a flat oven supplied by ANDRITZ Perfojet, Montbonnot, France. The flat oven is perfect for producing the latest trend in nonwovens – lightweight carded webs that work with bi-component technology. This means that CETI and its clients now have the most up-to-date equipment and technology to produce the very latest in high-end nonwovens for the hygiene market.

Frederic Noelle, Division Head of Innovation and IP, ANDRITZ Nonwoven, says, "Like CETI, we at ANDRITZ working in the nonwovens area are always looking out for the next trend, the next customer preferences and, of course, working on ways to best produce those preferred products.

"We had been noticing more and more that air-through-bonded nonwoven products were growing in demand, particularly in the Far East, and particularly in the premium hygiene sector; however, there was no complete pilot line in Europe. We discussed our findings on the ground with CETI, where we had already installed an Omega dryer and oven inline with a nonwoven card as well as a spunlace unit. Very soon it was mutually decided that air-through-bonded nonwovens were an important trend that demanded an R&D solution at the research facilities in the European Metropole of Lille.

"It took almost exactly one year from the final decision to the delivery, installation, and commissioning of the flat oven at the end of 2017. This was a challenge for a number of reasons, but mostly because of space constraints. Also, because this was a pilot line built with versatility in mind, the 12 meters long and 12 tons in weight flat oven had to be movable for when there were trials of nonwovens not using this oven. Essentially, CETI needed a completely plug and play solution to slide in the oven when needed for trials, and then unplug and slide out when not needed."

A LOT OF NEW OPPORTUNITIES

The oven itself has been designed to cope with speeds much higher than normal capacity to make sure that it's futureproof in terms of increased

"Our strength is to take an ingenious invention or idea from our clients and bring it through to prototype as fast as possible. "

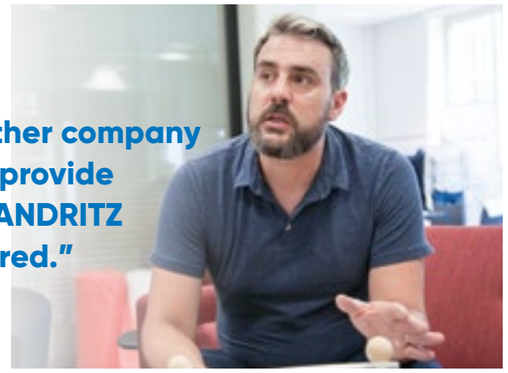
PASCAL DENIZART
CEO, CETI

"Like CETI, we at ANDRITZ working in the nonwovens area are always looking for the next trend, the next customer preferences and, of course, working on ways to best produce those preferred products."

FREDERIC NOELLE
Division Head of Innovation and IP
ANDRITZ Nonwoven

SIMON FREMEAUX
R&D Production Manager, CETI

"No other company could provide what ANDRITZ delivered."



ANDRITZ air-through-bonding line at the CETI facilities

"With this new technology, we can apply all sorts of new features to nonwovens..."

MÉLANIE MONCEAUX
R&D Engineer and Senior Project Manager, CETI

running speeds, it is also able to run in both directions to enable different production technologies to be inserted and applied at either end. The oven can be unplugged and moved very quickly with three people and uses air-cushioned feet that are attached to the frame of the oven.

The flat oven is also prepared for the complete monitoring of the air-through-bonding process through the ANDRITZ IIoT solution Metris.

The completed project provides CETI and its customers an R&D platform with both flat and Omega ovens for the prototyping of the fast growing trends in air-through-bonding nonwovens. This unique line covers most of the customer expectations and market needs.

So, what new opportunities has the new flat oven technology brought to CETI and its clients? Mélanie Monceaux, R&D Engineer and Senior Project Manager at CETI says, "With this new technology, we can apply all sorts of new features to nonwovens; for instance, for hygiene products we can increase bulk by blending other fibers into the mix. We are also working on other solutions when it comes to sustainability, for instance, tea bags, where we can eliminate the binders, and therefore make the products more biodegradable.

"The flat oven has also been generating a lot of interest among our customers who have a lot of their own ideas when it comes to testing new products using the air-through-bonded nonwoven process, particularly when it comes to using more sustainable and renewable raw materials."

"Sustainable raw material and biodegradable end products are becoming increasingly important for us at ANDRITZ when we are designing technology for nonwovens," adds. Noelle, "The air-through-bonding process can also use natural fibers from wood and, as the process replaces chemical bonding, the end result can be a much more sustainable nonwoven product."

In terms of production, CETI is clearly delighted with the technology ANDRITZ has supplied since its inception in 2012, including the latest in the shape of the flat oven, which has enhanced the ability within CETI to really get things done when it comes to R&D. Simon Fremeaux, CETI's R&D Production Manager says, "When CETI was founded, we knew that there were very few companies in the world that could be considered leaders in nonwoven technology; ANDRITZ was one of those, and we have worked together well since the beginning. When it came to the flat oven, the prerequisite was to have a machine that was totally flexible, that could be moved, and stored, and then implemented again with speed when needed.

"No other company could provide what ANDRITZ delivered. Added to the size, speed, and versatility of plug and play, ANDRITZ also added the feature that it could run in both directions. We truly have a customized piece of equipment that has added a lot of extra possibilities to CETI's R&D offerings."

FAST PROTOTYPING IS THE KEY

CETI is literally at the cutting edge of innovation for products that are going to be used by a lot of us as well as generations to come in the areas of hygiene, automotive, and textile applications. This carries huge responsibilities as the demands of the end user are increasing. CEO Denizart says, "The consumer is becoming much more demanding, and is the driving force behind design, quality, price, and sustainability. More and more the well-informed consumer wants to know exactly what the product is made of and where it is coming from.

"At CETI, our core business is building, working on new materials, and prototyping products that brands can have faith in. Our strength is to take an ingenious invention or idea from our clients and bring it through to prototype as fast as possible. This is where our partnership with ANDRITZ is key for us; their experts really listen to what we want, as well as share their own knowledge. They then apply our needs and their own expertise, and the results speak for themselves.

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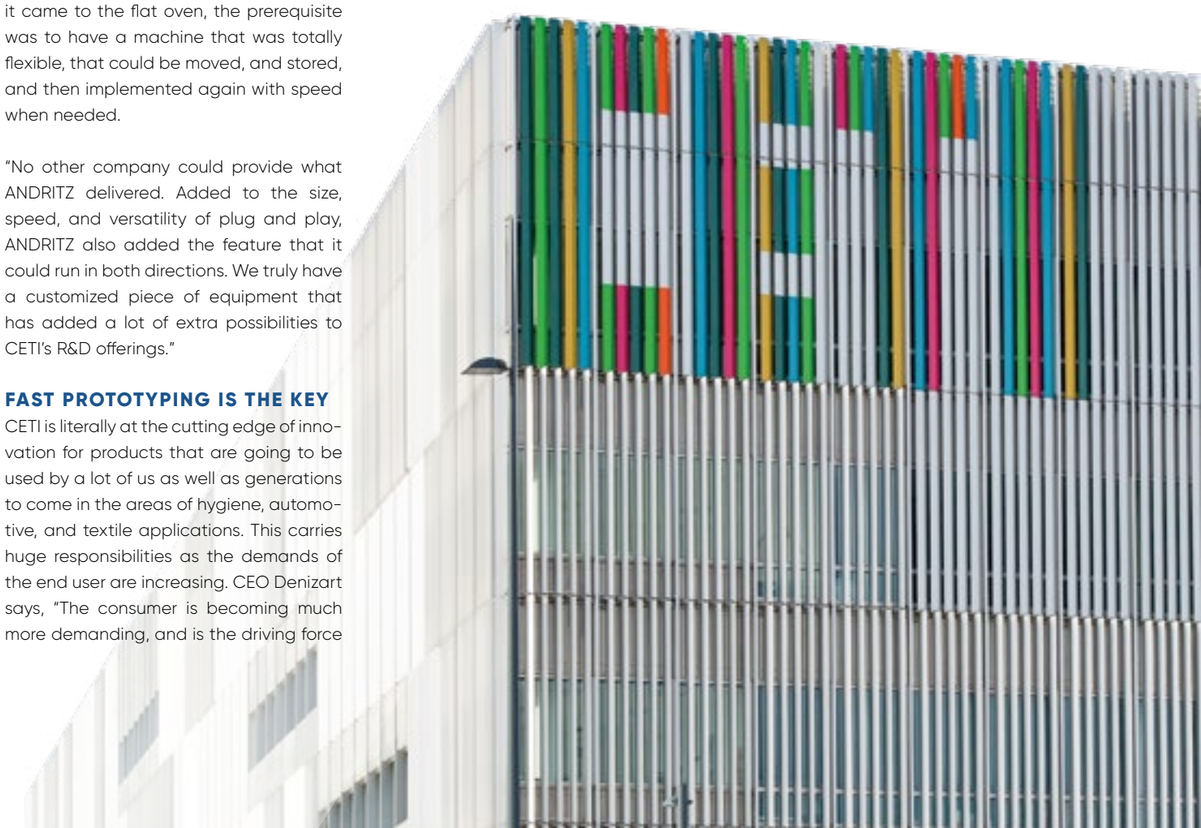
CETI building in Tourcoing



FIBER GPS™ THE SHORTEST ROUTE TO FIBER QUALITY

Innovative GPS navigates shortest route to fiber quality at lowest cost.

Like your smartphone's GPS can guide you almost anywhere in the world, the "papermaking GPS" guides you in making the right choices about fiber mix, applied energy, and paper quality. It's significantly reducing trial and error on your machine and saving time and money.

While it is true that papermakers have considerably more data today to help them navigate their processes, there are still some blind spots. For example, in the stock preparation area even experienced papermakers are "flying blind" in refiner operation. Operator screens do not show how a change in applied power or fiber mix affects stock quality in the machine chest. In most cases, laboratory tests received after the sheet has already been produced are the only way to probe the stock quality. This results in outdated quality measurements that are no longer helpful, as the pulp is already processed with potentially unacceptable quality, resulting in off-grade quality.

One way to describe the operational settings that produce paper within specification is to run trials with different fibers, additives, and applied power settings and then to determine the corresponding effect on quality. However, on-machine trials can be risky and expensive, and off-machine trials can be inconclusive since the actual production equipment is not used. The ability to predict real-time cause-and-effect in refiner operation does not exist… until now.

BRINGING LIGHT INTO THE DARKNESS

For many years, a papermaker's goal has been to have the means of visualizing fiber quality during refiner operation and to see the real-time variation in quality with process changes. In the early 2000s, ANDRITZ developed a proprietary simulation tool, which enhanced the refiner plate selection process leading to energy savings and fiber quality improvements, but it still lacked insight into real-time fiber quality.

"The days of flying blind are now over. ANDRITZ Fiber GPS, a software based simulation and optimization tool, brings light into the darkness and allows papermakers to look into stock preparation refiners while in operation," says Peter Antensteiner – Vice President, LC Refiner Plates, Fiber GPS.

Fiber GPS™ shows the operator all relevant parameters at a glance

FOCUS ON THE BIG (AND SMALL) PICTURE

Fiber GPS is the evolution of the earlier simulation tool with fiber quality data models. Instead of focusing only on refining process parameters, Fiber GPS utilizes a statistical quality model, which combines these parameters with fiber quality data. This model uses pulp quality data representing intrinsic fiber quality features such as length, chemical surface composition, and fines content, as well as information about "refinability," to calculate fiber qualities of refined pulp mixtures. With this expansion of view from individual refiners to system-wide fiber quality development, a user can visualize and understand the quality impact of fiber mix, flow and consistency, power application, and plate design.

By simulating the complete stock preparation area, Fiber GPS allows the user to "deep-dive" into the fiber quality customization process.

SAVINGS POTENTIAL IN A MIXED UP FIBER WORLD

Another breakthrough in Fiber GPS is the ability to predict pulp quality for a fiber mix entering the refiner. Until now, papermakers were able to determine pulp quality for only single fiber types, so this development makes Fiber GPS unique and brings with it a sizable savings potential for customers. With Fiber GPS, operators can confidently make changes to achieve the desired paper quality and avoid on-machine disruptions due to trial and error. Fiber GPS™, sold on a monthly fee basis, helps optimizing the total cost of ownership.

