Magazine of Pulp & Paper // 2025

ANDRITZ

SPECTRUM №46

In pit stop style: pulp mill reloaded

Suzano Três Lagoas // 38

In pit stop style: pulp mill reloaded

Suzano Três Lagoas

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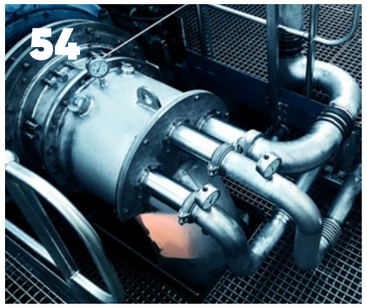

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PIONEERING IN TECHNOLOGY AND **CREATING GROWTH THAT MATTERS**

At ANDRITZ, two words encapsulate everything we do: innovation and growth. From pioneering technologies to strategic acquisitions, every step we take is aimed at creating growth that truly matters to our customers.

This year, we have made significant strides in that mission. ANDRITZ completed two strategic acquisitions: A.Celli Paper, a renowned Italian tissue and paper specialist, and Diamond Power International, a U.S.-based leader in boiler cleaning systems and services. Together, we now offer an even broader portfolio of solutions to meet the diverse needs of our industries.

Across the globe, our teams turned bold ideas into real results. In China, we started up Liansheng Pulp & Paper's kraft mill – the largest in the country – and equipped their Zhangzhou mill with two complete *Prime*Line tissue lines, enabling them to successfully enter the tissue market. In Austria, we transformed Heinzel Group's Steyrermühl PM3 machine into PM6, producing kraft papers for sustainable packaging and quickly surpassing performance targets. And in Brazil, at Suzano's Três Lagoas mill, we executed our largest pulp mill shutdown ever, bringing both lines back into operation in a rapid turnaround that delighted our customer.

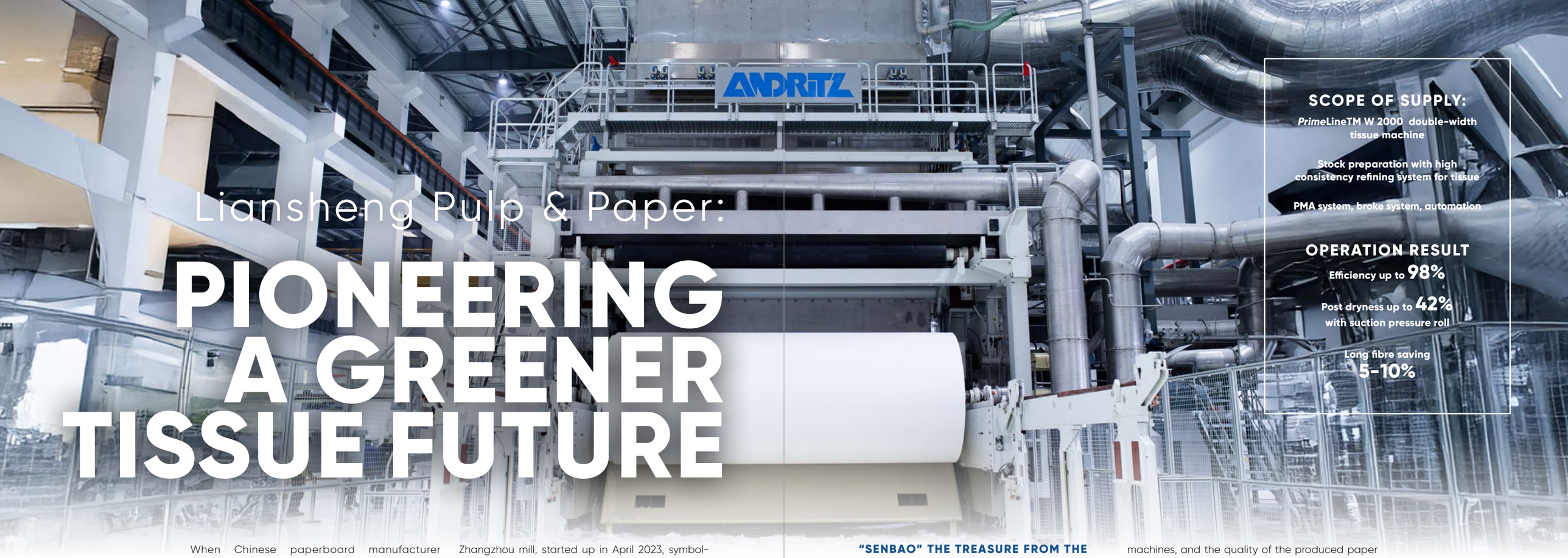
Our commitment to sustainability drives many of these achievements. This year we introduced technologies enabling wood chips to replace peat in agricultural substrates, thus reducing environmental impact in horticulture. We also launched Europe's first large-scale paper machine clothing recycling service to help customers close the loop and reduce waste.

Of course, these innovations and solutions begin with listening to you, our customers. We are committed to understanding your challenges and ideas – and to helping you achieve your goals.

In this issue of SPECTRUM, you'll see how collaboration, expertise, and innovation come together at ANDRITZ to deliver impact – for today, and for the future.

Sincerely,

Jarno Nymark
Member of the Executive Board
ANDRITZ Pulp & Paper



Liansheng Pulp & Paper:

PIONEERING A GREENER TISSUE FUTURE

SCOPE OF SUPPLY:

PrimeLineTM W 2000 double-width tissue machine

Stock preparation with high consistency refining system for tissue

PMA system, broke system, automation

OPERATION RESULT

Efficiency up to **98%**

Post dryness up to **42%** with suction pressure roll

Long fibre saving **5–10%**

When Chinese paperboard manufacturer Liansheng Pulp & Paper decided to trailblaze into the tissue market, it looked for the very best in efficient technology and environmental performance. ANDRITZ was chosen to supply two *Prime*LineTM W 2000 tissue lines, TM1 and TM2, complete with stock preparation and automation systems for its Zhangzhou mill in Fujian Province, China.

With an already successful portfolio of packaging paper under its belt, Liansheng Pulp & Paper recently took the courageous decision to launch into the tissue market to continue its forward-looking mission of growth into the paper industry. To underpin its entry into the market, the Zhangzhou mill, started up in April 2023, symbolizes a milestone in Liansheng Pulp & Paper's breakthrough into the tissue industry.

Now, with its strategic planning and corporate development through continuous innovation, Liansheng Pulp & Paper is already making its mark in the tissue market by creating a comprehensive portfolio from packaging to tissue paper grades. Furthermore, ANDRITZ's innovative technologies and solutions have brought Liansheng Pulp & Paper more comprehensive and competitive tissue paper production equipment, with significant energy consumption reduction and production efficiency enhancement and setting a new benchmark for green development in the industry.

"Currently, we have about 30 different types of tissue products being produced on the two ANDRITZ machines, and the quality of the produced paper has been well received by our customers, making our brand even more competitive in the market."

Zhang Hua
Vice General Manager of Tissue at Liansheng Pulp & Paper, Zhangzhou

"SENBAO" THE TREASURE FROM THE FOREST – LIANSHENG PULP & PAPER'S GREEN COMMITMENT

The company has already successfully launched its own brand of tissue products, "Senbao," which includes a variety of product series and grades of facial, toilet, napkin and kitchen towel products. As the dedicated brand for Liansheng Pulp & Paper "Senbao" symbolizes "the treasure of the forest," with a product concept that emphasizes "virgin pulp from nature". The products feature a soft touch and gentle texture, fully reflecting Liansheng Pulp & Paper humanistic care for consumers and its focus on nature and health. With high-quality, environmentally friendly characteristics, and a diverse product line, the company is committed to meeting the complex needs of end consumers for daily-use tissue paper, creating a "Forest · Pulp · Paper · People" green ecological community, and standing out in the competitive domestic tissue market.

The two ANDRITZ tissue machines are traditional crescent former machines, with the advantage of a large operating range, covering all grades of tissue from 11 to 42 gsm. "I believe this is an advantage for our customers, especially based on our current product structure and various complex market factors," says Zhang Hua, Vice General Manager of Tissue at Liansheng Pulp & Paper, Zhangzhou. "Currently, we have about 30 different types of tissue products being produced on the two ANDRITZ machines, and the quality of the produced paper has been well received by our customers, making our brand even more competitive in the market."

Shen Wei, Senior Manager of Tissue at Liansheng Pulp & Paper, Zhangzhou, adds, "We have already produced 42-gram paper on the ANDRITZ machines, and the quality of the paper, as well as the formation, is excellent. Currently, only ANDRITZ tissue machines can produce such a grade. Furthermore, the hand towels produced from converting machines are of very good quality. We have successfully changed the grades many times on both tissue machines, and everything has gone smoothly."

MULTI-DIMENSIONAL COST SAVING, BUILDING UP CORE COMPETITIVENESS

In recent years, energy saving and consumption reduction have been key indicators for paper manufacturers to maintain sustainable development and competitive advantage. ANDRITZ *Prime*Line tissue sustainable production has been proven effective in every step of daily operation. When talking about the energy consumption of these two tissue machines, Hua and Wei comment, "The two tissue machines are equipped with suction pressure rolls which have no additional hydraulic units needed, resulting in significant electricity savings. The drives also have low electricity consumption, thus ANDRITZ has done a great job in reducing

The ANDRITZ team collaborated closely with the Liansheng team at the Zhangzhou mill.

overall energy consumption. In addition, ANDRITZ's heat recovery system is better than other makes of similar machines, making incredible energy-savings when applied with the suction pressure rolls. The suction pressure rolls can achieve a post dryness of 42%, ensuring both dryness and the bulk of the tissue, reducing cost while ensuring excellent paper quality."

To reduce the raw material cost for tissue manufacturers, ANDRITZ has recently introduced a high-consistency refining system in stock preparation for tissue, aiming to reduce the proportion of long fiber while ensuring paper strength. Wei also gives a positive evaluation of the actual application of the high-consistency refining system; he says, "ANDRITZ's high-consistency refining system is very helpful for our goal of reducing long fiber use. If we did not use the high-consistency refining system, the use of long fiber would have to increase by at least 5-10%. Long fiber savings are quite significant for us in terms of cost savings."

HIGH EFFICIENCY, STABILITY, EASE OF OPERATION AND ACCESSIBILITY

ANDRITZ has vast experience in double-width tissue machine technology, which is favored for its high efficiency, stability, and convenient maintenance and operation in more than 30 Chinese domestic references. These unique advantages have been fully demonstrated in the Liansheng Pulp & Paper TM1 and 2 project. Hua comments, "From a daily operational perspective, the stability of these two tissue machines is really good, and the machine efficiency is also excellent." Wei adds, "The current machine efficiency can reach around 98%. These two tissue machines with suction press rolls make operation and maintenance more convenient and cleaning of the felt easier. Convenience of operation is very important for paper makers, team leaders, and even supervisors in the workshop. Machine efficiency is also one of the KPIs for workshop assessment. It has an impact on labor costs, which will also affect the subsequent development of the project and the efficiency of whole operation."

CUSTOMER-ORIENTED: THE EXCELLENT MANIFESTATION OF THE ANDRITZ SERVICE PHILOSOPHY

"As a large manufacturing enterprise in the pulp and paper industry, ANDRITZ's expertise and know-how are undoubtable." Wei continues, "During the optimization, the ANDRITZ team provided a lot of support and constructive ideas from a technical, personnel, and company perspective."