FIBER GPS WITH ANDRITZ REFINER PLATES – THE COMPREHENSIVE STOCK PREPARATION SOLUTION

The beating heart of every stock preparation area is its refiners. The core of each refiner is its refiner plates. ANDRITZ plate specialists will be able to support Fiber GPS customers by reducing trial and error via simulation and scenario management. ANDRITZ will be able to optimize plate technology for a customer's particular system and grade structure for maximized quality effectiveness and reduced total cost of ownership. Fiber GPS expands a papermaker's view from a single refiner at a time to complete stock preparation area, and the effect of each plate design choice becomes accessible, which maximizes the effectiveness of the plate selection process. ANDRITZ offers various beneficial packages with Fiber GPS including ANDRITZ refiner plates and Refiner service.

Antensteiner concludes, "Savings opportunities are boundless! When market prices for different fiber sources rise, Fiber GPS can reduce total cost of ownership by suggesting a cheaper mix. Also, sophisticated algorithms behind Fiber GPS provide reliable fiber quality prediction over several stages of refining as well as mixing of different refining lines – a true breakthrough."

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"Fiber GPS has an optimization-assist mode that guides operators to a best-case scenario in terms of cost and quality."

PETER ANTENSTEINER
Vice President
LC Refining

BENEFITS AT A GLANCE:

QUALITY ASSURANCE
Visualize and maintain desired paper grade quality

TOTAL COST OF OWNERSHIP REDUCTION
Optimize Total Cost of Ownership (TCO) and see historical comparison between real-time and optimized costs

FIBER MIX OPTIMIZATION
Discover which fiber mix maximizes savings potential while meeting quality specifications

PAPER GRADE DEVELOPMENT
Set up and manage quality standards for each paper grade to compare different scenarios

REFINER PLATE OPTIMIZATION
Browse through ANDRITZ refiner plate library and optimize plate patterns

VENDOR QUALIFICATION
Determine the effect different pulps have on paper grades and how to best use specific pulps

GETTING TECHNICAL

AUTOMATION

Fiber GPS provides real-time, simulation, and optimization assisted operations. It comprises ANDRITZ IDEAS simulation platform as a virtual plant, I/O point communication with DCS for real-time data, Metris historian, and a custom Fiber GPS graphical interface.

FIBER GPS OPERATING MODES

In Real-Time Mode, Fiber GPS receives process parameters directly from the mill, and it allows operators to visualize pulp quality currently being produced within a spider graph and whether the quality meets the desired paper grade specifications. With this information, operators can proactively course correct in real time as needed.

Simulation Mode is an interactive space that lets users manipulate the various process and equipment parameters like flow rate, pulp furnish, power settings, and refiner plates and shows how these changes affect machine chest quality. Operators can save these "what if" scenarios for further analysis and reduce the need for mill trials.

Optimization mode recommends best-case operating conditions without trial and error on the machine and allows the operator to manage the total cost of ownership and fiber quality. An operator can also see a comparison between real time and optimized process conditions, always remaining in control of the process.

TOTAL COST OF OWNERSHIP REDUCTION

To reduce total cost, Fiber GPS considers the refiner power and cost of the various fibers that a mill uses and recommends the most cost-effective fiber mix and power settings that will produce desired sheet quality.

REMOTE ONLINE SUPPORT

Fiber GPS™ is a software-based solution, which is installed at the mill site. ANDRITZ global refiner plate specialists and start up team are able to remotely monitor the system and provide assistance as needed.

Key Equipment: Let your performance grow with

THE NEW INNOVATIVE EvoDry™ PULP DRYING SYSTEM FROM ANDRITZ

The EvoDry Pulp Drying System designed by ANDRITZ is a new and innovative system that combines selected areas of development into one complete, reliable, high-performance drying line.

In designing the pulp drying system, ANDRITZ has produced a high-performing, low-maintenance, all-in-one drying line unlike any other drying system, while also considering aspects relating to health, safety, and the environment.

The excellent performance of the line is due to a variety of new technologies that work together and alongside existing components. The new features are designed to achieve greater reliability and flexibility, making an efficient and reliable drying line that produces top pulp quality.

To increase the performance of the entire drying process, the new concept includes:

- Patented EvoDry sheet dryer that increases evaporation capacity for higher performance
- Patented system of web position sensors and a self-adjusting turning guide roll
- Patented broke detection system for fast and reliable restarts
- New closed-draw feature to reduce sheet breaks
- State-of-the-art features for fast, safe dryer cleaning

HEALTH AND SAFETY CONCEPTS

As well as high operational functionality and performance, EvoDry has been designed with health and safety in mind, as can be seen in the many automated features incorporated into the system. The new design has focused on less direct operator contact with the components of the drying line and, consequently, less risk of accidents. This new system features a fully automatic hands-free tail threading system throughout the entire drying line, making it both faster and safer and giving less opportunity for errors. Additionally, the new felt changing system that is part of EvoDry is quick and easy to install and remove, thus another improvement to increase runability and safety.

ENVIRONMENTAL AND ENERGY EFFICIENCY

A significant factor in the design of EvoDry is the creation of a pulp drying system that helps to improve the environmental impact of various mill processes. This has been achieved by optimizing newly designed key equipment to reduce energy consumption and introducing new developments in energy-saving technologies, such as the boiler exhaust energy recovery system or the newly designed combi-press.

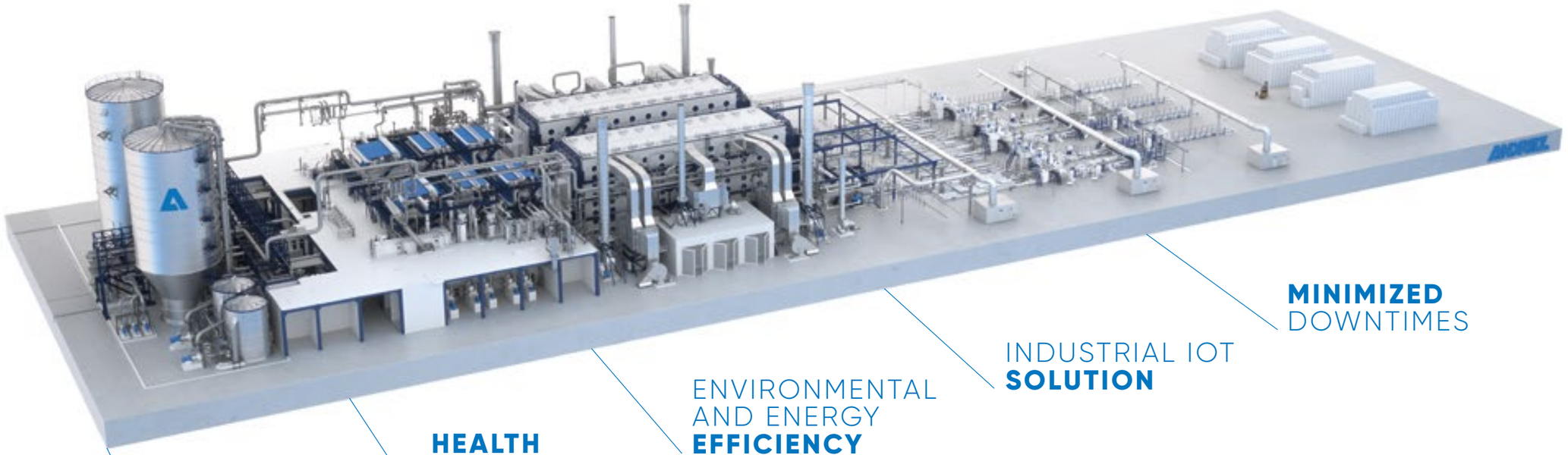
In addition to energy use, another environmental concern for pulp drying lines is the need for large quantities of fresh water. This important issue has received much consideration in the design of the EvoDry system. The new pulp drying system can reduce the amount of fresh water by reusing a larger amount of internal process water. Not only does this put less strain on the environment, it also means a reduction in operating costs.

In creating a new, efficient, and reliable pulp drying line that is more environmentally friendly, has improved health and safety features, is low maintenance, and has higher operational runability, ANDRITZ has also designed a system that has lower operating costs. The more efficient equipment, the lower energy requirements, and the ability to reuse water from other stages of the process all combine to reduce the overall expense of running a drying line.

INDUSTRIAL IOT SOLUTION

The EvoDry Pulp Drying System is an efficient and reliable drying line, and offers greater reliability and more flexibility than any previous drying systems. The introduction of a web-based solution called PREDICT (via Metris - ANDRITZ' brand of Industrial Internet of Things) enables performance monitoring, data analysis, fault detection, and maintenance efficiency, and makes EvoDry one of the most innovative all-in-one drying systems available.

CONTACT
pulpdryinglines@andritz.com



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WITH THE EvoDry PULP DRYING SYSTEM, ANDRITZ HAS OPTIMIZED PULP DRYING PERFORMANCE BY INTRODUCING KEY FACTORS SUCH AS:

- Higher operational runability
- Improved performance and reliability
- High-quality pulp
- Reduced operating costs
- Increased health and safety performance
- Improved environmental conditions

HELIOS SHINES BRIGHT AT SCA ÖSTRAND

The largest engineering projects northern Sweden has ever seen was completed recently with the doubling of capacity at SCA Östrand's softwood kraft pulp mill. The project – named Helios after the God of the Sun in Greek mythology – is now setting a new global benchmark in high-performance pulp production. ANDRITZ supplied some of the latest key technology to the completely rebuilt mill.

→

Left to right: Göran Bröttgårdh, ANDRITZ; Ingela Ekebro, SCA; Håkan Wänglund, SCA; and Henrik Grönqvist, ANDRITZ; alongside the new EvoDry™ Pulp Drying System from ANDRITZ

INGELA EKEBRO
President
Project Helios

"We needed to be sure we were aware of all the impacts that would occur with such an expansion at the mill."

"When we started this project, we wanted to create a pulp mill that would be the brightest star in the heavens," says SCA Östrand's Helios Project President, Ingela Ekebro. "We had an internal competition to find a name, and one name jumped out clearly, 'Helios' the ancient Greek name for the sun, the brightest star in our solar system."

The name Helios is indeed fitting – the project has been immense in its scope and scale – the aim was to more than double the capacity of Östrand's softwood kraft pulp mill from 430,000 tonnes a year to 900,000 tonnes – but with some extra challenges thrown in; the expansion was to take place in the same mill perimeter (there was no extra land available) and it had to take place while the mill was still running.

So why not a greenfield mill? Ekebro says, "That decision was quite easy for SCA to take. We have produced pulp on the site since 1932, we have all the infrastructure in place, and we have a lot of skilled people here – also, very importantly, it made good financial sense."

The expansion of Östrand comes at a time of increasing demand for high-quality softwood pulp, which is the preferred raw material of many tissue producers around the world. Arvid Eriksson, Sales Director, Tissue, SCA, says, "Two things are key to our customers; they want to secure sufficient volumes of certified pulp and they want a top performing product where tensile strength is of particular importance. We do both.

"With a strong environmental profile and a low carbon footprint, we can help our customers reach their environmental goals. Our environmental data will be the new industry benchmark, we will increase tensile strength by more than 5%, which will help our customers increase their product quality and at the same time reduce their energy use."

A METICULOUSLY PLANNED EXPANSION

Plans for expansion at Östrand have clearly been on SCA's agenda for some time. As long ago as 2004, a new recovery boiler was ordered from ANDRITZ with a unique insistence; it had to be expandable for an imminent future capacity increase.

"There was never a question of whether the Helios project would happen," adds Ekebro. "It was always a case of when. We have been preparing for this expansion for some time now.

"When it came to the recovery boiler, we initially had it designed for higher steam pressure and better efficiency and also with an increased turbine capacity to enable us to produce much more electricity. Crucially, the housing had to be built with a movable wall so we could increase the capacity of the boiler exactly when we needed to."

After the recovery boiler installation and start-up in 2006, the next logical step was a new lime kiln, also supplied by ANDRITZ which started up in 2011. At the time, this move sparked off discussions into the viability of doubling capacity of the mill and presentations were made to senior management at SCA, who found the content "very interesting," says Ekebro.

"But of course a major evaluation of the complete SCA value chain, from forest to final products, was needed before we could embark on such an ambitious project."