Looking forward to the future, Hua fully affirms ANDRITZ's technical strength and service quality and looks forward to further deepening cooperation between the two parties in the near future. Wei concludes, "It is exciting to have ANDRITZ bringing more energy-saving and carbon-reducing innovative technologies to the industry. Shoulder to shoulder with each other, we look forward to a win-win situation in a high-quality green transition in the paper industry."

STRENGTHENING SUSTAINABLE INNOVATION: ANDRITZ AND LIANSHENG PULP & PAPER JOIN FORCES

ANDRITZ and Liansheng Pulp & Paper have forged a strong partnership marked by innovation and environmental stewardship. Established in 2020 as part of the Liansheng Paper Group's expansion into household paper production, Liansheng Pulp & Paper is Fujian's premier packaging paper manufacturer, renowned for its commitment to eco-friendly manufacturing practices. Through collaborative efforts, ANDRITZ has supported Liansheng Pulp & Paper in achieving operational excellence, enhancing production efficiency, and maintaining stringent environmental standards. This partnership exemplifies a shared dedication to sustainability and cutting-edge solutions in the paper industry. Fan Lele, Vice Sales General Manager of Household Paper, Liansheng Pulp & Paper, says, "We were excited to hold the first tissue in our hands. The tissue quality has been excellent right from the start."

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ADVANCED TECHNOLOGY FOR HIGH-PERFORMANCE TISSUE PRODUCTION

The *Prime*LineTM W 2000 tissue machines are engineered for high performance, featuring a design speed of 2,000 m/min and a working width of 5.65 m. They incorporate advanced energy-saving technologies, including 20 ft *Prime*Dry Steel Yankees and steam-heated hoods, ensuring optimal thermal efficiency. The performance of an ANDRITZ steel Yankee exceeds that of a cast-iron Yankee of the same size. Steel Yankees have an evaporation rate that is 15-20% higher than cast-iron models, thus resulting in 8-10% better machine performance.

The stock preparation systems are optimized for NBKP (Needle Bleached Kraft Pulp) and LBKP (Leaf Bleached Kraft Pulp), leveraging FibreSolve FSV pulpers, a pulp screw press, and HC refiners to deliver consistencies of 25%-30% while maintaining exceptional fiber quality. Additionally, the systems encompass advanced approach flow solutions, broke handling, and a comprehensive fabrics and rolls package—featuring state-of-the-art forming fabrics, press felts, and roll covers—to ensure superior dewatering efficiency and reliability at high operational speeds.

HC refining system for tissue

*Prime*LineTM W 2000 tissue machine

Read the complete story online!

"WE GOT EXACTLY WHAT WE WANTED."

Read the complete story online!

In order to hit the production "sweet spot" more consistently, MDF panel maker, Pfleiderer, decided to do things differently at its plant in Baruth, Germany. ANDRITZ appreciated the challenge of coming up with a tailor-made solution, featuring a range of new designs that created possibly the most advanced refiner-feeding system in the industry.

There were no installation problems and no major issues with the start-up.

In Baruth, near Berlin, Pfleiderer has been manufacturing wood-based panels for almost quarter of a century, supplying building and decorating materials for homes, offices, healthcare, hotels, and restaurants. In that time, it has earned a reputation as one of the leading operators in the MDF business.

To make that possible, it uses one of the largest refining systems in the industry. Due to continuous growth and Pfleiderer's determination to maximize the plant's operating efficiency, they decided to use the latest state-of-the-art innovations from ANDRITZ to optimize Baruth's refining system.

That meant changing things up, especially between the plant's digester and refiner. Baruth wanted consistent chip quality at the digester exit, processed and fed at a consistent rate, so they could run the refiner at a consistent load and speed. At the same time, they also came up with a plan to make the whole new digester discharger/screw feeder set-up easier to access for quicker maintenance. ANDRITZ responded with a range of tailor-made innovations, featuring a radical change in layout, a built-in third chip-steaming stage, and a new screw design.

NEW SCREW, NEW PERFORMANCE

After around 20 years of operation, Pfleiderer wanted to resolve some operating pressure issues, and get the plant ready to meet the industry's next-generation challenges. This included replacing the digester discharger with a new unit that better matched their mechanical, quality, and profitability goals. They asked ANDRITZ for a tailor-made discharger, with the exact proportions that would enable Baruth to operate at the "sweet spot". As Alexander Held, Technical Services Director, Pfleiderer, explains, "We wanted a new, state-of-the-art digester base unit, designed with diameter and pressure levels to fit our requirements."

The upgrade required quite a few innovations, and ANDRITZ was glad to contribute. Alexander Held remarks, "We've never had a partner before that was so open to non-standard requirements; ANDRITZ really listened and immediately understood our wishes." Karl Rausseck, Technical Services, Pfleiderer, adds, "The experience from the planning phase to the final design was very positive - unique. I've never seen such a good design." Florian Grünberger, ANDRITZ Key Account Manager, admits, "Our customers usually run their refining systems for decades. Over such long periods, production capacity, fiber quality, and energy consumption requirements can often change. It was great to be able to offer a tailor-made solution for a customer with specific requirements, to adapt to changing production conditions."

The newly-designed digester discharger works quite differently from the old one. Instead of being a classic drop feeder, the new unit compresses the cooked woodchips via a slightly conical screw set-up, to create chip plugs. These then enter the new ANDRITZ C-Feeder (constant feeder), which slices the chip plugs into small, equal-sized pieces to ensure a highly-consistent feed volume entering the refiner. Other innovations included a central steam unit, which gives Pfleiderer the option of a third steaming stage, especially for any fiber clumps that may have evaded the two steaming stages inside the digester itself. This helps to ensure less-variable

temperatures, and that can actually reduce overall steam consumption. "We have been using this option since Day 1, right from the start-up," explains Alexander Held, while Christoph Liese, Production Manager, Pfleiderer, confirms, "We have a good steam spread now."

A further innovation was a new wear ring inside the digester base, next to the agitator tips. ANDRITZ also provided a cartridge solution for the bushing of the agitator shaft. This can be swapped out at planned service intervals, saving time and money on changeovers, which are now seven times faster. Karl Rausseck adds, "We made many practical changes to simplify the system. For example, we rotated the agitator drive by 90°, to make it more easily accessible. It was a really good decision; it makes it much easier to install spare parts, thus reducing costs and downtime."

NEED FOR FEED

A new, compact and maintenance-friendly C-Feeder was also manufactured to Pfleiderer's specific design. This state-of-the-art unit replaced the old twin-screw design with a single screw. Karl Rausseck explains, "I was skeptical, at first. I've been working on this digester for more than 20 years, and I was afraid the C-Feeder wouldn't be able to handle the operating conditions; there can be some big fiber chunks to deal with. But it has turned out to be really solid." Florian Grünberger concurs, "It's a more complex piece of equipment, so Karl was afraid it would be more sensitive but, in fact, it is very robust."

The new C-Feeder works together with the new digester discharger to ensure continuous feeding of wood from the base of the digester into the ribbon-feeder to match the new throughput capacity needs. This means it now operates with far more consistent energy consumption, which reduces operating expenses and extends refiner plate lifetimes (assuming like-for-like fiber characteristics). Another major advantage is homogeneous defibration, which means the plant uses a lot less adhesive during production, while delivering reliable board properties in all capacity ranges.

CUSTOMER BENEFITS

Homogeneous feeding of wood chips leads to:

- Refiner load deviation reduced by almost 50%
- Steaming pressure deviation reduced by over 70%
- Overall refiner energy consumption reduced
- Adhesive consumption reduced

The innovative design helped to increase efficiency, by reducing maintenance time and costs.

ALL TARGETS HIT

The new equipment arrived at Pfleiderer Baruth in September 2023, and the upgraded system started up in October, on time, as planned, and with no delays. David Klement, ANDRITZ Project Manager, notes, "The project installation took place during three weeks of downtime, exactly as planned. There were some obstacles – there always are – but we trusted our design, combining the old and the new equipment, and it worked. Pfleiderer noticed an improvement right from the start-up – they can 'hear' that it is running quieter now." Christoph Liese confirms, "There were no installation problems and no major issues with the start-up. And there have been no stoppages since, no trouble with worn parts – it's working well and running smoothly. We hit all of our targets. There has been a clear improvement in all variables. The project was a success and we would absolutely recommend this system." Alexander Held concludes, "It was almost a 'plug-and-play' solution. We were already achieving our savings targets as early as January 2024." It is noted that the savings targets were met just three months after start-up. "From our side, this is a real success story. We got exactly what we wanted."

According to Christoph Schwarz, ANDRITZ Product Manager, "Pfleiderer is a very careful customer, keeping a keen eye out for any difficulties. So from such a high-precision customer, this is very high praise, indeed."

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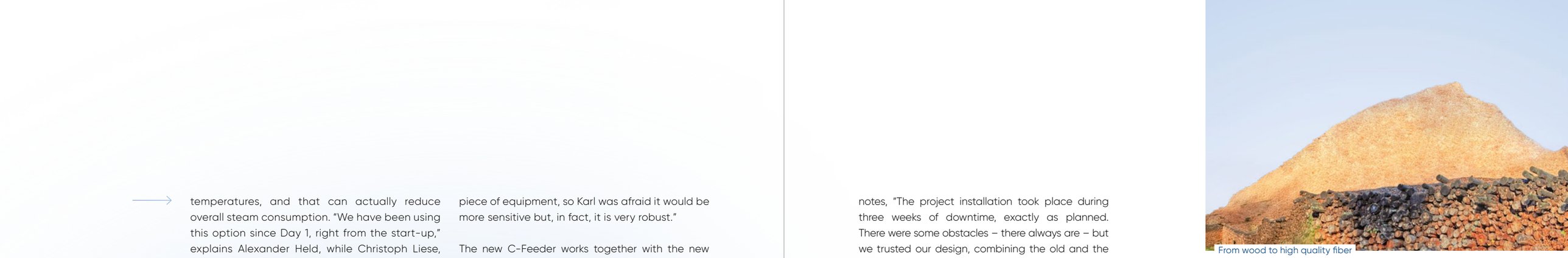


From wood to high quality fiber


ANDRITZ and Pfleiderer Team


ANDRITZ Digester Discharger and C-Feeder

"Since start-up, everything is working well and running smoothly. We hit all of our targets for this project. There has been a clear improvement in all variables - we achieved all of our expectations."

Christoph Liese
Operations Manager, Pfleiderer

STEAM DEICING IN THE DEBARKING DRUM

LESS ENERGY, LESS WATER, MORE SAVINGS

In its never-ending quest to improve performance across the whole of the pulp mill, ANDRITZ has dramatically enhanced the process of deicing logs in the woodyard by introducing steam injection into the debarking drum.

With a much smaller footprint, less water and energy use, and improved efficiency when it comes to wood losses, steam deicing technology from ANDRITZ represents huge savings to pulp mill operators when deicing logs.

Antti Haapalainen, Head of Wood Processing Product Group at ANDRITZ explains, "The traditional way to deice logs in the woodyard is by using warm water – at around 50 °C – which is sprayed in a long tunnel onto the log bundles on a moving conveyor. In this case, the warm water melts the ice and snow on the surface logs; however, the logs in the middle of the bundle do not get so much heat energy and can often remain frozen.