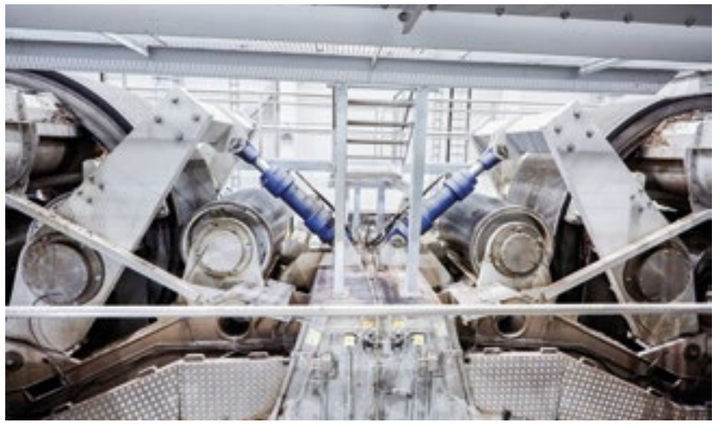
In January 2014, a feasibility study was conducted with the results being presented six months later, after which the go ahead for the pre-project study was given. Around 45 people worked on the pre-project study, which looked into every conceivable area that the Helios project might affect. "We looked into every single aspect, not just the processes. We looked at market conditions, the quality aspects, the supply situation, and the wood logistics," says Ekebro. "We needed to be sure we were aware of all the impacts that would occur with such an expansion at the mill."

There were five start-ups in the white liquor plant during project Helios

The new EvoDry™ Pulp Drying System from ANDRITZ

HÅKAN WÄNGLUND
General Project Manager
Project Helios

"The recovery boiler expansion was really special, and something that had never been done before, so there was a lot of excitement around the mill."



Two new-generation HQ-Press bark presses at wood processing increase energy value of bark.

Kristoffer Mohlin, Project Engineer, Project Helios (left); Johannes Jammernegg, Senior Start-up Manager, Pulp Drying, ANDRITZ

"It is, of course, during this pre-study when we have lots of discussions with suppliers," says Håkan Wänglund, General Project Manager, Helios. "While we know how to run a pulp mill, we obviously don't have the experience of what is latest on the market, and what new technology we should be looking at to maximize the project's success. This is where knowledge and the latest in technology and processing experience from ANDRITZ was vital."

"The discussions with suppliers during the pre-project study were extremely important for us because that is when we set the framework for the design," adds Ekebro.

THE LATEST PROCESSES FOR LOW ENERGY AND CHEMICAL CONSUMPTION

ANDRITZ was chosen to supply its very latest technology to four key areas of the Helios project; wood processing, pulp drying, the white liquor plant and the recovery boiler.

"ANDRITZ was selected as a supplier because of its excellent technology in these process areas," says Ekebro. "In particular, we searched for the latest designed processes that have low energy and chemical consumption and very high productivity."

New technology for the Helios project included the latest ANDRITZ HQ-Presses in wood processing, new technology for burning wood dust in the lime kiln, a new state-of-the-art EvoDry Pulp Drying System and, finally, the skill and expertise to expand the recovery boiler.

Henrik Grönqvist, Project Director, ANDRITZ, Helios Project, says, "We have always had the utmost respect for SCA's spirit of willingness to try something new, and in the Helios project we brought in some of our latest and most exciting technology, which has been designed, at its very heart, to improve performance all around, but particularly in reducing energy use across the mill.

"In terms of our very latest technology installed at SCA Östrand, on the wood processing side we have the ANDRITZ HQ-Presses, which cut down energy greatly when it comes to burning bark in the boiler. In the white liquor plant, we have eliminated the use of fossil oil use in the lime kiln by installing new technology that burns wood dust instead. The EvoDry Pulp Drying System has many new, groundbreaking innovations, but in the Helios project case it is extra special, as we are taking additional heat from recovery boiler exhaust

GÖRAN BRÖTTGÅRDH
Project Director, Commercial,
ANDRITZ, Helios Project

LOGISTICAL CHALLENGES AND HEALTH AND SAFETY ASPECTS OF THE PROJECT:

"The Helios project was intense from the very start in August 2016 when the first erection activities began here on site. In the project execution phase, it was obvious that the storage area and truck transportation to the site were places where bottlenecks could occur. We at ANDRITZ organized our own area around 10 km away from the mill where we could bring in cargo and have an intermediate storage both indoor and outdoor according to the materials and equipment being stored. This worked well, as we could bring all the project parts and equipment needed in on a just-in-time basis.

The biggest challenge was, of course, the shutdown we had starting in April 2018 when we had a lot of activity at the site. At this time we had around 600 people of all different nationalities performing numerous different tasks on the white liquor plant, EvoDry sheet dryer, and recovery boiler expansion. In fact, we had up to 500 people working in the recovery boiler building alone at this time, as this was when we carried out the immense task of moving the recovery boiler wall – over 70 m high and weighing 460 tonnes.

From the very beginning, safety was regarded as the most important target for both SCA and ANDRITZ. There were no other risks that could influence the project more than a serious accident. That is why a Lost Time Accidents (LTA) target as low as five was calculated from the very first day and was jointly agreed with SCA for the Helios project. ANDRITZ achieved this target for 1.1 million working hours with an LTA of 4.54 calculated for all the site work carried out in this project. This figure was a result of a huge amount of dedication and effort of the whole project team."

SAFETY STATISTICS FOR THE HELIOS PROJECT:

4.54 LTA (calculated from the first day)

1,100,000 total working hours

0 serious or fatal injuries occurred during this project. Most general injury was due to slipping/tripping.

>100 near miss reports issued leading to more than

>200 safety observations which were used in preventive actions

400 common site safety walks together with SCA performed

325 tool box talks were held by ANDRITZ together with sub-suppliers

440 ANDRITZ's own induction training sessions held at site before any work was allowed to start, in addition to mill's own safety introductions

Helios project was a really well-planned and designed project in order to double the capacity, though keeping the existing mill running almost the whole time

and producing additional low pressure steam, which is used in the pulp dryer - this saves the fresh steam and has never been done before."

The recovery boiler expansion was something of a project on its own. Grönqvist explains, "This was really new thinking, to expand capacity of the recovery boiler from 3,300 to 5,000 tds/d, and meant a lot of design and on-site engineering work. During the shutdown, we had to move a hanging wall (over 70 meters high and weighing 460 tonnes) 3.8 meters to house the expanded boiler. This exercise had to be 100% accurate, as there was only a 15 mm clearance for the expanded boiler to fit in."

SCA Project Manager Wänglund says, "The recovery boiler expansion was really special, and something that had never been done before, so there was a lot of excitement around the mill. There were close to 500 people working day and night while the wall was moved, so the atmosphere was very intense. In the end we were even more delighted, as initially the boiler capacity was going to be expanded to 4,400 tds/d, but during the pre-project we reached another figure of 5,000 tds/d which, was extremely good for us.

Commenting on the scope of supply, Ekebro says, "Something we really like about ANDRITZ is its boldness, and way of introducing new technologies and new solutions."

TEN PERFECTLY TIMED SEQUENTIAL START-UPS

The project to double capacity at SCA Östrand took a total of nearly three years with numerous start-ups of combined equipment at carefully timed phases to allow minimum disruption to the mill operation. In fact, there was only one complete shutdown during the whole project, when the recovery boiler expansion took place.

HENRIK GRÖNQVIST
Project Director, ANDRITZ
Helios Project

"Ten successful start-ups while the mill was running with no serious incidents or accidents was possible due to good cooperation!"

Over the course of the Helios project, there were 10 separate ANDRITZ start-ups, including five in the white liquor plant, two in the wood processing area, two in pulp drying and the recovery boiler start-up.

The recovery boiler fired up on June 23 and full production of the complete Helios project began on July 2, 2018.

Ekebro says, "To build a new mill inside an ongoing operation has some challenges, of course, but there are also major advantages, particularly if you get the start-up sequences right when it comes to all the various processes and equipment.

"We started up the wood processing plant first, followed by the pulp dryer, which gave us a huge advantage to have these working before the main start-up up of the recovery boiler."

Wänglund adds, "The numerous sequential start-ups were an advantage, as they gave us a buffer and extra time to debug the system before the main start-up when full capacity would be expected."

Grönqvist concludes, "Ten successful start-ups by ANDRITZ while the mill was still running with no serious incidents or accidents is work well done. Without good cooperation with SCA and seamless teamwork within the ANDRITZ team, this would never have been possible."

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The unique ANDRITZ horizontally fed HHQ-Chippers produce excellent chip quality

View from the inside of the lime kiln, using wood powder

Parts of the heat recovery system located in pulp drying

The recovery boiler was expanded by 3.8 m and the capacity was increased from 3,300 to 5,000 tds/d

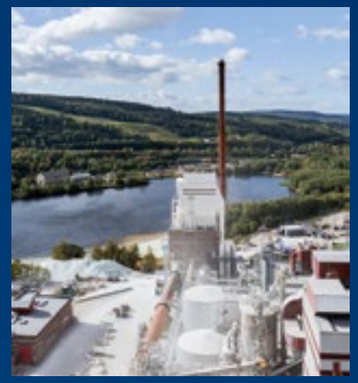
GETTING TECHNICAL

HELIOS / SCA ÖSTRAND

ANDRITZ SUPPLIED NEW PRODUCTION TECHNOLOGIES AND EQUIPMENT FOR THE EXTENSION OF SCA'S ÖSTRAND PULP MILL:

Complete debarking plant with two parallel debarking and chipping lines, each consisting of a PowerFeed de-icing conveyor, a water hydrostatically supported debarking drum for a capacity of 425 m³ sob/h and measuring 5.5 × 39 meters, and horizontally fed, XL-size HHQ–Chipper operating with TK-IV QuickClamp knife system. The delivery also includes two new-generation HQ-Press bark presses resulting in excellent bark dry content, as well as modernization of the existing chip handling, chip screening, and conveying system to the new fiberline.

ANDRITZ new, innovative **EvoDry Pulp Drying System** with its energy-saving technologies, which substantially reduce the mill's operating costs, including a boiler exhaust energy recovery system, fine screening, a twin wire dewatering system with a fully automatic tail threading system to meet strictest health, safety, and environmental regulations, a new-generation sheet dryer for lowest downtime and fast start-up, as well as a cutter and two baling lines.



New recausticizing machinery including a LimeGreen green liquor filter enabling efficient green liquor filtration with a minimum of waste going to landfill, two LimeFree centrifuges for dregs, LimeSlake technology, LimeWhite white liquor disc filter to optimize white liquor quality, and LimeDry lime mud disc filter upgrade;

ANDRITZ LimeFlash technology in the existing lime kiln, enabling a substantial increase in the capacity of the existing lime kiln without the need to invest in a new lime kiln. The delivery also included upgrade of the existing **wood dust burning system**, which ANDRITZ supplied in 2011 in order to support the new increased lime kiln capacity.

Substantial increase in the recovery boiler capacity from 3,300 to 5,000 tds/d. The existing boiler was supplied by ANDRITZ in 2006 and had already been designed to enable a major extension by moving the boiler side wall and widening the heating surfaces of the superheater, boiler generation bank, and economizers. The boiler extension allows optimum flue gas flux before and after

the rebuild, which has great benefits compared to traditional technology for expanding the recovery boiler by moving its front wall. The total increase of the boiler width was 3.8 meters. In addition to boiler enlargement, one additional electrostatic precipitator (ESP) chamber and feed water pump were added.

TIMELINE OF THE 10 ANDRITZ START-UPS:

White liquor plant
October 11, 2016
White liquor pumping

White liquor plant
March 14, 2017
Leg 1 phase 1
LimeGreen
LimeFree

Wood processing
July 14, 2017
Leg 1
chips to old fiberline

White liquor plant
September 19, 2017
Leg 1 phase 2
LimeSlake
Green liquor cooler
LimeMilk
Methanol burning system

Pulp drying
January 27, 2018
using the pulp from the existing fiberline

White liquor plant
February 9, 2018
Leg 1 phase 3
LimeWhite
LimeWhite upgrade
LimeDry upgrade

Wood processing
June 21, 2018
Leg 2
prefilling of chips to fiberline

Official mill start-up date
June 21, 2018

Recovery boiler
June 23, 2018

Pulp drying
June 23, 2018

White liquor plant
June 24, 2018
Leg 2 and 3
LimeFlash upgrade
Woodpowder system upgrade

TARGET: ZERO FOSSIL FUELS

HANNA BJÖRKMAN
Team Manager
Energy and Recovery
Södra Cell Mörrum

"I have to say that we really were impressed with the help we received from the ANDRITZ process experts who went through every possible scenario with us before the connection to the new evaporation plant was made."

Södra Cell is one of those far-sighted northern European pulp producers that is constantly looking for ways to become fossil-fuel free and to make high-grade products in the most environmentally sound ways possible. ANDRITZ recently aided Södra Cell towards its sustainability target by supplying the latest in evaporation plant technology to its Mörrum mill in southern Sweden.