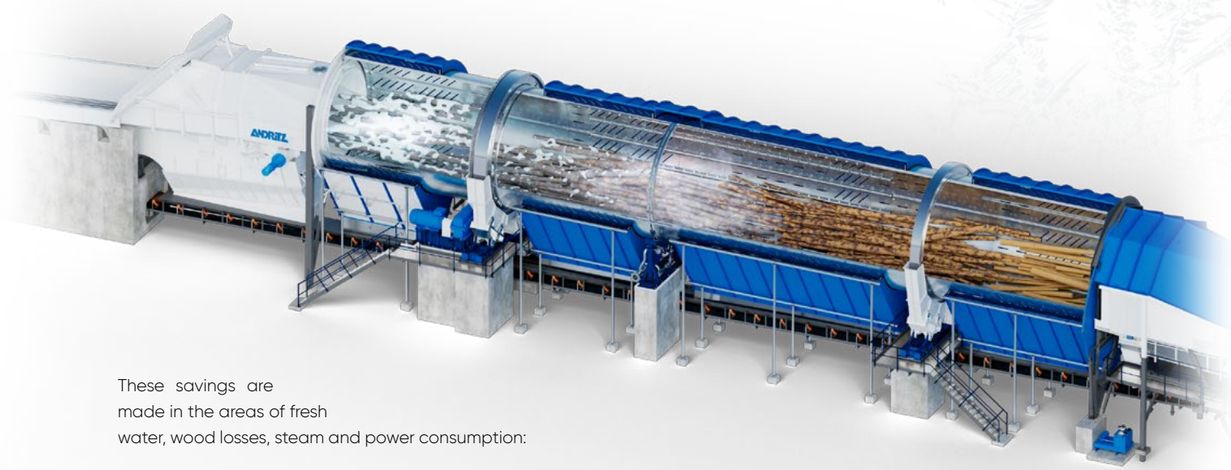
"In the case of the ANDRITZ steam injection deicing system in the debarking drum, multiple injectors are housed in the drum itself, and the energy transfer of hot steam is much more efficient than warm water, and therefore super-efficient when it comes to deicing the logs. At the same time, the steam injection system has a much smaller footprint and has markedly less auxiliary equipment required for operation."

The operating principle from ANDRITZ first involves a steam injection to melt ice and snow in the entrance of the drum, followed by a second injection of steam spread directly on the surface of the logs during debarking using special log lifters. Steam injected directly onto rotating logs ensures that all logs are properly deiced. Furthermore, the amount of energy and thus the whole deicing process is easier to control and can be accurate according to the requested debarking degree, thereby saving energy.

"This constant steam injection sequence in the drum is crucial to the debarking process as it makes sure that the frozen core of the logs does not cause the surface bark to freeze again, resulting in a much more efficient debarking process," says Haapalainen. "In the case of the warm water deicing system, energy input stops at the entrance of the drum and frozen cores can re-freeze the surface bark. Ultimately, this means the debarking process needs more warm water and the drum needs to rotate harder to get the required result, which increases energy costs and the possibility of white wood loss."

SAVINGS: FRESH WATER, EFFLUENT, ENERGY, AND WOOD LOSS

Calculations by ANDRITZ indicate that an average size pulp mill, with a warm water deicing system can save around 1.5 MEUR a year by installing a steam injection system on a typical nordic debarking line.



These savings are made in the areas of fresh water, wood losses, steam and power consumption:

- Fresh water consumption savings of up to 40%
- Lower emissions and carbon footprint
- Electricity consumption up to 240 kW lower installed power
- Steam consumption up to 20% saving
- Less wood losses, at medium sized mills (more than 100 KEUR annually)
- Lower investment cost (equipment and civil works)
- Efficient layout of the plant
- Lower life cycle costs (less equipment to maintain)

"There are many savings to be made by installing a steam injection system," says Haapalainen. "First of all, with a warm water deicing system, fresh water needs to be constantly added as the water becomes full of soil, mud, and bark residue. With the steam injection deicing system in the debarking plant, 40% less fresh water is required, which also means there is much less effluent."

"Also, there are generally lower emissions considering reduced effluent and we need less equipment due to the smaller footprint. Electricity consumption is much lower due to less energy being used in the debarking process and, of course, there is less wood consumption due to more accurate debarking efficiency. In addition to these savings, →

"over-debarking" can be avoided and drum rotation can be kept optimum for the purpose."

Furthermore, due to exposure in the long tunnel of conventional deicing conveyor, some 2 MW of heat loss occurs during winter months on the warm water deicing system, representing a 23% energy loss. As the steam injection system is contained in the debarking drum and energy transfer to logs is more accurate, much less energy is wasted.

INSTALLATION AND LIFE CYCLE

Due to its smaller footprint, less equipment requirements, and lower effluent amounts, the steam injection deicing system is ideal for both greenfield and existing mills.

"A smaller footprint and less equipment mean a major saving on capital costs," says Haapalainen. "The steam injection deicing drum can replace existing deicing systems at mills, for example, in cases where effluent load has to be minimized, as ANDRITZ has the engineering expertise to tailor-make to individual mill requirements."

"There are less civil works, investment costs are lower due to less equipment needed, and the lower lifecycle costs mean a fast return on investment."

ANDRITZ is currently installing a new debarking and chipping line with steam deicing in the debarking drum at the Nordic Paper Bäckhammar mill in Sweden. The plant will have the capacity to process over 1.4M m^3 sob of pine and spruce logs annually. Start-up is scheduled for the fourth quarter of 2025.

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"With the steam injection deicing system in the debarking plant, 40% less fresh water is required which also means there is much less effluent."

Antti Haapalainen
Vice President, Wood Processing, ANDRITZ

USED PAPER MACHINE CLOTHING

A HOLY GRAIL OF RAW MATERIAL FOR RECYCLING

ANDRITZ has recently partnered with HolyPoly, a trailblazing German recycling company, to offer a unique solution for the disposal of all used Paper Machine Clothing (PMC) – circular economy at its peak!

Each year, around 7,000 tons of fabrics and felts from paper, board, and tissue producers are discarded across Europe, with most ending up incinerated or in landfills. Recognizing this challenge, ANDRITZ has worked extensively with universities and recycling experts to develop a sustainable solution. The result: a brand-new PMC recycling service now available to customers across Europe.

To bring the concept to life, ANDRITZ teamed up with HolyPoly, a dynamic German recycling specialist with the right expertise and passion. Already experienced in recycling post-consumer waste, HolyPoly provides the full package—logistics, regulatory compliance, and processing.

"As ANDRITZ is not a certified recycling company, we needed a partner to help make this happen," says Jan Freudenberg, Director R&D Forming Fabrics, ANDRITZ. "HolyPoly has proven to be the perfect fit."

Under the exclusive agreement, HolyPoly takes complete responsibility for collecting and recycling used PMC. The process is designed to integrate seamlessly with existing waste handling procedures at paper mills—no extra work is required.

All brands and types of PMC are accepted, not just ANDRITZ products. Once collected, the material is treated, baled, and transported to HolyPoly's recycling plants. Mills receive a detailed annual report tracking volumes, destinations, and recycling outcomes—essential for sustainability reporting and carbon reduction targets.

"As of now, all used PMC can be turned into valuable plastic products," says Freudenberg. Applications range from electronics housing to automotive parts – and eventually, even back into new ANDRITZ PMC, thus closing the loop.

This first-of-its-kind solution significantly boosts the sustainability and circularity of paper production and helps mills prepare for stricter waste regulations.

So how can a customer get involved? "Just give ANDRITZ a call – we'll develop a tailored proposal for your mill," says Freudenberg.

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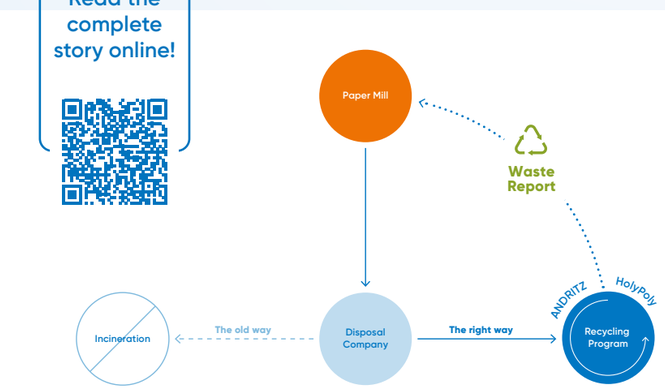
Read the complete story online!



Watch our video

FROM DATA TO EXCELLENCE

WAGGERYD CELL'S COMMITMENT TO QUALITY WITH PULPEYE

Waggeryd Cell, located in Vaggeryd, Sweden, is one of the world's most efficient producers of BCTMP (bleached chemi-thermomechanical pulp) and CTMP (chemi-thermomechanical pulp). The mill is committed to delivering stable and precise pulp quality tailored to meet the specific needs of its paper and board customers, who demand exact quality measurements and comprehensive data.

To achieve top quality pulp, Waggeryd Cell uses the ANDRITZ PulpEye Fiber Properties Analyzer, an intelligent analyzer that continuously monitors pulp quality online. The analyzer takes samples every 10 minutes and provides real-time data on multiple quality parameters. Advanced statistics (ExtractEye) transform the extensive PulpEye data into information that enables operators to adjust the process to maintain consistent quality and meet the high standards expected by each of its customers.

MEET QUALITY REQUIREMENTS AND REDUCE VARIATION FOR DIFFERENT PULP GRADES

The key modules used by Waggeryd Cell are crill and fiber properties. These data are statistically transformed to calculate product bulk and tensile. This information is particularly valuable for customers who require precise quality measurements to manufacture and maintain stable and precise products to meet their customers' quality requirements.

PulpEye Fiber Properties Analyzer also offers a module to measure the traditional freeness value. It is increasingly well recognized that the same freeness value can be achieved by running refiners in different ways, which will result in different strength and bulk properties and confirms the importance of measuring key fibre properties during production.

INCREASE PRODUCTION AND OPTIMIZE ENERGY CONSUMPTION

Energy consumption is a significant concern for Waggeryd Cell. The CTMP process consumes a lot of energy and the PulpEye Fiber Properties Analyzer plays a crucial role in optimization of the energy input.

"We do not put too much energy into the pulp production, but not too little either. So, we optimize the energy consumption in the CTMP process," explains Henrik Karlsson, Sales Manager from Waggeryd Cell.

By leveraging the capabilities of PulpEye solutions, Waggeryd Cell aims to increase and optimize its production and energy consumption year after year. This commitment to quality and efficiency ensures that the company remains a reliable partner for its customers in the paper and board industry.

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PULPEYE FIBER PROPERTIES ANALYZER CAN BE ADJUSTED TO SPECIFIC CUSTOMER NEEDS

Benefits of PulpEye Fiber Properties Analyzer:

- Quick results
- Robust and truly modular system
- Low maintenance (few moving parts)
- Data transformed into information that enables immediate operational decisions
- Timely pulp quality information calculated from fibre properties measurements
- Lower reliance on (delayed) laboratory testing

PulpEye Fiber Properties Analyzer cabinet

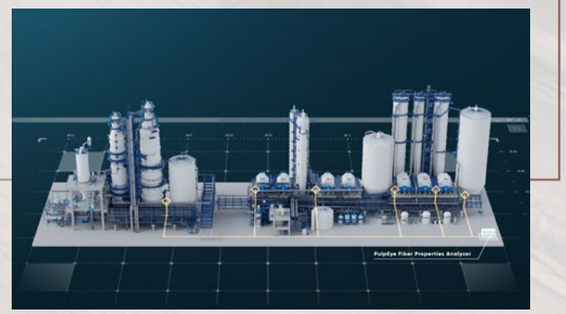
DID YOU KNOW ...?