Right from the nurseries where it plants and nurtures seeds and young trees, all the way to the trucks that deliver its final products, Södra Cell is eliminating fossil fuels wherever they may occur. This ongoing ambition is driven by its strong sustainability target to reduce CO_2. Södra is aiming for fossil-fuel free production by 2020 and fossil-fuel free transport by 2030.

The Södra group is also having a major push to reduce the amount of energy it uses and also another sustainability target to reduce electricity consumption by 10% across the board by 2025. The company is already a major supplier of green electricity to the Swedish national grid as well as an important supplier of district heating; last year, it supplied 335 GWh of electricity – equivalent to the annual consumption of 130,000 electric cars – and provided 414 GWh district heating, enough to warm 25,000 homes through Sweden's very cold winters.

All these achievements, of course, mean that there is a healthy amount of ongoing investment at Södra Cell's three mills, Mörrum, Värö and Mönsterås. The mills are all located in southern Sweden and produce a combined total of 1.6 million tonnes of market pulp annually.

MÖRRUM – A SPECIALTY MILL

Södra Cell's Mörrum can be considered a specialty mill in the world of pulp – in addition to producing some 300,000 tonnes per year of high-quality softwood market pulp, it also produces 170,000 tonnes per year of dissolving pulp for the production of textiles. It has two separate lines at the mill, with Line 1 producing dissolving pulp from hardwood and Line 2 producing the softwood pulp. The mill is perfectly located at the delta of the Mörrum River close to both soft and hardwood raw material, as well as close to the Port of Karlshamn where its pulp is shipped to customers around the world.

Among the latest investments at the mill was the installation of a new evaporation plant from ANDRITZ, which is part of the mill's long-term goal to increase pulp production capacity at the site to 500,000 tonnes annually.

"After we converted Line 1 to dissolving pulp in 2012, we noticed a lot of bottlenecks at the mill, and we began gradually solving them in a step-by-step fashion," says Jan-Olof Karlsson, Head of Technology, Södra Cell Mörrum. "We started with wood processing, as that was causing us obvious quality issues, and then moved swiftly onto the brown stock washing system, which was very old and worn and badly in need of replacement. After these two bottlenecks were solved, we could see pretty clearly that the evaporation plant would be the next part of the process that needed serious attention."

Hanna Björkman, Team Manager, Energy and Recovery at Södra Cell Mörrum, continues, "We were using two old evaporation lines and they were in a poor state, leaking, and very noisy. As we are very close to urban areas near this mill, this was not a good situation. The old system was also very unreliable, and we were losing a lot of production due to problems with chemicals in the process – we often had to shut the lines for cleaning.

"But the main problem with the old evaporation plant was the amount of energy it used. Of course, the evaporation plant is one of the most energy consuming parts of a mill anyway, but when you are working with some technology from the 70s, it made the economics even more worrisome."

A new evaporation plant had been talked about at Mörrum for a very long time, more than two decades. Karlsson says, "The fact is replacing an evaporation plant isn't an easy decision; it's a big event to realize, and a major investment. We had actually been discussing a new plant for a long time but the main problem was where to put it. We were even thinking we might build on the old one, perhaps retrofit with new technology."

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The new 7-effect high dry solids evaporation plant replaces existing evaporation lines and significantly enhances energy efficiency at the Mörrum mill

Södra Cell's team worked on a pre-study for one and a half years with its own technology experts as well as suppliers and outside consultants. The final board decision came in 2016 to go ahead with the new plant.

"We chose ANDRITZ to supply the evaporation plant at Mörrum for a variety of reasons," says Karlsson. "We looked into all areas with all suppliers, technically, financially, of course, but also organizationally. It was really important to us how a supplier would run the project from their side.

"It was clear quite early that there was big support from ANDRITZ as a company for taking on this project, and it seems they really wanted to work with us. It even seemed that there was an element of prestige in working with Södra Cell Mörrum. We liked that approach."

"PUT THE CAT ON THE TABLE"

The contract to supply a new evaporation plant was signed in March 2016 and the scope from ANDRITZ included an integrated tank farm, integrated stripping plant, and a liquid methanol plant. The 7-effect high dry solids plant was supplied to enhance energy efficiency at the mill, as well produce 46.5 MW of district heat to the surrounding municipalities. The plant was also to enable usable side streams of biosludge and tall oil, as well as produce very clean condensates for reuse at the mill.

Due to a lot of experience with recent projects with various results, Södra Cell decided to form a steering committee comprising senior management from both Mörrum and ANDRITZ. One of the main areas of focus was the importance of communication during the project. The steering committee gave the project teams the responsibility to come up with a solid plan that would enable clear lines of communication, as well as a way of creating mutually-adhered-to goals. After a period 'behind closed doors', where all the project members were in attendance, a list of 'Project Norms' was created for all the key people involved in the evaporation plant project.

The list included nine different elements: Safety First; Respect the Time Schedule; Direct Communication; Respect Rules; Respect Each Other; Transparency; Be on Time and Prepared; Everyone is Responsible for the Whole Project.

"The Finnish have a great expression, 'put the cat on the table', which basically means 'let's talk about the real issues here'," says Karlsson. "This is exactly the sentiment and atmosphere we wanted to create, as communication is key to the successful execution of such projects. The key evaporation project members all signed the list of nine Project Norms and it proved to be a very successful tool as the project commenced."

Mari Räsänen, Senior Project Manager, ANDRITZ, who was responsible for the Mörrum project, says, "Södra Cell had a really interesting way to kick off this project; we all met each other around a table and got to know each other on a personal basis. It made for open lines of communication right from the start, and the Project Norms list was often referred to whenever the project encountered some challenges."

JUST-IN-TIME

This project at Mörrum was a major challenge, as there there were significant logistics involved due to the sheer number of process parts as well as the construction

JAN-OLOF KARLSSON
Head of Technology
Södra Cell Mörrum

"The fact is replacing an evaporation plant isn't an easy decision; it's a big event to realize, and a major investment."

(Left to Right) Mari Räsänen, Senior Project Manager, ANDRITZ, Hanna Björkman, Team Manager, Energy and Recovery, Södra Cell Mörrum and Magnus Lundström, Project Manager, Södra Cell Mörrum

of the building. Magnus Lundström, Project Manager, Södra Cell Mörrum says, "In some way we had two projects going on here; we had the process and machinery project with ANDRITZ, as well as the building project. It is always a challenge when you build something new at a mill."

One year after the contract signing, the first equipment began arriving from ANDRITZ, starting with the steel for the erection. "After the steel we started bring in the 7-effects, three of which came from Spain and the rest from Finland," says Räsänen. "This was an exciting time, as the effects were very large and had to come by sea and through some very tight channels."

When equipment arrived, due to space constraints at the mill, the project had to commence in a well ordered just-in-time fashion to make sure the work could proceed according to schedule. Any delays had to be communicated immediately so that any impact could be taken into account. "This is where the steering committee really came into its own," says Räsänen. "We really felt that we could approach any members of the committee immediately if there was a problem and we could solve it together."

On the November 27, 2017, the new evaporation plant was ready for commissioning and start-up. To keep ahead of the project in terms of the new skills required, the mill invested in a simulator so the operators could familiarize themselves with the new evaporation plant's processes and operation. "This made for a very good start," says Björkman. "We were able to train the process operators but also we were able to go through all the logic and programming sequences in pretty much a real environment."

SWITCH-OVER IN JUST FOUR HOURS

After all the building and erecting, connecting of numerous pipes, the electrification and commissioning of pumps and ancillary equipment, the whole switch-over from the old plant to the new resulted in the mill being without an evaporation plant for only four hours. "We were prepared for a much bigger and longer drama," says Björkman. "But it went really smoothly, which tells us a lot about how well the preparations went."

"I have to say that we were really impressed with the help we received from the ANDRITZ process experts who went through every possible scenario with us before the connection to the new evaporation plant was made."

So what difference has the new plant made at the mill? Björkman concludes, "Well, we now don't have an evaporation plant that hinders the rest of the mill; we have an energy surplus and, of course, the working and living environment in and around the mill has improved a lot. This capacity and energy efficiency has enabled us to increase the supply and delivery of district heating to three local towns and villages around the mill.

"I'm really glad we didn't do a retrofit; that would not have brought us to where we are today!"

Clearly, the new evaporation plant at Mörrum is another major step towards Södra Cell's high-bar setting of its sustainability goals.

CONTACT
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FACTS & FIGURES:

Production Softwood/Hardwood:	470 kAdt/a 60%/40%
Pulp raw material:	Spruce, Birch, Aspen, Beech
Number of thermal effects:	7
Evaporation capacity:	700 t/h
Weak liquor dry solids / temperature:	15% / 88°C
Firing liquor dry solids:	78% excluding ash
Steam economy (excl. District Heat):	5.3
Warm water temperature:	50°C
Stripping capacity:	360 t/h (B+C-condensate)
MeOH in A+stripped condensate / share:	<60 mg/l / 100%

FEATURES:
Production 46.5 MW of District Heat side streams
(bio sludge and tall oil waste streams)

SUB-SYSTEMS:
Integrated stripping for all C- and B-condensate MeOH liquefaction

A DAY IN THE LIFE OF...

... ILKKA POIKOLAINEN

Workplace: Metsä Group's Äänekoski bioproduct mill, Finland
Position: Vice President of the bioproduct mill

After graduating from Oulu University, Finland, with a focus on pulp and paper, Poikolainen worked first for UPM's label business followed by Stora Enso's fluting business as a Operational Manager. In 2005, he started working at the Metsä Group as a Production Engineer of Äänekoski mill, moving into the position as Production Manager and then took over as Vice President at Metsä Fibre's Rauma mill. Poikolainen was also responsible for the company level production efficiency project as well as the company level contact person to outsourced maintenance at other Metsä Fibre pulp mills in Finland. After five years at Rauma, Poikolainen was given the leading role of Vice President at Äänekoski bioproduct mill in early 2018.

Poikolainen is married to Mari, and between them they have children from the age 12 to 22 and a cat called Mimmi. The family lives in a top floor apartment in Jyväskylä, a town some half an hour's drive from the bioproduct mill at Äänekoski. Poikolainen is an avid fan of athletics and is often seen traveling around Europe spectator at some of the larger international gatherings; he also likes running, cross-country skiing, and spending time at the family's cottage in the Finnish countryside.

The bioproduct mill has recently gained a lot of attention over recent times, as it represents the largest forest industry investment ever undertaken in Finland. The huge $1.4 billion project was completed in August 2017 and the mill was started up seven minutes ahead of schedule. Since its start-up, the mill has been breaking all sorts of records in production and environmental performance, including being 240% energy self-sufficient, which represents 2.5% of all electricity production in Finland.

→

SEPTEMBER 24, 2018

A DAY IN THE LIFE OF ILKKA POIKOLAINEN METSÄ GROUP'S ÄÄNEKOSKI BIOPRODUCT MILL

06:30 // EARLY MORNING BREAKFAST WITH MARI

It's usually an early start for the Poikolainen's – Mari, Ilkka's wife is a kindergarten teacher and needs to get to her school on the outskirts of Jyväskylä by 7.30. Ilkka usually drops her off on his way to the mill at Äänekoski.

08:00 // ARRIVAL AT THE BIOPRODUCT MILL

Poikolainen starts his day reading production diaries from the evening shift, dealing with emails, and taking part in Skype calls. The Äänekoski bioproduct mill employs some 150 people and produces 1.3 million tonnes a year of softwood and hardwood pulp, using around 6.5 m³ of wood.

08:30 // MORNING MEETING WITH THE PRODUCTION AND MAINTENANCE TEAM

Poikolainen attends a daily production morning meeting at the mill, with the first subject on the list always being safety. "As a mill and as an organization, safety is the number one priority for us. I am very proud of saying that our mill is very clean and it is very important that it is kept clean for the well-being of our work force here. Our philosophy when it comes to all operations at our mill is to make every day better and better," says Poikolainen.

09:00 // MILL'S MANAGEMENT TEAM MEETING IN THE TIMBUKTU ROOM

Numerous meetings are part and parcel of every mill manager's day. Different kinds of meetings offer great opportunity to discuss and share ideas, for example, the development of operations and products and committing people to this work.

Around 20% of the mill's sales already comes from bioproducts other than pulp. Most recently, the Metsä Group's and Itochu's joint venture has started to build a demonstration plant for producing 500 tonnes of wood-based textile fibres next to the bioproduct mill. The mill also utilizes numerous side streams derived from the pulp process and produces product gas, sulfuric acid, tall oil, turpentine, and bioenergy.

"The most exciting part of my job as mill manager at the bioproduct mill is all the development actions and projects we have ongoing; we see a lot of potential in the future to develop our mill in all sorts of ways and produce many different bioproducts," says Poikolainen.

The word "Timbuktu" has special significance at the mill – it was the secret code word for the Äänekoski bioproduct mill concept before the project became public knowledge.

12:30 // LIFECYCLE MANAGEMENT OF PROCESSES AND EQUIPMENT

The lifecycle management of process equipment is a very important part of a mill's long-term success. Systematic and well-planned maintenance and lifecycle planning are as important as equipment performance. Close cooperation with the equipment supplier is essential to optimize both the overall operating costs and equipment performance.

Regular meetings with Harry Qvintus, Senior Vice President of ANDRITZ Pulp & Paper Service in the Nordic Region are an important part of Poikolainen's routine. ANDRITZ supplied the very latest in woodyard, fiberline, recaustizing, and evaporation plant technologies to the bioproduct mill. "Equipment for the bioproduct mill was selected based primarily on environmental, material and energy efficiency, low water consumption, and low emissions," says Poikolainen.

13:30 // COMMUNICATION STRATEGY STEERING COMMITTEE

The bioproduct mill has become a showcase for not only the global pulp, paper and bioproducts industry, but also for the nation of Finland. The mill has around 20,000 visitors a year from all over the world for example, forest owners, customers, students, and other stakeholders.

This means communication is a very important part of the mill's everyday operations and the mill has a dedicated team looking after both external and internal communications. Today, Poikolainen and the communications team discuss an upcoming visit by 14 members of the Finnish parliament.

15:00 // MONITORING DAILY STATUS OF THE MILL

Being Vice President of the mill, of course, also means keeping a close eye on safety, quality, environment, cost efficiency, the actual production, operations, and equipment. Digitalization has been fully implemented at the bioproduct mill via extensive automation of production equipment that is comprehensively integrated into data networks. New features at the mill include tablet computers and a mobile application deployed to provide swift access to maintenance and conditioning not only from the control room but also from locations around the mill.

Preventive maintenance is an extremely important area of focus for the bioproduct mill, and Metsa Group has a company specially assigned to the task. Using the latest tools in digital, mobile technology, the teams are able to keep ahead of the curve and make sure any potential problems are quickly isolated and dealt with. "We can monitor such aspects as vibration levels and the status of frequency transformers during operation, thereby forecasting potential malfunctions," says Poikolainen.

17:00 // WALKAROUND WITH THE PRODUCTION TEAM

"We have an excellent team here," says Poikolainen. "and my passion is to drive the mill to achieve remarkable results in the future. Continuous improvement is in our hearts here at the bioproduct mill."

AFTER 17:30 // ANOTHER VARIED DAY AT ÄÄNEKOSKI COMES TO AN END

At the end of the day, when essential routines are completed, urgent emails are answered, and discussions on major topics are concluded, Poikolainen leaves the office. As Poikolainen departs from the mill, he tells the SPECTRUM editorial team: "One thing I can say to you for sure is that every day is different at the bioproduct mill."

View video footage of this report in our augmented reality App!

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FOR FURTHER INFORMATION SEE PAGE 2

When you've been in business for 130 years, you learn a few things about adapting to change. So when Germany introduced new emissions targets, UPM's Schongau mill stayed ahead of the game with a major upgrade of its bubbling fluidized bed (BFB) boiler. Welcome to futureproofing.

Originally built in 1887, UPM's newsprint and supercalendered magazine paper mill in Schongau, Bavaria, Germany, has been taking the environment seriously for a long time.

Schongau was already deinking waste-paper in the early 1960s. Today, it has FSC, PEFC, EU Ecolabel, and German Blue Angel Ecolabel certification, as well as being ISO 14001 Environmental Management System and EMAS Eco-management and Audit Scheme accredited. On the energy side, Energy Management Systems ISO50001 and EN16001 are also in force. Schongau also typically recovers and uses or sells 97% of its waste as a product.

UPM Schongau's Project Engineer, Peter Frömmrich, was involved with this project from start to finish and he insists, "We need to protect what we have in the world. We have beautiful nature around our mill."

STANDING THE TEST OF TIME

In order not just to meet, but continue to beat, its environmental obligations, UPM Schongau took action when Germany lowered the national NOx emission limits for waste incineration plants. The mill's bubbling fluidized bed (BFB) boiler, which ANDRITZ originally supplied in the late 1980s, either had to be replaced or significantly upgraded.

UPM went with ANDRITZ again and decided to upgrade. Frömmrich says, "We did consider replacing the whole thing, but it's a really solid boiler and still in good condition."

The wide-ranging 4.5-million Euro project resulted in a staged combustion concept, optimized air staging, improved bed fluidization, finer bed ash, and better combustion control.

So did it beat the targets?

Dr. Ulrich Hohenwarter, Director Global Sales & Products for ANDRITZ's Power Plant Service, was also heavily involved right from the start, and he admits it wasn't easy. But with the right equipment, control parameters, fuel mix and – crucially – trust between UPM Schongau and ANDRITZ, the upgraded plant's steam output and emissions are still ahead of the game. Even though UPM Schongau's BFB boiler is now almost 30 years old, its NOx emissions were brought clearly below the targets. Under the previous government limit of 200 mg NOx (at 11% O_2), the boiler had been emitting 170–190 mg NOx.

Frömmrich noted that "It exceeded my expectations. It was really very good."

A SHORT TIMESCALE

The installation of the new equipment and control system was carried out during a month-long shutdown during the summer of 2016, with handover in December 2016. Final refinements took place at the start of this year.

Frömmrich points out that the short timescale of the work was one of the key aspects of the project, which also involved a full suite of maintenance work around the boiler area. "This was a technically-demanding project to meet environmental targets on a tight timescale. We had to do a lot of preparation work and planning the timing was crucial. There was no room for error. We had to work multiple shifts 24/7 to stay on schedule." He explains that because the boiler is so important for getting rid of the waste – bark and fibre-containing sludge from Schongau itself, as well as from UPM's nearby Augsburg and Ettringen mills – downtime had to be strictly minimised. As a result, the planned timescale was "very optimistic," he says. And yet, "ANDRITZ planned it through side-by-side with us. The detailed engineering and implementation were very good. They supervised the work every day and we managed it."

From first contact to handing over responsibility to the customer, ANDRITZ and UPM put in two and a half years of hard work. From ANDRITZ's point of view, that meant the design, delivery, erection, and commissioning of all of the areas. As part of this process, Frömmrich appreciated that "ANDRITZ didn't treat every meeting as an excuse to charge a little more. We had a very good relationship."

The aim was to ensure even distribution of combustion air in the combustion chamber and recirculation of the flue gas to control the amount of oxygen available to react with the flame. The right air flow is also one of the factors necessary for proper bed fluidization, which is also necessary to ensure the correct pressure drop, otherwise non-uniform burning can create hot spots or dead spots. All of this helps to regulate the flame and bed temperatures, which optimizes combustion, thereby limiting CO levels and NOx emissions.

The rebuilt secondary air system now has more optimally laid-out air blowers to feed air in from the side walls, and optimally-designed air nozzles now cover the complete cross area of the combustion chamber. Frömmrich points out that "the new system can handle a higher volume of air at higher pressure. Nothing now goes into the boiler that we can't control."

In the primary air system, the modernization raised the primary air temperature from 160 to 200 °C, which helped to keep the bed temperature high even with low-calorific fuel mixtures.

The improved air staging also meant a big improvement in boiler temperature control. This resulted in a lower combustion chamber outlet temperature and the avoidance of temperature spikes and the related NOx and CO issues.

AIR TIME

The boiler now not only beats the new emissions targets, it also enjoys more stable operation – regardless of the fuel mix. Further benefits include reduced consumption of make-up sand and extended lifetime of pressure parts and main components. All of which mean lower costs, in the long run.

Hohenwarter notes that every part of the emission-reduction package was necessary to deliver the promised performance, but he nevertheless points to the main highlights, which were the secondary air system, the FGR system, and the bed ash system.

In this case, both the primary and secondary air systems, as well as the FGR system, were modernized to bring the air staging up to the very latest technology.

UPM's newsprint and supercalendered magazine paper mill in Schongau, Bavaria, Germany

UPM Schongau team Peter Frömmrich, Ulrich Starker, Karl Welz and Max Wörnzhofer, and ANDRITZ project manager Theo Bauer in the control room

New secondary air layer for advanced air staging to reduce NOx emissions.

The upgraded FGR system now also feeds the rebuilt primary air system and the two new ignition burners, too. It also helps to keep the boiler bed fluidized, as well as simplifying temperature control, meaning – yet again – more uniform combustion. It is clear that this was a common theme throughout - as Frömmrich says, "Like with the secondary air system, we now have much more control. We can now control a higher volume of air in more individual stages."

All of this means more stable, reliable steam generation, which means lower emissions, lower costs, and longer parts life.

"WE GOT WHAT WE WANTED"

Another key part of the project was the modification of the bed ash system, including the wind screen with ash separator. The upgraded system at Schongau not only removes impurities from the bed material, but also separates out the good sand for re-use, avoiding extra cost. "It really helps to save a lot of money for fresh sand," Hohenwarter points out.

The system now also has no moving parts, meaning that Schongau's BFB boiler now has maintenance-free recirculation of its bed material, resulting in better system availability and safety.

Frömmrich points out, "The modernization [which has a more enclosed set-up] has given us some big advantages. It's running very well – we got what we wanted."

Also, combined with the new FGR layer, the finer bed material and the right trim mean it has been possible to meet the new emissions targets without even having to use the SNCR (Selective Non Catalytic Reaction) system that UPM also decided to install at the mill.

Hohenwarter smiles when he reflects on this part of the project. "It was decided to play it safe, but I was 99% certain we wouldn't need the SNCR system. We tested it out, but the modernized set-up at Schongau works so well that it's just not necessary. It's just used as a back-up system."

Frömmrich admits that this was one of his highlights, too. "This was the big bonus of the project. We didn't know if we'd be able to meet our targets with just the primary measures, but we did it. We don't need the SNCR system and its ammonia, so we avoid additional costs and the technological and environmental challenges associated with that. The authorities preferred it this way, too."

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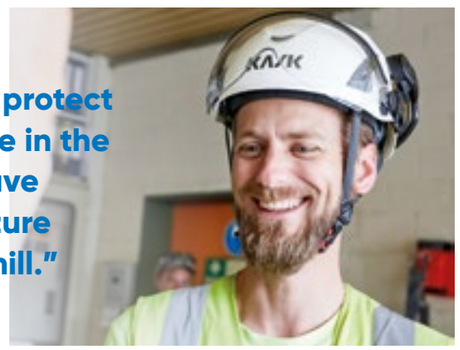

PETER FRÖMMRICH
Project Engineer
UPM Schongau

"We need to protect what we have in the world. We have beautiful nature around our mill."

New wind screen for advanced bed material recirculation.

DELIVERED PACKAGE

- Chip bin discharger
- Modernization of primary air system
- Modernization of secondary air system
- Modernization of flue gas recirculation (FGR) system
- New superheaters
- New Selective Non Catalytic Reaction (SNCR) system
- Optimization of bed ash system
- New low-NOx burners
- New fuel chutes
- Steam heater for secondary air
- Renewed brick lining
- Control and automation

The investment also involved two new superheaters in the pressure part, as well as low-NOx ignition burners with integrated flue gas recirculation just above the secondary air system. Frömmrich explains, "We have been working very closely with ANDRITZ on the superheater side. We refined the combustion process and we have it well under control and it's running really well." Meanwhile, the new low-NOx ignition burners "have had a good effect," says Frömmrich. "Emissions are down. ANDRITZ resolved some clogging issues by using pressurized air and it's working well. Performance has increased significantly. This also enabled us to close and dismantle the old back-up boiler and its oil system, which we sometimes used to fire the old burners."

TIME TO REFLECT

Summing up, Frömmrich says, "The project went really well." UPM's investment in this upgrade by ANDRITZ reduced the BFB boiler's emissions, as well as improving operating stability considerably. NOx emissions are now clearly below the new government limit, without even having to engage the new SNCR system.

Hohenwarter says ANDRITZ was right to be confident, "Even an old boiler can achieve good things when your modernization concept is right and both supplier and client know the value of good teamwork and open communication." Frömmrich adds, "When the people are right, the project usually runs right. UPM and ANDRITZ were honest with each other and it was a pleasure to work together. I'm guessing they felt the same at ANDRITZ – I'm still in touch with them today."