The acquisition of PulpEye in 2024 adds core pulp quality analyzers and measurements into the automation and digitalization portfolio.

ANDRITZ acquired PulpEye in September 2024. PulpEye is a technology company focusing on online applications and services for the global pulp and paper industry. The Swedish company provides pulp, paper, and board producers with a wide range of proven online pulp analyzers, measurements, and controls ranging from chip quality and kappa to fiber properties and more throughout the process.

Since 2002, PulpEye products have contributed to stabilized and higher pulp quality, process efficiency, and reduced energy consumption in chemical, mechanical, and recycled pulp production as well as stock preparation and MDF/MDP. Based on customer-specific needs, modules are combined and connected in a system that provides analysis data and control of any specific fiber property.

The acquisition of PulpEye complements ANDRITZ by providing total solutions that combine measurements, analyzers, advanced process control, and mill-wide optimization, as well as a broad range of global services.



BioCircleToZero

NEW R&D PROGRAM UNITES COMPANIES, RESEARCH, AND UNIVERSITIES FOR TECHNOLOGICAL BREAKTHROUGHS IN FINLAND

ANDRITZ continues to innovate new ways of increasing the value of wood at pulp mills, ultimately aiming to create biorefineries. With the recently launched BioCircleToZero program, funded by Business Finland, the company aims to take a giant leap forward in efforts to double the value of wood.

It is said that "necessity is the mother of invention" and this certainly applies to wood use in Finland. The situation in Europe in recent years has led to rising costs of raw material while wood harvesting in Finland is approaching sustainable limits. As a result, the focus is shifting toward maximizing the value extracted from each stream without increasing forest use.

Johan Engström, Chief Technology Officer, ANDRITZ Pulp & Paper says, "We simply have to get more value out of the wood being used at pulp mills. One of the most straightforward ways to address this challenge is to burn less wood-based material in the process, increase the pulp yield, utilize side streams, such as lignin and biomethanol, or increase the value by high-value products like man-made textile fibers. In reality, biomass will always be burnt to some stage, but technologies for the biogenic CO_2 together with green hydrogen can be converted to, for example, eFuels. To meet these challenges, we have launched the BioCircleToZero initiative and with a lot of intense, combined innovation and effort, we can realistically see doubling the value of wood in the future."

BUILDING A STRONG PARTNER ECOSYSTEM FOR TECHNOLOGICAL BREAKTHROUGHS

Doubling the value of wood sounds like a highly ambitious task; however, there is a lot of interest and support for the program. The five-year BioCircleToZero program was launched in early 2025 by ANDRITZ and supported by Business Finland, the country's agency for trade and promotion, with a grant of 10 MEUR. Led by ANDRITZ, the initiative has been set up to encourage cooperation and R&D efforts with companies, research institutes, and universities working in the field of forest product industries, energy, climate, and environmental sectors.

Expecting some 100 members, the initiative has already secured big-name supporters in the forest products industry as partners, including companies, research institutes, and universities. Business Finland has also provided an additional 20 MEUR to partners contributing to the program.

Kari Tuominen, CEO of ANDRITZ Finland, says of the program, "This is an extremely important initiative. At ANDRITZ we have always been known for developing innovative new technology that is well received by our customers. Although we have had many successes in joint developments for the forest product industries in the past, with the BioCircleToZero pro- →

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Are you interested in the opportunity to collaborate with us in Finland?
Let us know and we will contact you directly.

Contact us: BioCircleToZero@andritz.com

"As a technology supplier to the pulp, paper, and bioproducts industries, the program is exciting for us as this initiative will benefit the complete wood value chain and therefore many different industries around the globe."

Kari Tuominen
CEO ANDRITZ Finland

gram we are building a large ecosystem where it is not only us bringing new technology to market. We are leading the initiative, but our partners are also key in any new development that enables the creation of added value from wood."

PIONEERING INTO ALL AREAS TO BENEFIT THE COMPLETE WOOD VALUE CHAIN

One of the examples of innovation as part of the program is the better use of wood at chemical pulp mills. Currently, approximately half of the wood going into a chemical pulp mill ends up being burned for energy as process residues. Engström says, "This can, and must, be reduced. Burning such a valuable raw material should be minimized as much as possible, especially if a commodity product is being made. There is so much more that can be done to add value to the wood instead of simply burning it."

To address this, the program focuses on developing added-value products from the process side streams that would otherwise be used for energy. Engström continues, "We have already developed successful solutions for making new products out of the side streams from pulp mills and, in some cases, we have created solutions that seemed impossible to begin with. This is what the BioCircleToZero program has been designed for; building ecosystems that will enhance and optimize the utilization of all areas of pulp mills, innovating and proving the feasibility of pioneering new products."

TARGETING FOR MORE RESOURCE-EFFICIENT INDUSTRIES

The BioCircleToZero initiative focuses on four main streams with each stream having its own set of tasks and goals:

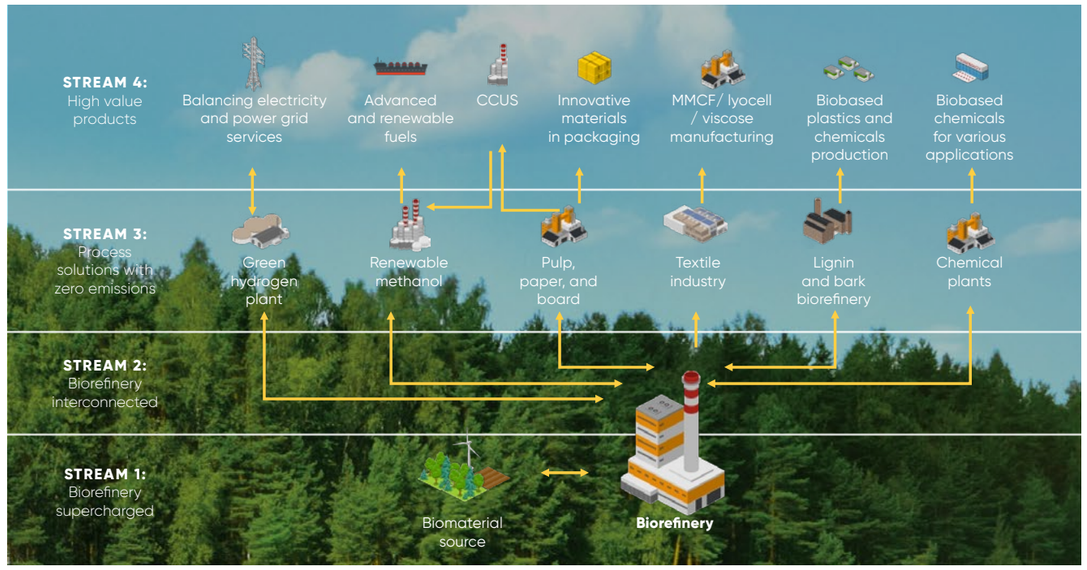
Stream 1: Biorefinery supercharged – Concentration on biorefinery process improvements and connections to enable emission-free production processes.

Stream 2: Biorefinery interconnected – Focusing on enabling the ecosystem growth around biorefinery processes by opening the materials, services, and side streams flows to third parties. This stream will also evaluate and develop new business models for biorefinery ecosystems, for instance, business models that enable growth creation from negative emissions.

Stream 3: Process solutions with zero emissions – This stream focuses on turning biogenic carbon flows into high-value renewable fuels and products by combining green hydrogen and P2X technologies with biorefinery processes.

Stream 4: High-value products – This stream develops new processes and high-value products to create more value from pulp, such as man-made cellulosic fibers (MMCF) for the textile industry and

Targeting for a more resource-efficient forest industry



chemicals from biobased feedstocks. Moreover, the streams encompass ANDRITZ's key capabilities in biorefinery technologies and P2X.

"One of the clear directions ahead is that we must utilize all waste at pulp mills and make as many products out of the wood as we possibly can before burning it," says Engström. "From the burnt biomass, we can collect biogenic CO_2 emissions to enable even more products to be made, for instance, fossil-free fuels for aviation or marine applications."

Engström continues, "We at ANDRITZ lead the BioCircleToZero program, and our valued partners in the ecosystem are the contributors that follow along on our journey towards doubling the value from wood without harvesting more trees. In the initiative, we set goals for the journey. Our task is to build a complete, effective ecosystem, which develops pioneering solutions to achieve our ambitious and exciting aim of doubling the value of our precious wood supply."

Tuominen concludes, "This is not only about pulp and paper, but we are also pioneering into all areas of how value can be added to wood, including the production of textiles, biochemicals, biofuels and e-fuels, recycling and reusing materials and energy, and the environment. As a technology supplier to the pulp, paper, and bioproducts industries, the program is exciting for us as this initiative will benefit the complete wood value chain and therefore many different industries around the globe."

CONTACT

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"One of the clear directions ahead is that we must utilize all waste at pulp mills and make as many products out of the wood as we possibly can before burning it."

Johan Engström
Chief Technology Officer, ANDRITZ Pulp & Paper

RAMP UP IN STYLE

Brazilian pulp giant Suzano started up its Ribas do Rio Pardo pulp mill in eastern Brazil in July 2024. Utilizing the very latest in ANDRITZ technology, the mill has set a benchmark in reaching the nominal pulp capacity of 1 million tons of production in less than six months after start-up.

The largest single-line eucalyptus pulp mill in the world, Ribas do Rio Pardo pulp mill, is set to produce 2.55 million of tons per year of top-quality pulp for the global market and at the same time generating 180 MW of surplus energy for Brazil's national grid.

At the peak of the construction and erection phase of the new mill, around 10,000 personnel were working at the site, with over 300 ANDRITZ skilled employees.

SCOPE OF SUPPLY – A FOCUS ON SUSTAINABILITY

ANDRITZ supplied the complete pulp mill, including wood processing plant, the world's largest single-line fiberline, pulp drying system, evaporation plant, recovery boiler, power boiler, white liquor plant, gasification plant, and a SulfoLoop™ sulfuric acid plant. The new mill also has the latest in ANDRITZ automation and digitalization that enables unprecedented levels of autonomy and sets the benchmark for the global industry. In addition, ANDRITZ supplied more than 500 pumps for all process islands. These pumps were designed and sized to consume the lowest possible power due to their high efficiency while handling a variety of abrasive and corrosive media.

With a major focus on sustainability, the mill runs entirely on renewable energy, producing a surplus of 180 MW, which is supplied to the national grid and equivalent to the use of two million inhabitants with around 1.5 TWh of electricity. The SulfoLoop™ sulfuric acid plant enables the mill to be completely self-sufficient in sulfuric acid. The plant has a capacity to produce 153 tons of commercial grade sulfuric acid per day from the mill's concentrated odorous gases and elemental sulfur.

As part of the scope of supply, ANDRITZ will continue supporting the mill by providing maintenance services. This support started a couple of months before the start-up in July 2024. The five-year contract Suzano has signed with ANDRITZ covers several maintenance modules for all process islands and equipment at the new mill. The modules comprise lubrication as well as predictive, inspection maintenance services, including vibration analysis in mechanical equipment and electrical thermographic inspections.