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IDEAS Digital Twin in Process Industries

IMPROVING PULP M WITH DIGITAL TWIN

Since the 1980s, thanks to advances in computation technologies, computer-based simulation of processes using first principle models has become a well-known and widely used engineering tool for various industries. As our understanding of processes has increased, their representative models have become more realistic and sophisticated. The resulting improvement in accuracy has made simulation a fundamental predictive and diagnostic tool in process industries.

Accurate simulation can reduce engineering and construction costs, optimize process design, and improve operation performance by decreasing operation costs and increasing efficiency. In fact, simulation technology has become so advanced that it is now possible to simulate the interrelated processes of an entire pulp mill and connect these in real time to the mill's physical operation. These sophisticated first-principles based models are referred to as "Digital Twins."

DEFINING THE DIGITAL TWIN

The term Digital Twin was first introduced by NASA [1] in 2010 and quickly adopted by other industries. There is no official definition of Digital Twin as it relates to process industries; however, there are three important characteristics that are common across most descriptions of the term. Firstly, the simulation must be core to the functionality of the process. Secondly, the simulated process must follow the entire life cycle of the plant. And lastly, the simulation must be directly linked to the operation. Together, these three aspects create an intricate pairing between process and simulation – a Digital Twin.

According to the industry research and trend analysis group Gartner, the concept of a Digital Twin is considered to be one of the most important disruptive technologies of 2018 [2]. As the internet and information technologies have been integrated into industrial operations, a new industry era known as Industry 4.0 (or the Industrial Internet of Things) has emerged. Digital Twins are a fundamental aspect of cyber-physical systems, which are one of the basic pillars of Industry 4.0, closely integrated with artificial intelligence and advanced analytics.

There are some major differences between a traditional simulation solution and a Digital Twin. In addition to being connected to an operational plant in real time, a true Digital Twin must run concurrent to the plant's operation, receive operation data in real time, process this data, and then generate valuable results in a timely manner. From a technical perspective, the combination of three components enables a true Digital Twin of processes to be formed: High-fidelity models, real-time connectivity to the operation being simulated, and a robust simulation environment.

THE MODELS MATTER MOST

High-fidelity models are at the heart of any Digital Twin solution. The term "fidelity" corresponds to how realistically the

ILL OPERATION TECHNOLOGY

The yellow dots are the lab data points. The plot represents 82 data points at 15-minute intervals.

The IDEAS Virtual Instrument predicts the percentage of solids in the evaporator (blue trace). The plot represents 82 data points at 15-minute intervals.

Virtual Instrument value for heat transfer coefficient with time. The decline in value reflects fouling of the evaporator surfaces. The plot represents 82 data points at 15-minute intervals.

models represent the process. Once high-fidelity models are built, they can be used for different applications within the Digital Twin structure.

ANDRITZ provides a true Digital Twin solution for the pulp and paper industry using IDEAS simulation software and its unique execution platform. A unique feature of IDEAS is its ability to combine continuous processes with discrete events (human characteristics and interventions). This enables IDEAS to simulate pulp and paper processes spanning the entire life cycle of a mill – from feasibility studies, engineering, construction and commissioning to operation and online optimization – and then combine each individual process unit into a single, interconnected high-fidelity model.

ANDRITZ ensures the high fidelity of IDEAS models by combining the process, mechanical/physical, and control/logic aspects of a mill. Building a true representation of the entire mill operation requires consideration of information obtained from process descriptions and calculations, P&IDs, physical layout drawings, equipment characteristics and data sheets, material-balance equations, chemical reactions, and lab test data as well as discrete events. The control system behavior and logic are integrated, as is operation data when available to further tune the models.

Once the modeling process is complete, the simulated, or virtual, mill behaves in the same way as the actual mill, providing realistic dynamic process responses. This simulation is then tied into the ANDRITZ execution and communication platform, which is connected to the mill's control and monitoring systems. Through the ANDRITZ execution platform, the virtual mill can be accessed and used by ANDRITZ's Digital Twin applications (also developed using IDEAS software) for a variety of purposes at different stages of the project life-cycle.

BENEFITS OF DIGITAL TWIN TECHNOLOGY

Digital Twin applications have a wide range of uses. During the early stages of a project, Digital Twin applications can analyze the pros and cons of various design scenarios, eliminate design mistakes, identify potential bottlenecks and early engineering flaws, and inform necessary equipment specifications. Operator training simulators similar to flight simulators can be built using the digital replica of the mill. Later in the life cycle, applications can be used to measure the conditions and/or physical characteristics of a process and provide virtual measurements where real-world measurements are impossible and real-time plant-wide optimization becomes possible. Digital Twin technology can also be used to simulate the future operation of a mill, providing insights that can be used to conduct maintenance, manage inventory, guard against process failures, and minimize the impact of major events such as shutdowns.

For example, one of ANDRITZ's Digital Twin applications, called the IDEAS Designer, can be used to automatically run the virtual mill through thousands of what-if design and equipment scenarios in order to optimize the circuit design and determine the most competitive net present value (NPV). Another, the IDEAS Instructor, allows operators to train using the virtual rather than real plant environment. And the IDEAS Guardian application connects to the mill's real-time operation, allowing numerous what-if scenarios to be run rapidly alongside the mill's operation using real-time data. The results provided can be applied for condition monitoring and optimized decision-making.

USING DIGITAL TWINS IN REAL TIME

Connecting the Digital Twin applications to real-time operations is what truly unlocks the full potential of the ANDRITZ Digital Twin solution. Consider the evaporation process in a pulp mill (Figure 1). The virtual model of the pulp mill is connected to the mill's real-time operation. The IDEAS Guardian application uses this replica to detect any undesired conditions such as fouling and scaling, and is also used to take virtual measurements that are not accessible in the real world using conventional instrumentation.

Operational evaporation data on pressure, temperature, and flow are the inputs in real time, and IDEAS Guardian outputs virtual instrument information to the operator screens, including heat transfer coefficients and predicted evaporator percentage solids (see Figure 2), Temperature Rise, Boiling Point Rise per effect, heat and mass balance, and production levels.

The IDEAS Guardian uses this virtual instrument data to enable operators to continuously analyze fouling of heat transfer surfaces, guiding them by providing the optimal cleaning frequency. In the case of a physical instrument failure, the IDEAS Guardian can be set to automatically input values from that instrument's virtual twin into the control system, bypassing the need for manual input and thereby eliminating any disruption of operation.

CONCLUSION

You could compare the concept and function of the ANDRITZ Digital Twin architecture to that of a smartphone. The IDEAS simulation software and first-principle model are like the phone itself and its hardware, systems, and circuitry. The ANDRITZ execution platform is like the operating system, the iOS or Android, that allows the phone's functionality to be accessed as well as connected to other systems and devices. The Digital Twin applications are the mobile "apps". Through the operating system, the "apps" draw on specific functions, connections, and data to either perform a specific task or generate a specific result.

The trajectory of the pulp and paper industry continues towards Industry 4.0 as more and more mills integrate new and cutting-edge technologies into their operations. Digital Twin technology can greatly enhance the efficiency, cost-effectiveness, productivity, and profitability of pulp mill operations, and industry-leading systems, like IDEAS, that combine high-fidelity models with real-time connectivity and an advanced operating platform, are poised to take those operations to the next level.

IDEAS Digital Twin has many other applications for the engineering, commissioning, and operation. For further information, please visit www.andritz.com/metris.

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[1] M. Shafto, M. Conroy, R. Doyle, E. Glaessgen, C. Kemp, J. LeMoigne, and L. Wang, "Draft modeling, simulation, information technology & processing roadmap," Technology Area, vol. 11, 2010.

[2] https://www.gartner.com/doc/3865406/top-strategic-technology-trends

Figure 1: The Digital Twin - IDEAS model of a pulp mill's evaporation process

SMALL STEPS TO BIG IMPROVEMENTS

The Holmen Group's Braviken Paper Mill, situated in eastern Sweden, has always prided itself on being at the top of its game when it comes to production efficiency and quality of final product. When it needed to further enhance its TMP's capacity and efficiency – but crucially keep costs to a minimum – ANDRITZ was at hand to provide a tailor-made solution.

A walk through the entrance to the Braviken Paper Mill tells one that the paper machines at this mill were once thoroughbreds in the world of newsprint production – the walls here are adorned with congratulatory world record-breaking plaques heralding a different time in the 1970s and 80s when newsprint was a dominating force in global papermaking.

Fast forward into the 21st century and the world of paper production is a completely different one; graphic paper demand has declined dramatically, resulting in a highly competitive business environment with even the smallest production efficiency changes making a difference.

Fredrik Bragsjö, TMP Manager at Braviken says, "Our whole business landscape has changed over the years. At one time we were sending newsprint all over Europe, and even further afield across the world.

"Now we are much more focused on producing high-quality, wood-containing SC papers for large volume catalogues and long run mass produced magazine titles, such as the still-popular weekly TV guides. We also produce book papers here at Braviken."

A MIXTURE OF OLD AND NEW

The Braviken Paper Mill, which first began producing in 1977, could be described as a seasoned player in the modern history of papermaking, having been through the ups and downs of market demand trends in the industry. The mill has always been quick to adapt to these changing times, which means keeping a close eye on all the equipment being run, old and new, and making sure maximum efficiencies are being obtained.

The TMP plant at the mill is very much a mixture of old and new equipment, and the old TMP lines were pioneers in TMP pulp for newsprint paper. In fact, the occasion of its start-up was something of a national event at the time, with the King of Sweden symbolically pushing the big red start-up button.

"We have always had a mindset of continuously improving existing equipment at the mill," says Olle Lindeberg, Production Engineer, Braviken. "And it's not always about the glamorous picture of installing all things big, shiny, and new. At this time of a highly competitive environment, often you have to roll up your sleeves and deal with the older equipment, make it better, take smaller but effective steps, gradually eliminating the bottlenecks."

The latest in the line of many small-step improvements at the mill was the rebuild of its "BR1" reject refiner. "We wanted to improve the quality of the pulp, increase tensile strength, and reduce shives with the aim of making the pulp more suitable for a smooth surface on the paper we produce. And of course, look for ways to reduce energy," says Bragsjö.

Erik Muggerud, Senior Process Specialist, ANDRITZ, adds, "The mill also wanted an increased capacity and simplification of its BR1 reject refiner. The main goal was to create a barrier (plug) for steam as close as possible to the refiner to be able to increase the production rate, at the same time as reducing energy usage."

The BR1 reject refiner needed a complete tailor-made solution to ease plugging

Left to right: Fredrik Bragsjö, TMP Manager, Braviken; Olle Lindeberg, Production Engineer, Braviken; and Erik Muggerud, Senior Process Specialist, ANDRITZ

Bragsjö (l) and Muggerud discuss production issues in Braviken's TMP control room

A TAILOR-MADE SOLUTION

Due to the many rebuilds over the years, a simplification between the reject screw press and the refiner meant taking out some of the old equipment, but also reusing as much as possible of the existing equipment. A side entry plug feeder, chute, and level conveyor were then installed as well as a new ribbon feeder housing.

The complexity of the project and space constraints in the refiner area meant that it was not possible to use standard equipment and the ANDRITZ team had to innovate with a tailor-made engineered solution.

The first customer contact for the project was in 2016, with the contract signed in April 2017. Removal and erection work started in September 2017 with start-up taking place just five days later.

"ANDRITZ experts came up with the perfect solution, mostly due to the intense knowledge they have both of TMP and of our plant at Braviken," says Bragsjö. "It would have been easy to have just taken out the old and replaced with new equipment, but cost constraints did not allow this, and it means we can now spend our valuable resources on solving the next bottleneck."

Crucially, and one of the bonuses of moving the plug as close as possible to the refiner, safety at the TMP plant has been greatly improved. Muggerud says, "The reject pulp will not have to cope with the backflow of steam that can plug the chute down to the refiner feed. There is always a danger to operators when plugged pulp needs to be removed from the chute; this makes a big difference to safety at the mill."

Has the rebuild of the BR1 reject refiner achieved the results the mill was looking for? "I would say a definite 'yes', says Lindeberg. "We have increased capacity and have better quality pulp and a safer working environment, but, added to that, the renewed BR1 comes with much greater flexibility, meaning we can adapt the refiner for making pulp for SC paper and then change it again when making book paper."

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PULP TRENDS

by Oliver Lansdell, Hawkins Wright

"The good times are returning" according to Oliver Lansdell, Director, Hawkins Wright, provider of market intelligence and analytical services to the international pulp, paper, and biomass industries. And it seems that the pulp industry, in particular, is enjoying something of a renaissance. There are various reasons for this optimism, including increasing demand for virgin fiber content in tissue and hygiene products, the exciting growth of renewable packaging, and strong demand in niche applications such as wood-based textile fibers and other new markets in the bioeconomy.

1 What has happened to supply and demand of pulp grades over the last 10 years?

Demand for bleached chemical market pulp has grown by 11.5 million tonnes since 2007 to total 58.1 million tonnes last year (an average increase of 2.2% per annum). During this period, the Chinese market grew by 13.1 million tonnes, offsetting declines in the mature markets of North America, Western Europe, Japan and Oceania. Modest growth is also reported in Eastern Europe, other Asian countries, and Latin America.

BHKP demand has grown by 9 million tonnes during this period and the BSKP market has expanded by 3.5 million tonnes. Demand for sulphite has fallen by 1 million tonnes. Of the growth in BHKP, 10.1 million tonnes has been BEKP and 2.2 million tonnes has been Asian hardwood pulp. This growth has offset declines in birch, NBHK, and SBHK.

2 What is Hawkins Wright's five-year regional outlook for growth?

Global BCP demand growth is forecast at 5.5 million tonnes during 2017 – 2022; BSKP +1.6 million tonnes, BHKP +4 million tonnes. The China market is forecast to expand by 4.4 million tonnes, underpinned by growth in virgin fiber content tissue production and modest displacement of RCF.

By 2022, the Chinese market is expected to account for 38% of global shipments (up from 34% last year).

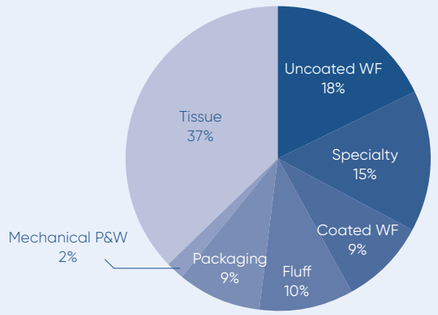
Amongst the other growth regions, shipments to Asia/Africa are forecast to expand by 0.9 million tonnes by 2022, and we expect growth of 0.4 million tonnes in Eastern Europe and 0.3 million tonnes in Latin America. Meanwhile, shipments to the mature markets of North America, West Europe, and Japan are forecast to contract by 0.5 million tonnes.

Note that our forecast for demand is influenced heavily by our expectations for future supply growth; against a backdrop of limited capacity expansions, shipment growth will be increasingly supply constrained.

3 What is the supply outlook for the industry?

Based on current plans, market pulp capacity will rise by 3.8 million tonnes during the period 2017 – 2022. Growth will average 0.75 million tonnes each year, at an average annual growth rate of 1.0%. Note that more than half of the expansion will take place this year.

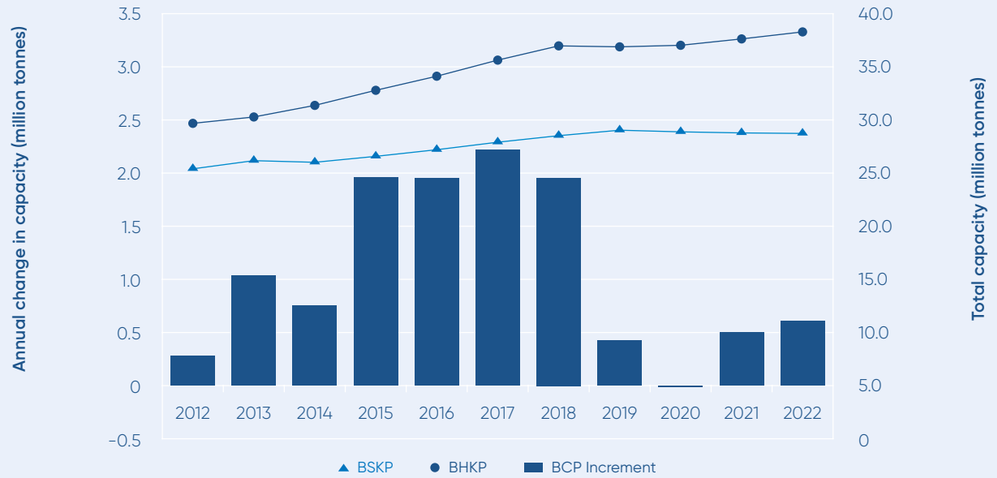
BLEACHED CHEMICAL PULP DEMAND BY END-USE (2017)



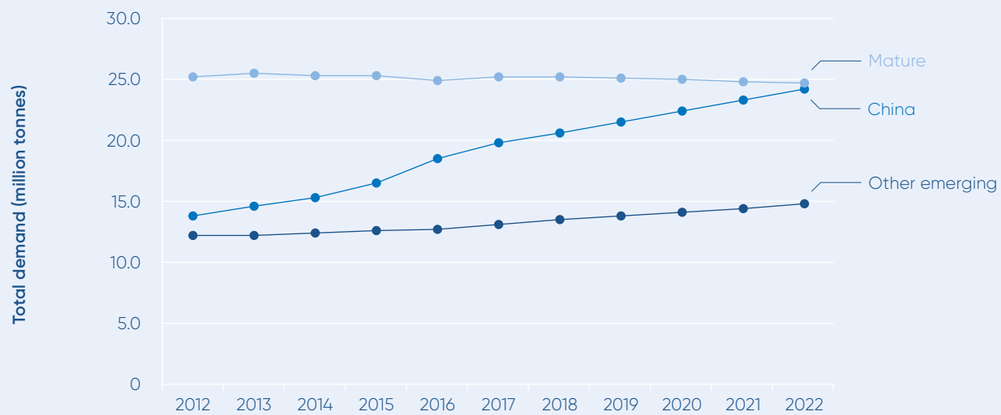
AUTHOR: OLIVER LANSDELL
DIRECTOR, HAWKINS WRIGHT

Lansdell is an industry analyst and consultant with more than 14 years experience in the international pulp and paper industry. He has been with Hawkins Wright since 2007, working as one of the editors of Pulpwatch, Hawkins Wright's monthly newsletter; the co-author of the Outlook for Market Pulp service; and the principal author of the Outlook for Dissolving Pulp.

ANNUAL CHANGE IN BCP CAPACITY AND GROWTH BY GRADE, 2012-2022



WORLD BCP DEMAND FORECAST BY REGION, 2012-2022



ANDRITZ & NOVIMPIANTI

MUTUAL RESPECT

Pietro Saccomano, Managing Director of ANDRITZ Novimpianti, and Klaus Gissing, Director *Prime*LineTIAC and Air & Energy Systems at ANDRITZ

Novimpianti is one of the leading suppliers of drying and ventilation equipment for all kinds of paper machines

More than three decades ago, Pietro Saccomano co-founded Novimpianti, an Italian firm specializing in air systems and reducing energy consumption. More recently, the Lucca-based company has focused mainly on tissue mills. Earlier this year, Novimpianti became ANDRITZ Novimpianti, part of the ANDRITZ Paper & Tissue Division.

We spoke about the deal with Pietro Saccomano and Klaus Gissing, Director of Air & Energy Systems and the new tissue pilot plant *Prime*LineTIAC within ANDRITZ Paper & Tissue.

How did the deal come about?

SACCOMANO: In the early days, we sold to paper mills in the Lucca area, but over time, the market became more global, and so did we. On one side, we were selling to paper machine manufacturers locally and abroad. The other was direct sales to mills as rebuilds on existing paper machines, new hoods, and auxiliary equipment. Then in 2015, we had no sales related to new machines at all, so we were forced to increase the rebuilds part of the business. That was when we decided to look around to join a machine manufacturer, because the worldwide market was difficult to handle for a small company like ours. And that is when we met Klaus.

GISSING: I was on a business trip in Italy when we had the first discussion. Could this be possible in the future? At that time, we were busy building the new pilot plant. So I said to Pietro: "Of course ANDRITZ is interested, but we have a lot to do with this pilot facility" – so we couldn't immediately start serious discussions. But it was definitely our goal.

SACCOMANO: In that meeting, we found that there was a common interest. But on the ANDRITZ side, there was a long wait.

GISSING: But Pietro and Novimpianti did not forget. After we installed the pilot machine, I went back to Lucca and he asked "Are you ready now?" That was in October-November last year.

SACCOMANO: It was good that we had enough time to think it over. Because we got together when we were really ready and we had a full idea of what we wanted to do.

What did Novimpianti have that ANDRITZ didn't?

GISSING: ANDRITZ is really successful in the business of new tissue machines and we had delivered our machines and our hoods. But with all our success in selling new machines, we did not focus so much on innovation in Air & Energy systems, and Novimpianti is really strong in the area of energy saving, which has become more and more important. We saw that we had to go far deeper into that, too.

SACCOMANO: We have always tried to save thermal energy, electrical energy, and operational energy, i.e., people. Manpower is energy. Also, being able to supply both paper machine manufacturers and the rebuild market gave us a great opportunity to improve the product. When you replace a product, you have to know very well what you are removing, because the customer expects that your new product will do a better job. When I replace a hood, I want to know what the Yankee is doing. And that doesn't mean just replacing something broken or old. Often, they want their return on investment from higher production capacity or lower energy consumption, so you need to improve on what you replace.

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ANDRITZ and Novimpianti have become one, enabling customers to energize their mills with proven air and drying systems for innovative tissue and paper production

Combining Novimpianti's products and expertise with the experienced ANDRITZ tissue & paper team means customers have a superb range of engineered solutions for productivity, quality and sustainability

GISSING: We definitely recognized that our customers expect more support from us on rebuilds and service. For us it was logical to acquire a company that was very strong and competitive in the area where we want to improve.

What will be the benefits for ANDRITZ and Novimpianti customers?

GISSING: With the acquisition of Novimpianti, we can serve all of our customers – new machine customers and existing customers with running machines – both for rebuilds and optimizations and, in the future, new innovative products, especially in energy and air systems in tissue mills. We see a huge potential in Novimpianti for innovation. We have installed the most modern tissue pilot plant in the world, but most of the success is expected from the wet end. ANDRITZ Novimpianti should help to maximize the benefits from the dry end, too.

Who will the existing Novimpianti customers call, now that you are part of the ANDRITZ GROUP?

SACCOMANO: It's now ANDRITZ Novimpianti, but still with the same people. Customers know the people, not the company. There is a relationship with the people.

So it's all about the relationships?

SACCOMANO: The good relationship with a paper mill is the place to start. That is why we organized a group of technicians that maintains a good relationship with the customers. Because those technicians are available when the customer has a problem, you grow a special relationship with the mill. And that helps you to sell when they need a replacement. That was another point that was of interest to ANDRITZ when they were thinking about acquiring Novimpianti. It's easy to know who needs a new paper machine around the world, but it's more difficult to track who needs rebuilds. Such business is a must for improving direct sales.

On the ANDRITZ side, when you add a company like Novimpianti to the family, what will change for ANDRITZ customers?

GISSING: As well as rebuilds and optimizations, our existing customers will also get information on new technology much faster. We will come up with new products in the future. Just a few weeks ago, we had an R&D meeting in Lucca, and we shared lots of ideas.

So when you include innovation, you are talking about 1+1=3. Just merging two companies, you usually get 1+1=1.7 in headcount or 1+1=2 or 2.5. But we have planned for innovation and new products. Our goal is in the next 3-4 years, at least double the employees and triple the revenue.

Any hints on the innovations to come?

GISSING: One aspect is resource saving – energy as well as water. To give you a hint: we will work on heat storage, and steam generation from the exhaust. I guess we will launch a couple of new products within the next 12-18 months. In the past, ANDRITZ grew very much by acquisition, not so much by innovation. This is a cultural change – the focus will now be on innovation. Pietro will take care of the R&D for the next few years. Lucca is the right place for this. Also, we call it ANDRITZ Novimpianti Air & Energy Systems. We have to take care of a tissue mill's full energy chain in future. More and more tissue producers these days are newcomers, and they don't have a big organization, so they like to have everything from one source, one interface, one responsibility. So that is another direction – complete solutions.

It's been a few months since you announced this deal. How has this first phase been?

GISSING: I think the most important aspect for this merger and integration is respect. We have the same goal in mind – to create an ANDRITZ Novimpianti that can really grow and come up with innovations and new products for the future. It's my belief so far that we have managed it well.