COMMISSIONING, START-UP AND RAMP-UP

All equipment was in place at the mill in early 2024 and despite some unavoidable delays in construction the commissioning and start-up went according to schedule. Roberto Furtado, Commissioning and Start-up Corporate Manager from ANDRITZ says, "Once all the process islands and equipment were in place, instrument checks were completed, and a water run across all systems and sub-systems was carried out. The commissioning was very successful and went according to plan allowing for a smooth start-up."

Joel Starepravo, Project Director, ANDRITZ says, "The start-up officially took place on Sunday, July 24th at 9 pm when the first chips were fed to the digester. Despite some initial teething problems - very normal in projects of this scale - the mill was stable from the start.

Read the complete story online!

"One of the highlights of this particular start-up was the quality of the first pulp produced from the mill and we reached the agreed quality very fast."

The top rate quality of the pulp so early after the start-up was instrumental in the further ramping of the mill to nominal capacity. "The ramp-up started in a synchronized and organized way," continues Furtado. "And as soon as we saw that each process area was stable enough, we were able to begin ramping up the speed."

The mill reached its designed daily production capacity within only 87 days of the beginning of operations in July 2024 with an excellent 95.3% of final pulp already meeting market-ready quality standards.

"In terms of reaching nominal capacity so fast this project was a benchmark for ANDRITZ and the industry," says Starepravo. "In less than 90 days we went from first chips fed into the digester to full mill capacity, virtually unheard of in this industry. Furthermore, in just five months we completed the learning curve at the mill, four months earlier than we agreed with the customer."

ONGOING PERFORMANCE AND ENVIRONMENTAL EXCELLENCE

The mill is now running at a capacity of 8,004 tons a day delivering top quality pulp at the same time as generating a significant amount of renewable energy for the Brazilian grid.

"From the woodyard to the dryers the mill is running better than expected and due to the fact that this mill includes all ANDRITZ equipment, a smoother start-up and quick ramp-up was enabled. Working closely with the customer made it easier to get good results and the close cooperation really made a difference in this case."

Starepravo comments, "Despite some delays in the construction phase of the project, we met the customer's requirements when it came to producing sellable, high-quality pulp in the agreed original time frame.

"With the high capacity, excellent quality pulp, and low chemical consumption this mill has provided an excellent solution to Suzano's requirements."

On the environmental front, the mill is now running completely free of fossil fuels, with biomass from eucalyptus feeding the gasifiers, recovery boiler, and power boiler. Furthermore, the SulfoLoop plant is running at full capacity and provides all the mill's needs when it comes to sulfuric acid used in the pulping process.

Roberto Furtado
Commissioning and Start-up
Corporate Manager, ANDRITZ

"In less than 90 days we went from first chips fed into the digester to full mill capacity, virtually unheard of in this industry."

Joel Starepravo
Project Director, ANDRITZ

"Ribas do Rio Pardo really is a showcase mill for the industry. Together with Suzano we have brought a new and record-breaking mill to life, fueled by 100% planted eucalyptus trees. With the SulfoLoop plant the mill is recycling sulfur from waste steams to make sulfuric acid, closing environmental loops and creating circularity.

"We at ANDRITZ are very proud to be creating growth that really matters in the global pulp industry," concludes Starepravo.

AUTOMATION AND DIGITALIZATION – A BENCHMARK IN THE PULP INDUSTRY

The Ribas do Rio Pardo mill has one of the most comprehensive automation and digitalization scopes supplied by ANDRITZ with a high level of autonomy. Built entirely with ANDRITZ equipment, the mill integrates a full suite of automation and digitalization solutions – starting with a robust foundation of automation, electrification, and instrumentation. Going beyond the basics, it incorporates a bundle of ANDRITZ Smart Series Intelligent Instruments, which enable a truly elevated level of digitalization and data-driven decision-making through its connection to digitalization solutions from Metris.

ANDRITZ Smart Series Intelligent Instruments provide data from the process to ANDRITZ Digital Solutions, enabling improvements in the production process. An excellent example is the Smart Woodyard Process Optimization, which utilizes advanced measurement solutions for analysis of loading deck discharge, infeed volume, and debarking degree to determine optimal debarking and chipping operations, thereby optimizing quality, minimizing wood losses, and generating savings.

Another example of a high-value combination of solutions is the Smart Smelt Spout Robot, which frees the operators from the hazardous activity of keeping the spouts in good operation condition while the advanced visual analysis provides valuable information of smelt reduction rate and char bed dimensions – information that can be used for recovery boiler operation optimization by Metris ACE (Advanced Control Expert) and by the Digital Twins.

There are many more solutions - a total of 42 ANDRITZ Smart solutions in the Ribas do Rio Pardo mill to provide advanced process measurements, analyzers, analytics, machine vision solutions, condition monitoring systems, robotics, and mechatronics solutions, thereby enabling a higher level of autonomy.

Furthermore, ANDRITZ has implemented a comprehensive suite of digital solutions at the mill. Starting with Metris Operator Training Simulation (OTS), designed to train Suzano's team across 16 key process areas from ANDRITZ EPCM scope as well as non-ANDRITZ. It familiarized operators with control screens and the plant's automation philosophy, covering start-up, shutdown, and abnormal situations.

For the highest levels of optimization and efficiency, the full library of the ANDRITZ advanced process controls is in application and there are more digital solutions to come, such as mill-wide optimization, where we are stabilizing and optimizing the processes across all process islands, including the overall production control (mill balance) and first of its kind mill-wide cost optimization.

CONTACT

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We are at your Service!

Interview with Tomi Suikki, Executive Vice President, ANDRITZ Pulp & Paper Service

Read the full interview online:

Starting in the pulp and paper industry in the early 90s, Tomi Suikki is responsible for ANDRITZ's global Pulp & Paper Service Business Area Segment which has more than 100 locations, 70 service centers and manufacturing facilities, manned by nearly 7,000 service experts. ANDRITZ Pulp & Paper Service covers wood processing, fiber and drying, recovery and power, paper, fabrics and rolls, and maintenance.

With a motto of "work should be fun", Suikki lives in Kotka, Finland, and counts running and biking as his hobbies.

What is ANDRITZ's strategy when it comes to ensuring customer satisfaction in pulp and paper service operations?

Our strategy focuses on being a local and regional partner to our customers. We invest in our regional capabilities, including engineering, sales, and supply chains to ensure fast, responsive service. This fast response is seen as critical, especially in emergency situations. As well as being local, we are also global. For instance, when a customer has an emergency situation, we assist in keeping the mill running if possible, at the same time as using logistic networks, whatever it takes, to make sure essential parts are supplied quickly and the mill is up and running as fast as possible.

ANDRITZ recently acquired two companies: A.Celli Paper and Diamond Power International. Can you tell us how the acquisitions fit in with ANDRITZ's future service strategy?

The two acquisitions fit in perfectly with our strategy for growth and allow us to expand service offerings in the power and recovery boiler service and tissue and paper machine technology. Both acquisitions fill our portfolio gaps and provide access to new technologies and markets.

Read about the A.Celli Paper acquisition on page 62 of this issue.

Can you provide examples of how ANDRITZ has driven innovation in service product offerings within the industry over recent years?

All our product groups have the target of coming up with two new innovative products every year. This has worked very well, and to date we have released new products that have clearly benefited our customers in the areas of sustainability, safety and improved efficiency. The latest successes now on the market include the Smelt Spout Robot for improved safety in recovery boilers, Smart Series Solutions to bring intelligence to our machines and processes for improved operational performance and our new service cooperation with HolyPoly for recycling used paper machine clothing.

Any exciting developments ANDRITZ is working on in Pulp & Paper Service you would like customers to know about?

As well as acquisitions and innovations, we are also focused on expanding our local capabilities by new service centers around the world. Our latest development is a new service center at Palembang on the island of Sumatra in Indonesia, which will be fully operational at the end of the year. This will allow us to service the larger mills on the island as well as provide services to other mills in southeast Asia. Furthermore, early next year, we will open our very modern Três Lagoas service center in Mato Grosso do Sul state, Brazil. This is a region where there are a number of large mills located, and we are very excited to have an increased ANDRITZ presence there.

EXPERT INTERVIEW

ANDRITZ ACQUISITIONS DIAMOND POWER INTERNATIONAL

The acquisition of Diamond Power International brings an added dimension to ANDRITZ service offerings. The company is a designer and manufacturer of advanced boiler cleaning systems for power and recovery boilers with service bases in 15 countries. Its main manufacturing locations are in Lancaster Ohio, (US) and in Dubarton, Scotland (UK). In addition to boiler cleaning technologies, Diamond Power provides a variety of process optimization products.

How important is new technology, including digitization and AI, to service operations at ANDRITZ?

Digitalization and AI are central to transforming service operations at ANDRITZ. Customers worldwide use our digital tools to optimize maintenance, monitor equipment health, and boost performance. Spare parts remain a cornerstone, and we're streamlining global operations by integrating AI into ordering processes for faster, more accurate transactions. This initiative supports our commitment to being a responsive, local partner with global capabilities. Digitalization and AI are strategic enablers of smarter, more sustainable service in the pulp and paper industry.

Can you tell us about the health and safety aspects of your operations?

The global service team constitutes of some 9 million working hours per year across our manufacturing and on-site operations, and health and safety are top priorities for us. We rigorously track any incidents and we run a proactive safety culture across all our operations. All incidents, including lost time and near misses, are reviewed globally to ensure shared learning and prevention. Furthermore, we have successfully introduced robotic technology to eliminate personnel having to work in hazardous locations, for example, the smelt deck of the recovery boiler.

How do you ensure quality and consistency in service delivery across different regions and cultures?

We have standardized processes that are implemented worldwide. As defined in our strategy, the fast and successful service is based on our local presence and local know-how. We measure our operational excellence with KPIs like customer satisfaction, and sales and project execution process performance. Quality management is led by a dedicated global quality manager and in all our operations we apply a continuous improvement philosophy.

Can you share your experience of managing such a vast service operation?

Well, I can tell you that every day is completely different! And yes, this is a vast service operation; over the course of a year, we handle over 60,000 quotations for our customers. But the key here is people. We have dedicated management locally and globally in place who are empowered to handle daily operations and make decisions that matter on the ground for our customers.

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Tomi Suikki, Executive Vice President ANDRITZ Pulp & Paper Service

THREE REASONS TO CHOOSE

LAMELLA EVAPORATION

ANDRITZ's lamella evaporation technology is preferred by pulp producers across the globe due to its resistance to plugging, cleanability, and the ability to maximize condensate reuse. These features combined give a remarkable boost to mill uptime when compared to other technologies in the market.

The secret lies in the lamella-type heating surfaces. Lamella evaporators typically feature inclined plates that provide a large surface area for heat exchange. The mechanical structure is designed to minimize scaling on heating surfaces.

If scaling still occurs, lamella heating surfaces cope well even in the most severe scaling conditions and often tolerate even non-soluble scaling (Ca, Si, etc.) without the need for mechanical or acid cleaning.

CLEANABILITY

Lamella units are also easy to wash. Vilma Kultalahti, Sales Manager, Evaporation Plants at ANDRITZ explains, "Shutdowns for mechanical cleaning can be avoided and scaling can be dealt with while the evaporation plant is still running. This also includes full evaporation unit boil-outs."