SACCOMANO: I agree. We are taking the general rules of ANDRITZ and adjusting them to the reality of what Novimpianti is. The challenge is to integrate with such a big company as ANDRITZ, but to maintain the good features of Novimpianti Drying Technology.

Pietro, it was mentioned that you will take care of R&D for several years. What are your plans for retirement?

SACCOMANO: I will retire when I am tired of work. For now, I enjoy working, so I don't think about it.

GISSING: We decided on a transition period. Pietro will be CEO of ANDRITZ Novimpianti, but we will bring in a new CEO very soon in the next year. Pietro will then take care of R&D and innovation. We want to keep him in the organization – his experience is extremely valuable.

SACCOMANO: I will do what I enjoy the most!

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PIETRO SACCOMANO
Managing Director of
ANDRITZ Novimpianti

"It is now ANDRITZ Novimpianti, but still with the same people. Customers know the people, not the company. There is a relationship with the people."

KLAUS GISSING
Director *Prime*LineTIAC
and Air & Energy
Systems at ANDRITZ

"We have the same goal in mind – to create an ANDRITZ Novimpianti that can really grow and come up with innovations and new products for the future."

GERHARD SCHIEFER
Head of ANDRITZ AUTOMATION

Metris

Looking out beyond the edge

In the near future, Edge computing has the potential to accelerate the evolution – perhaps even prompt an evolution – in industrial automation beyond what we have witnessed in recent years. Here are some of the benefits of using Edge devices.

More computing power in smaller packages. Greater connectivity. And, at last, an accepted communications protocol. These are the drivers that are pushing industrial automation away from centralized nodes out to the very extremes (edges) of a plant's network. By gathering data, crunching it, and running the control routines at the source – small, powerful Edge devices can control virtually anything. And, they are easily connected through the Internet to coordinate with each other.

Imagine an assembly line with 10 five-meter conveyor belts, each equipped with an Edge device. The flexibility to start, stop, run forward or backward, and control the speed of each belt is there – PLUS the ability to operate them as if they were one 50-meter belt. Or, more pertinent to our industry, imaging the sections of a paper machine each equipped with an Edge device. Precise control of the headbox, forming, pressing, coating, drying, and finishing sub-processes PLUS optimized machine control.

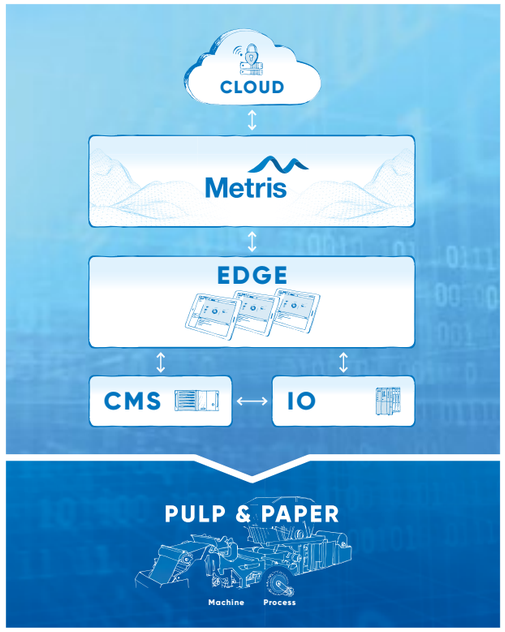
Local control and plantwide connectivity is that simple with Edge devices.

How does that compare to what we are doing now? Today, a classic industrial automation network relies on a rather rigid hierarchy in order to operate. There are field devices (instruments and valves) providing the basic input/output … connected to programmable controllers that execute the control tasks … connected to a server (or servers) that provide the main control … which are equipped with operator stations for visibility. Optimization software is separate. The topology of this classic network can be complex, is usually tailor-made, and is programming-intensive. More importantly, current networks that use a patchwork of incompatible protocols appear to lack the performance and capacity needed to meet growing demands.

An Edge device, on the other hand, combines the input/output, condition monitoring, and complete control in a small package. It performs complete control at the unit level (equipment or major sub-system) and can be easily linked with other Edge devices to perform machine automation or complete process automation. It is "configured" rather than "programmed" using a highly graphical, functional interface.

Of special interest is that these Edge devices have immediate or direct connection to the Internet or an external non-propriety network. The device itself provides translation between networks that use different protocols using the industry-standard protocol (OPC UA TSN), which has emerged as an excellent solution of real-time, vendor-neutral network communications.

Of importance to us at ANDRITZ is that Edge devices are highly compatible with our Metris X and Metris OPP systems, which are already platform-independent automation and optimization solutions. We can think of Edge devices as being the individual members of an orchestra (each playing the notes on their music sheets) with Metris acting as the conductor. There is clear potential for Edge computing in the pulp, paper, and power industries and we will keep looking out beyond the edge.



New Orders

Berli Jucker Cellox, Prachinburi, Thailand
*Prime*LineCOMPACT VI tissue machine with shoe press including stock preparation and automation systems

Celulosa Arauco, Horcones, Chile
EPS delivery of woodyard, fiberline, white liquor plant, and evaporation system

Daio Paper, Mishima, Japan
Delivery of a HERB recovery boiler and supply of new key equipment and services for the white liquor plant. Modernization of the fiberline including new DD-Washer and high pressured feeder with UniGrid

Dayasa Aria Prima, Surabaya, Indonesia
OCC-lines for PM1 and for PM2/3/5 including FibreFlow drum pulpers and reject handling system

Fajar Surya Wisesa, Jakarta, Indonesia
Two FibreFlow drum pulpers and reject handling

JSC Ilim Group, Bratsk, Russia
New LMD Lime Kiln, including supervision and start-up

Kabel Premium Pulp & Paper, Kabel, Germany
ATMP line with a combination of second-hand and new ANDRITZ equipment

K R Pulp & Papers, Shahjahanpur, India
New HERB recovery boiler

Kuantum Papers, Saila Khurd, India
New HERB recovery boiler and lamella package for evaporation plant

La Meridionale, Marsile, France
SeaSOx dry scrubber

Naini Papers, Kashipur, India
New HERB recovery boiler and lamella package for evaporation plant

Nettingsdorfer Papierfabrik, Nettingsdorf, Austria
HERB recovery boiler and a pre-evaporation plant

Papelera Guipuzcoana de Zicuñaga, Herani, Spain
Upgrade of recovery boiler capacity and modernization of the fiberline

Saker, Zilina, Slovakia
Universal Rotary Shear UC pre-shredder and a Universal Granulator UG

Sappi Saiccor Mill, Unkomaas, South Africa
SulfitePower liquor boiler, batch digester feeding, and bleach plant rebuild including GF-Filter improvement and pulp dryer upgrade

Sheng Hung, Taoyuan, Taiwan
Crosslapped Spunlace line for technical end-uses

Toyo Engineering Corporation, Kamisu, Japan
PowerFluid circulating fluidized bed boiler (CFB) with flue gas cleaning system for a new biomass power plant

Zellstoff Celgar, Castlegar, Canada
PM2 Baling Line Replacement

Project Start-ups

BSC Bahia Specialty Cellulose, Camaçari, Brazil
Maintenance management, industrial lubrification, sootblowers maintenance and inspections

Naberezhnye Chelny Paper Mill, Chelny, Russia
Filmpress and Pope reeler, dryer section rebuild

Cartiera del Chiese, Mentichiari, Bresca, Italy
Headbox and shaking unit

Dalian Ruiguang Nonwoven, Dalian, China
Complete Wetlace line

Fibris-ES, Aracruz, Brazil
Cleaner Bank, pump, EPC project

Hilmer Andersson, Lässerud, Sweden
Universal Shredder FRP for processing of wood waste and offcuts

Hunton Isolasjon, Gjovik, Norway
Chip handling, pressurized refining system and chemical, dosing system

S. Kijchai Enterprise, Rayong, Thailand
Pressurized refining system

Shandong Chenming Paper, Shandong, China
Stock preparation, paper machine approach system

Shouguang Meilun Paper, Shandong, China
Stock preparation, paper machine approach system

Sun Paper Holding Lao, Xepon, Lao People's Democratic Republic
HERB recovery boiler, LimeWhite white liquor filter, methanol liquefaction system, woodyard systems, pulp drying line, MC equipment for the complete fiberline, screening room and ozone bleaching stage

ANDRITZ supplied key equipment for Sun Paper's Lao Mill in Savannakhet Province in Lao PDR

ANDRITZ to supply major pulp production technologies and key process equipment for ARAUCO's MAPA project in Chile

International technology group ANDRITZ has received an order from Celulosa Arauco y Constitución S.A. to supply energy-efficient and environmentally-friendly pulp production technologies and key process equipment for modernization and extension of the ARAUCO pulp mill in Horcones, Arauco, Chile. The order value for ANDRITZ is in the region of 300 million euros; start-up is scheduled for the first quarter of 2021.

The ANDRITZ scope of supply includes:

- Wood processing plant
- Fiberline
- Black liquor evaporation plant
- White liquor plant

"During the sales phase, we assessed the capabilities of the company and ANDRITZ demonstrated its competence, commitment, and professionalism. Congratulations to the whole ANDRITZ team, who have worked hard, efficiently, and with passion and professionalism for this outcome. We are just starting, but I am sure this will be a great project for all concerned," says Franco Bozzalla, Senior VP Pulp and Energy at ARAUCO.

The MAPA project will renew and increase ARAUCO's efficiency and pulp production, and in addition, it will strengthen ARAUCO's competitiveness and leadership in global markets.

Breaking World Records

With our patented technologies, we are once again breaking world records and pushing steel construction to a new level.

The high-precision MG (machine glazed) steel cylinder with a diameter of 24 feet (7.315 m) and a weight of 196 tons had a long journey from our workshop in Hungary to Pöls, Austria. In order to be able to transport the gigantic cylinder, it had to be manufactured in two halves. Maneuvering 550 kilometers of road with numerous obstacles, lane changes and about a dozen tunnels forming barriers that required precise work of exceptional accuracy – a logistical masterpiece. When the cylinder arrived on site, the two halves were assembled and welded together. A huge crawler crane with a balancing weight of 650 tons was used to lift the gigantic cylinder into the machine hall through the roof. Again, this steel cylinder is the largest, welded, high-precision MG cylinder in the world. It is the key component of a new *Prime*Line MG paper machine for the production of specialty papers.

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DID YOU **KNOW** THAT...

... ANDRITZ ACQUIRED DIATEC, ITALY?

ANDRITZ has acquired a 70% stake in Diatec S.R.L., a leading manufacturer of converting machines for the hygiene and food packaging industries based in Collecorvino, Italy. The remaining 30% will stay in the hands of the two current shareholding families.

Diatec designs and manufactures special machines and technological solutions, mainly for the production of baby diapers and other absorbent hygiene products.
With this acquisition, ANDRITZ complements its product portfolio in Nonwoven technologies and is now able to offer the complete supply and value chain, from the raw material to web forming, finishing, and converting.

Get more information at: **ANDRITZ.COM/DIATEC**

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FOR FURTHER INFORMATION SEE PAGE 2

... ANDRITZ GASIFICATION PLANTS USING WOODY BIOMASS AS FUEL.

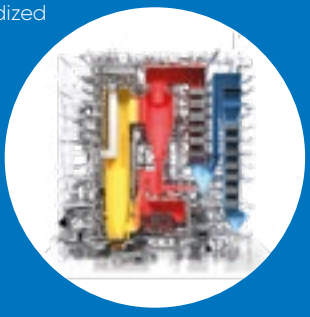
The ANDRITZ gasifiers are based on circulating fluidized bed (CFB) technologies. As a fuel, biomass replaces oil or natural gas and helps pulp mills reduce their overall greenhouse gas emissions (GHG). The approximate capacity can go up to 150 MW of product gas.

Get more information at:
ANDRITZ.COM/GASIFICATION

... JAPANESE ENERGY MARKET COUNTS ON ANDRITZ BIOMASS BOILERS!

ANDRITZ delivered its first bubbling fluidized bed biomass boiler (BFB-Boiler) with an output of 14 MWel to Noda Power, Japan in operation since 2016.

In 2017, the first circulating fluidized bed power boiler (CFB-Boiler) for Ichihara biomass power plant was ordered from TOYO Engineering Corp., Japan; subsequently, ANDRITZ received CFB boiler orders in 2018 for Kamisu and Toyama biomass power plants (each 50 MWel).



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