Bruno Tocchio, Senior Process Engineer, Evaporation Plants at ANDRITZ adds, "With lamella evaporators a small amount of low-solids liquids is introduced – ideally weak black liquor – and it effectively washes away water-soluble fouling without interrupting operations. This means mills can maintain continuous operation while ensuring stable black liquor properties."

Continuous running is a major advantage compared to other evaporation solutions available.

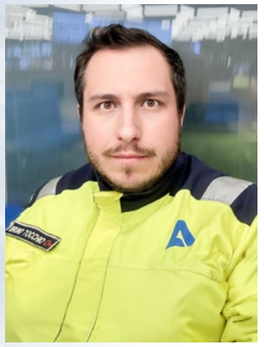
MAXIMIZING CONDENSATE REUSE WITH LAMELLA TECHNOLOGY

Reducing washing frequency improves black liquor dry solids stability, which directly impacts the quality and reusability of secondary condensates. This is a key advantage in modern pulp mills, where water conservation and effluent reduction are top priorities.

High purity of the recovered condensate is a major advantage. Tocchio explains, "The evaporated water returned to the process as 'secondary condensate' is of such high quality that it can be fully reused, eliminating effluent discharge and reducing overall freshwater consumption. This translates into significant operational savings and improved environmental performance."

"Shutdowns for mechanical cleaning can be avoided and scaling can be dealt with while the evaporation plant is still running. This also includes full evaporation unit boil-outs."

Vilma Kultalahti
Sales Manager, Evaporation Plants at ANDRITZ



"The evaporated water returned to the process as 'secondary condensate' is of such high quality that it can be fully reused, eliminating effluent discharge and reducing overall freshwater consumption. This translates into significant operational savings and improved environmental performance."

Bruno Tocchio
Senior Process Engineer, Evaporation Plants at ANDRITZ

One of the enablers of the full condensate reuse is the low vapor velocity design. This minimizes liquor carryover, reduces the COD (Chemical Oxygen Demand) load in the produced condensate, and improves the system's resilience to black liquor foaming. Even under non-ideal conditions, the process prevents liquor carryover into the condensate streams, ensuring consistently clean water for reuse.

With lamella evaporation, pulp mills not only achieve higher operational efficiency, they also meet stringent environmental regulations and achieve lower production costs.

LAMELLA TECHNOLOGY HAS BEEN PROVEN OVER DECADES

ANDRITZ started manufacturing lamella evaporation plants in Finland in the 1980s. Due to increased demand and modernized fabrication methods, production was increased and transferred to a new lamella workshop in Hungary in 2009. Recently manufacturing capacity was increased further with the construction of a state-of-the-art facility in Foshan, China, which began production in 2022.

Over the decades, and with hundreds of references worldwide, ANDRITZ has proven the success of its lamella technology and is now market leader in the supply of evaporation systems to pulp mills.

"Mills frequently consult us to provide the best solutions and optimal outcomes. Customers return even after decades for new plants, upgrades, and rebuilds. They trust us to make their processes successful and profitable," concludes Kultalahti.

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MAJOR TECHNICAL BENEFITS OF LAMELLA TECHNOLOGY

HIGH AVAILABILITY:

- Lamella-type heating surfaces are ideal for falling film evaporators and concentrators.
- ANDRITZ's lamella evaporation minimizes scaling and washing needs.
- The most severe scaling can be removed by boil-out during operation without a need for shutdown for mechanical cleaning.

HIGH AND STABLE PRODUCT LIQUOR DRY SOLIDS:

- High and stable product liquor dry solids enhances recovery boiler operation and ensures maximized electricity generation.

CLEAN CONDENSATES AND REUSABILITY:

- Unique heating element design ensures the cleanest condensates 100% reusable in the pulping process, e.g., in fiberline and white liquor plants.
- ANDRITZ's lamella design with low vapor velocities and efficient segregation combined with duct strippers support highest secondary condensate purity.

Wood chip side streams from sawmills:

A HUGE REVENUE OPPORTUNITY

With pulp mills facing rising demand for high-quality wood chips along with constrained log supply in some regions, sawmills are well positioned to capitalize on wood chip byproducts as a valuable revenue stream. ANDRITZ has all the dedicated solutions for sawmill operators to optimize production, ensuring consistent delivery of premium wood chips to meet pulp industry needs.

"Sawmills are often focused on their main revenue stream; sawn timber products," says Andreas Henning, Global Product Group Manager, ANDRITZ. "However, good quality wood chips from sawline side streams can offer a remarkable added revenue stream. The emphasis here is on high quality, as pulp mills will pay extra to ensure a more productive and efficient operation.

"In addition to offering sawmills a valuable supplementary revenue stream, the wood chip market provides greater consistency in demand when it compared to the sawn timber market. This stability enables sawmills to achieve more predictable financial returns, thus supporting long-term planning and reducing exposure to fluctuations commonly experienced in traditional lumber markets."

Adrian Yeoman, ANDRITZ Customer Service Manager, for Australia and New Zealand, adds, "Furthermore, sawmill wood chips tend to be of a better quality and higher density as they usually come from the outside of the log, which makes them ideal for the pulping process."

A HOLISTIC APPROACH TO PRODUCING QUALITY CHIPS

To take advantage of the added revenue stream, sawmills need to ensure chips are of the highest quality – and this is where ANDRITZ comes in. The company's mission in the supply of chipping technology is to always work to improve chip quality, reduce operational costs, increase uptime, and maintain consistent output.

"ANDRITZ takes a holistic approach to the supply chain in handling the sawmill side streams," explains Henning. "We achieve the best results when it comes to chip quality by the design of our canter heads and knife systems which are produced at our dedicated facility in Sweden.

ANDRITZ PowerHead canter with TurnKnife system

"Our experience and know-how are completely focused on producing equipment with safe operation and maximized availability, which includes selecting different materials for wear characteristics according to the various wood species used in regions of the world."

ANDRITZ sawmill products are designed and manufactured specifically for the species of wood being processed at individual sawmills. Specialist technology includes debarking and chipping equipment, including its PowerHead canter and the well-known TurnKnife system. This equipment is in use at sawmills around the world – operating on various wood species in a variety of climates.

"ANDRITZ has a dedicated R&D group working on optimizing chipping quality with different wood species," says Yeoman. "There can be vast differences in knife wear between one species and another; therefore we carry out intense trials on our customers' raw material, as well as offer support at the sawmill sites with ongoing optimization.

"In the trials we have carried out, our standard knives can double the lifetime over conventional knives used at sawmills, and our extreme wear resistant knives (EWR) can quadruple the lifetime. In a trial we carried out at the Napier Pine mill in New Zealand we increased the lifetime of the knife from 20 to 80 hours by using EWR knives, which represents an excellent return on the customer's investment."

A DIGITAL FUTURE AT SAWMILLS

Sawmill technology from ANDRITZ has not escaped the digital transformation. Technology available for chipping includes the SMART ScanChip Optical chip analyzer, which uses image analysis technology to monitor chip quality in a fast and accurate way. The ScanChip system is designed for either online version integration with the sawmill's control system or offline as a laboratory instrument.

Henning concludes, "Our chipping technology, whether the hardware of our knife systems or our digital solutions, revolves around producing the highest quality chips in the most efficient way and with the utmost safety. Working closely with our customers, ANDRITZ technology and know-how can make a huge difference when it comes to sawmills in terms of quality of chips, higher wood yield, safety, availability, and sustainability."

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SAFETY ASPECT

Safety is paramount when it comes to using ANDRITZ chipping technology, with the emphasis on minimizing handling. Henning says, "Safety is extremely important when it comes to knife handling, both for our customers and our own personnel. We have designed our knives to be much lighter than conventional alternatives, and they weigh grams as opposed to kilos. We also reduce the handling by using the knives until they have worn to the maximum, thus eliminating the need for regrinding."

Revolutionizing kraft paper production with Steyrermühl PM6

FROM VISION TO REALITY

The Steyrermühl paper machine PM6 is part of STARKRAFT, a business unit of HEINZEL Pöls, which has significantly expanded its kraft paper production capabilities, thanks to a groundbreaking partnership with ANDRITZ. This ambitious project involved converting the idled supercalendered (SC) PM3 at the Steyrermühl mill in Austria into PM6 to produce kraft papers for sustainable, flexible packaging.

The family-owned HEINZEL GROUP, based in Austria, is one of the most important pulp and paper producers in Central and Eastern Europe, trading in pulp, paper, wastepaper, and packaging solutions worldwide.

TIGHT TIMELINE

The timeline for this project was tight, and the start-up curve correspondingly steep. PM6 reached, and indeed exceeded, its target speed of 1,200 m/min within a few months of start-up.

The ambitious timeline reflected the desire to seize market opportunities, which wait for no one.

"This was a strategic decision within the group, based on the reality of an increasing market for brown and white kraft paper, the decline in graphic grades, and having identified an available asset at Steyrermühl that could meet the future requirements of this market," says Heinz Schnedl, CTO HEINZEL Pöls.

"We had to get ahead with production volumes and quality so as not to miss the round of budget discussions with our customers for 2025, and to ensure that we were a first mover with this innovative technology."

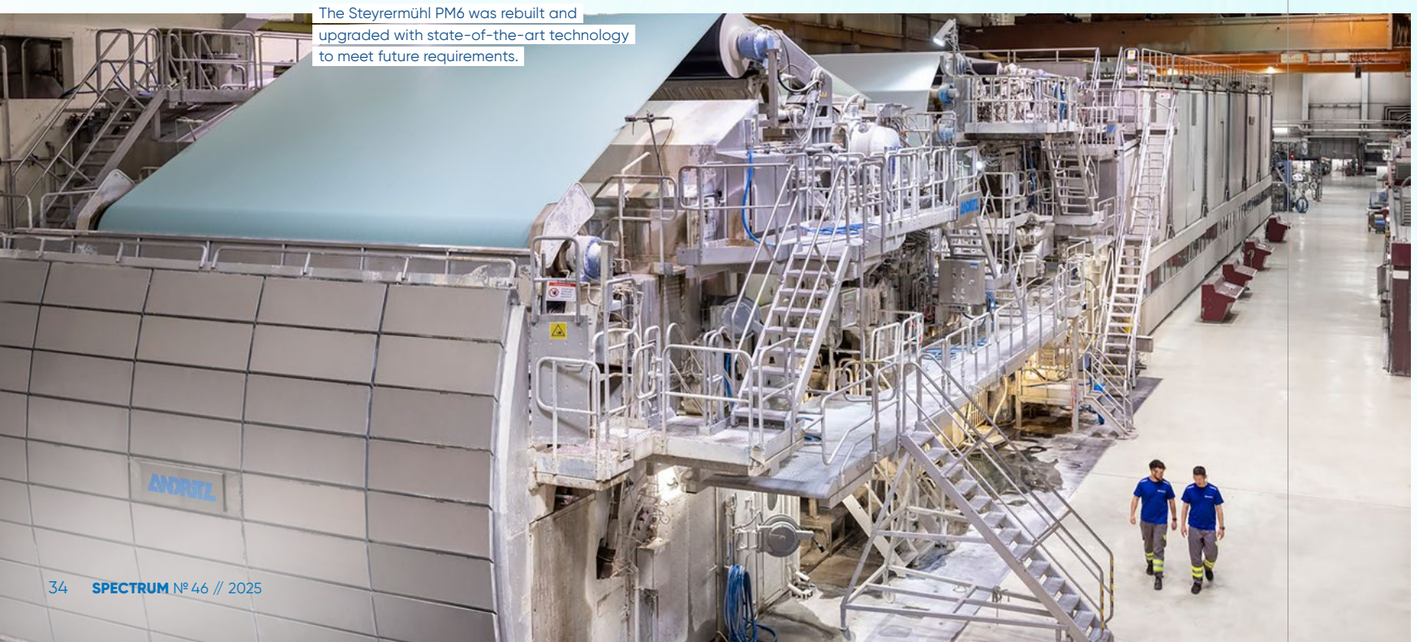
The project was not without its challenges, including the integration of new and existing equipment and the need to ensure that the stock preparation was flexible enough to produce a wide range of end products.

Personnel was also a factor, as Siegfried Gruber, Head of Technical Planning, HEINZEL Pöls points out, "Our team had to switch from one running paper machine to another idled one (newsprint PM4 to the new PM6), coping with enforced downtime, different technology on a narrower machine, and also dealing with a far broader range of product specifications – having previously been operating within the narrower specification confines of graphic grades. In the end, we were fortunate to have retained so much expertise in-house alongside the work of the dedicated ANDRITZ team."

In addition to the game-changing PM conversion, the ANDRITZ scope of delivery included upgrades of the stock preparation, approach flow, and broke

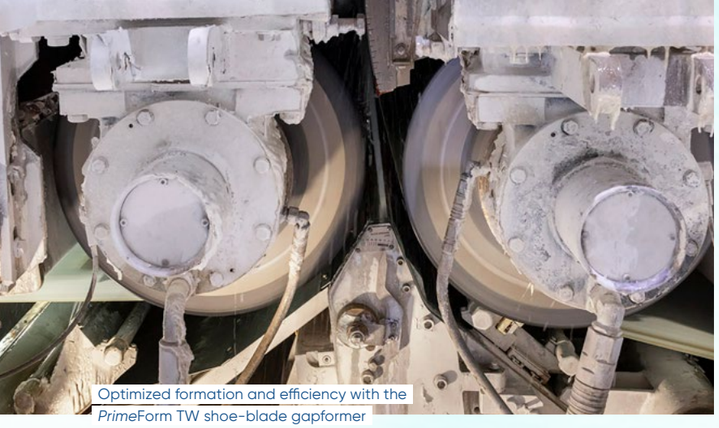
PROJECT FACTS

HEINZEL took over the Steyrermühl site from the Finnish paper group UPM on January 1, 2024. The Steyrermühl paper mill has a long tradition of producing high-quality graphic paper products, but ANDRITZ converted the former PM3 SC paper machine to produce sustainable kraft papers for the growing flexible packaging market. The rebuilt machine, now called PM6, will produce up to 150,000 tons per year of brown and white kraft paper in a range of basis weights, marketed under the established STARKRAFT brand. The new kraft paper grades will be used to manufacture carrier bags and pouches, amongst other flexible packaging products.



The Steyrermühl PM6 was rebuilt and upgraded with state-of-the-art technology to meet future requirements.

Built on trust, strengthened by time: HEINZEL GROUP and ANDRITZ continue their journey of innovation together.



Optimized formation and efficiency with the *Prime*Form TW shoe-blade gapformer

handling systems as well as extensive upgrades of the automation systems (DCS, QCS, MMD), detailed engineering packages, mechanical erection, and an upgraded steam and condensate system.

AT ITS HEART, A "FIRST" IN FORMING TECHNOLOGY

One of the standout features of this project is the use of the first gapformer designed specifically for kraft paper production.

The production of kraft paper usually requires a fourdrinier former, but PM6's gapformer rebuild features a new, unique concept, proven in pilot trials, which is based on a pulsation-free impingement shoe of the *Prime*Form TW.

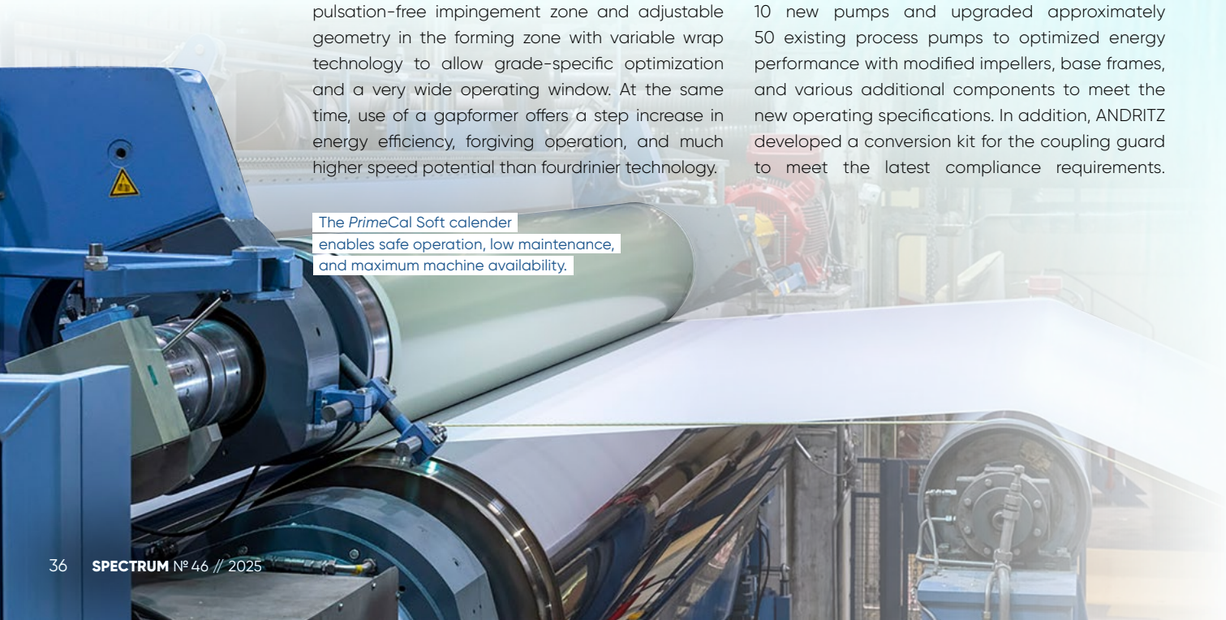
This fully adjustable shoe-blade gapformer retains high flexibility in basis weights and grades, thus ensuring robust, yet forgiving operation. At PM6 in Steyrermühl, it enables crucial, grade-specific paper properties with the lowest possible MD/CD ratios for both bleached and unbleached paper grades. This is combined with a *Prime*Flow AT headbox with dilution control for excellent cross-direction profiles and overall dimensional stability.

ANDRITZ applied patented technology to give a truly pulsation-free impingement zone and adjustable geometry in the forming zone with variable wrap technology to allow grade-specific optimization and a very wide operating window. At the same time, use of a gapformer offers a step increase in energy efficiency, forgiving operation, and much higher speed potential than fourdrinier technology.

The combination of the ANDRITZ *Prime*Press X shoe press and the upgraded steam and condensate system has resulted in significant energy savings, while maintaining high quality production. The new ANDRITZ VIB SteamTech profiling system and the *Prime*Cal soft calender technology, which replaces a multinip calender, further enhance the paper's surface quality, making it ideal for flexible packaging applications.

The project team identified the DCS, based on the Damatic Classic control system, for a substantial upgrade. This covered stock preparation, part of the wet end, drying groups, and the steam and condensate system, as mentioned above. In particular, it included the DNA Operator Station, which includes a DNA Backup and AlarmServer, a 20-client DNA Display Server, the GDCAD to DNA software upgrade, and the OPC UA Server. The network was upgraded, while the existing IO cards and application software from the XDi System were reused. ANDRITZ modified 50% of the existing application software, while upgrading the process station hardware and system software to the latest versions.

Last but not least are the pumps – the beating heart of any process industry. ANDRITZ installed 10 new pumps and upgraded approximately 50 existing process pumps to optimized energy performance with modified impellers, base frames, and various additional components to meet the new operating specifications. In addition, ANDRITZ developed a conversion kit for the coupling guard to meet the latest compliance requirements.



The *Prime*Cal Soft calender enables safe operation, low maintenance, and maximum machine availability.

Using an adapter disc, the integration of the current coupling guard of the outstanding ACP pump series will be facilitated.

A LONG-STANDING PARTNERSHIP

"This has been a highly challenging project," says Mario Wiltsche, Corporate Director, Paper Technology at HEINZEL Holding GmbH. "It was complex and very intense, with a short schedule to meet, a very steep start-up curve, and a lot of discussion about what to retain from the old machine and where new equipment was required. And all this was within an existing environment rather than a greenfield scenario. But thanks to skilled, experienced, and dedicated teams from Steyrermühl and ANDRITZ, we had a great start-up despite the time pressure and technical challenges."

The successful completion of this project is testament to the long-standing and fruitful partnership between HEINZEL GROUP and ANDRITZ. Previous collaborations include the conversion of PM10 at Laakirchen and the delivery of two new MG paper machines for the Pöls mill.

"It's always a more fluid situation when dealing with a rebuild," says ANDRITZ Project Manager Andreas Pfennich. "No matter the level of detail you might include in the project proposal, when the time comes to execute the rebuild or replace existing parts, there will be unforeseen technical aspects to handle. PM6 was no exception, but we were pleased that we managed to adhere to the agreed schedule despite this."

"This project not only enhances HEINZEL GROUP's production capabilities, but also underscores its commitment to sustainability, through energy savings and material optimization, and thanks to technological advancement in general," says ANDRITZ Sales Manager Paper & Board, Christoph Draxler. "ANDRITZ has proven itself to be a dependable, innovative partner through its ability to rise to the challenge of tailor-made solutions, while confirming its leading position in kraft and specialty grades. Despite necessary changes to the scope as the project progressed, ANDRITZ managed to keep to the original schedule. It was a project that required ANDRITZ's highly-flexible team of experts to think out of the box, particularly when recommending which parts of the old machine to retain and rebuild, and which to replace entirely."

STEYRERMÜHL'S FUTURE

With the Steyrermühl mill now producing high-quality kraft papers for packaging under the established STARKRAFT brand, HEINZEL GROUP is poised for continued growth. This project not only enhances its production capabilities, but also underscores its commitment to sustainability and technological advancement. "It has been a privilege to accompany STARKRAFT on this important journey," concludes ANDRITZ's Christoph Draxler. "At ANDRITZ, we further strengthened our leading position in flexible packaging paper technology development, having introduced a world-first technology, and successfully completed a project characterized by daily challenges and rewards."

Read the complete story online!

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Christoph Draxler
Sales Manager Paper & Board, ANDRITZ

ANDRITZ'S LARGEST PULP MILL SHUTDOWN

SUZANO'S TRÊS LAGOAS MILL

Stopping production at a modern pulp mill for regular, planned maintenance has become more like a F1 pit stop as producers endeavor to minimize downtime. ANDRITZ recently carried out the largest pulp mill shutdown in its history at Suzano's Três Lagoas unit in Brazil.

Starting on January 6, 2025, there was a flurry of activity at Suzano's Três Lagoas mill in Brazil as ANDRITZ carried out maintenance work on the largest general shutdown in its history at Suzano's Três Lagoas unit (MS). The shutdown covered both line 1 (H1) and line 2 (H2) production lines where a total of 413 professionals were mobilized in an operation that engaged all service areas of ANDRITZ. The shutdown represented the highest volume of activities ever executed by the services team.

Jonas Zolnir, Project Director, Service Division, ANDRITZ, says, "This project actually began a year earlier when we initiated the discussion and planning for the 2025 mill shutdown scope. The alignments were finalized by our Service Product Groups and Service Sales team in coordination with Suzano's Três Lagoas team. Planning began in October 2024, shortly after the scope was defined."

A MAJOR PART IN A HUGE OPERATION

ANDRITZ played a major part in what was a huge operation, with 123 partner companies working at the site and a peak work force of 2,215 workers with 5,328 scheduled maintenance orders across both lines. Furthermore, the project was supported by 40 specialist employees from other Suzano units.

Augusto César, Executive Manager, Recovery and Utilities, Suzano Três Lagoas says, "The technical and commercial discussions for ANDRITZ's responsibilities began several months ahead of the shutdown. This early planning was key to its success as ANDRITZ is one of our main business partners actively working across all areas of both mills. The company consistently assigns its top professionals to support and follow up on the services, which is a critical factor in the success of this long-standing partnership."

Over the course of two months, team coordination ensured that each stage of the project would be completed safely, on time, and at the level of quality expected by the customer. Specialists from various areas were involved, including woodyard, drying, cooking, fiberline, recovery boiler, and white liquor plant. ANDRITZ teams performed 27 main activities in almost all mill areas.

Complete overhaul of the 16 DD-Washers across both mills

For the first time, the drum was removed from the vat for recovery.

CHALLENGES AND SOLUTIONS

"One of the main challenges is choosing the ideal date for our general shutdown," says César. "Currently, we have shutdowns scheduled not only across all our own units, but also at other pulp mills throughout Brazil. This overlap creates scheduling conflicts with our key suppliers, which directly impacts the availability and quality of skilled labor.

"Another challenge is the distance between our unit and the main service providers, which leads to high mobilization/demobilization costs and potential delays in the arrival of workers, equipment, and materials."

For ANDRITZ, these challenges were firmly dealt with, starting with mobilization and preparation for the major activities during the shutdown. The H2 shutdown preparation started on January 6th, right after the end of the year and new year holidays. However, before the commencement date, there was a lot of planning and hard work from the ANDRITZ Field Services Coordination team who needed to organize and send to the mill a huge amount of material, tools, devices, work equipment, consumables, and containers.

Once the shutdown project began, then the real work started. "One of the key highlights of this shutdown was the work performed on the DD-Washer," says Zolnir. "For the first time, the drum was removed from the vat for recovery, replacing the traditional method that used the washer's own drive structure. This approach enhanced safety, reduced execution time, and made the system more stable and reliable. A dedicated team of 34 professionals handled the task, addressing critical issues such as cracks and liquor leaks that could have impacted production if left unresolved."

César adds, "Several critical activities were carried out to comply with NR-13 standards for our pressure vessels, with special attention to our two chemical recovery boilers. Noteworthy tasks included the chemical cleaning of our CR-01, upgrade of the DCS systems in both mills, and replacement of the DD Washer 44 drum in the bleaching area of Mill, which was performed by ANDRITZ.

"Other major activities included the installation of a new log feeder for line 3 in the wood yard, internal inspection of digesters, complete overhaul of the 16 DD-Washers across both mills, and replacement/inspection of rolls on the three drying machines."

Multiple safety actions were implemented daily by the leadership at the mill and partner companies, with the aim of zero safety incidents. Environmental aspects and impacts were also considered in every executed activity.

"Throughout the shutdown, safety remained the top priority for ANDRITZ," says Zolnir. "Training sessions, daily alignments with the customer, ongoing inspections, and close monitoring by the quality team ensured full compliance with standards during critical operations. The result was '0' accidents."

START-UP AND RAMP-UP

Line 2 was restarted after 15 days of shutdown, while line 1 was restarted after 17 days due to chemical cleaning of the recovery boiler. Ramp-up performance is measured by PTP (theoretical production loss) 15 days after start-up. After this shutdown, the mill achieved the best ramp-up performance for H1 since it began operations in 2007, with a PTP of 0.34 days. A good ramp-up is typically around 1.5 days of PTP. Ramp-up performance for H2 was below the historical average due to the expanded maintenance scope of recovery boiler 2 following inspection findings.

The improvement of these indicators has only been possible through the development of numerous control processes, which Suzano has continuously enhanced over the years. Examples include: maintenance checklists for 100% of activities; pre-start-up operational checklists for each area to identify restrictions; a dedicated shutdown coordinator supported by a team of operators released from regular duties 1.5 months in advance; a real-time monitoring app for all shutdown activities; daily alignment meetings with leadership for each task; designated nighttime area leads; and daily 12-hour forward planning reports to streamline overnight work.

"In this latest shutdown cycle, ANDRITZ successfully completed 100% of the scheduled scope within the defined timelines," comments César. "Although at times we faced major challenges, close collaboration between Suzano and ANDRITZ ensured that the right solutions were quickly found. We recognized a strong sense of partnership and cooperation from both sides.

"Another highlight was the fact that ANDRITZ recorded zero accidents throughout the 32-day shutdown period, which reinforced the strength of this partnership."

Zolnir concludes, "The success of this shutdown project is down to a coordinated effort by the Três Lagoas team and the combined ANDRITZ teams of product groups, field service, order execution, and the Araucaria Service Center. All services were delivered in line with the customers' three key pillars of safety, quality, and deadlines. There were no reworks or production losses due to ANDRITZ interventions.

"This was more than just a successful project; this general shutdown demonstrated ANDRITZ's ability to deliver complex operations efficiently, with skilled teams, strong infrastructure, and a clear focus on customer needs."

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"Training sessions, daily alignments with the customer, ongoing inspections, and close monitoring by the quality team ensured full compliance with standards during critical operations. The result was '0' accidents."

Jonas Zolnir
Project Director, Service Division, ANDRITZ

WOOD FIBER SUBSTRATE

Read more online!

THE SUSTAINABLE SOLUTION FOR PLANT GROWTH

Wood fiber substrate for the horticulture industry is a rapidly growing trend as regulations are increasingly being set to limit peat harvesting and usage. ANDRITZ is successfully utilizing its vast experience of wood processing and innovative technology to assist in transforming horticultural substrates into truly sustainable products.

Substrates are materials that supply nutrients to enable the solid growth of young plants. Due to increasing world population and other global trends such as climate change, the substrate market has substantial growth prospects with demand expected to double between the years 2017 to 2030*. Wood fiber used as a substrate is experiencing even greater growth, with forecasts predicting over a 400% increase by 2030*.

Even though peat remains the most important component for substrates due to its excellent characteristics for plant growth, it is unfortunately not environmentally friendly for two main reasons: its harvesting endangers the ecosystems for plants and animals on the peatlands and its utilization releases high quantities of CO_2. Peatlands cover just 3% of the Earth's land surface, but store twice as much carbon as the world's forests combined. Therefore, there are several ongoing projects and actions for their protection and restoration.

On the other hand, wood fiber is an excellent, sustainable complement and alternative to peat for plant-growing media for all types and sizes of plants and addresses environmental concerns and regulations.

Thomas Kaiser, Director, ANDRITZ Wood Fiber Substrate Team says, "Wood fiber substrates are increasing in consumption among producers, both professional and home gardening enthusiasts as they provide similar properties to peat, including structure for root growth and aeration. However, handling of the wood fiber substrate must be adjusted when compared to peat, for example, when watering.

"Most importantly, wood fiber is from a renewable source and is a much more sustainable option when compared to peat."

* Source: estimated by Wageningen University, The Netherlands.

DEDICATED TECHNOLOGIES FOR WOOD FIBER SUBSTRATE PRODUCTION

To cope with the increased demand for wood fiber substrates, ANDRITZ has developed technology designed specifically to produce tailor-made substrates according to customer demand. Utilizing its vast experience in wood refining in the pulp, paper, and panelboard industries, the company has launched two new fiberizing machines: Substrate Pressafiner and Substrate Refiner, which can cover the complete range of end products required for substrate demand.

Enrico Fuser, Senior Sales Manager, ANDRITZ Wood Fiber Substrate Team says, "ANDRITZ has decades of experience, know-how, and technologies in wood fiber production and with our two new substrate production machines we are able to engineer and control the morphologies of wood fibers to suit customers´ demands in both the professional and home gardening sectors.

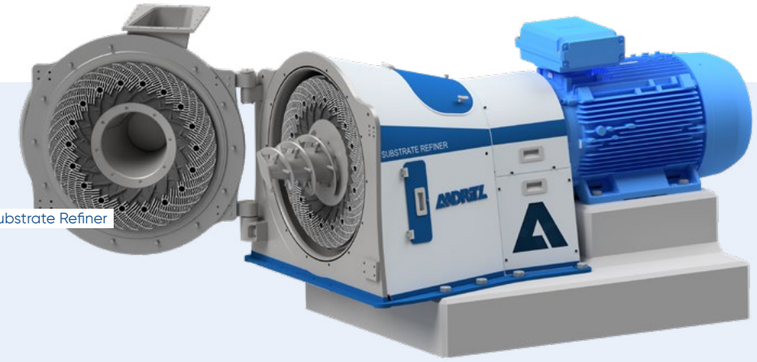
"These two new products are energy efficient and can be adjusted during operation to produce ready-for-market wood fibers at the desired quality. Both machines can be controlled with a touch screen and operator friendly visualization allows selection and fast adjustment of process parameters."

SUBSTRATE PRESSAFINER

The Substrate Pressafiner is robust and designed for a long service life. It offers outstanding fiber quality that is reproduced from season to season. Based on a slow rotating fiberizing screw (100 rpm), the Pressafiner is built for middle and coarse fiber qualities production.

- The Substrate Pressafiner provides operators control of wood fiber properties independent of raw material variations: wood chips, recycled wood, and also wood waste of different origins.
- Based on highly reliable existing equipment consisting of several well-proven technical solutions and also innovative patented concepts, the Substrate Pressafiner offers the right choice for economical operations.

Substrate Pressafiner



Substrate Refiner

SUBSTRATE REFINER

The Substrate Refiner is based on a quick rotating rotor (1,500 rpm) and requires clean raw material to produce a very broad range of homogenous wood fiber qualities.

- The Substrate Refiner produces wood fibers using as raw material fresh wood chips or a combination of fresh and recycled wood.
- For complex applications where a wide range of wood fiber qualities with consistent homogeneity is required, a comprehensive range of individual solutions is available.

ALL-IN-ONE SOLUTION FOR WOOD FIBER SUBSTRATES

ANDRITZ has the capability to supply customers with further technologies such as established preparation of various raw materials, including cleaning, separating, and size reduction as well as the further treatment of wood fiber in drying and baling.

"With our long-term process knowledge and game-changing technologies, we have made it our aim to be a global, full line solution provider and partner to our customers in the substrate industry. Starting from special raw materials up to market-compliant products, we can supply technology according to all specific needs," says Christoph Leitner, Sales Manager, ANDRITZ Wood Fiber Substrate Team. "Our innovative spirit in combination with our ability to supply individual, all-in-one solutions, our customers can be assured of consistent high-quality production and low energy costs.

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"With our latest innovations for the wood fiber substrate industry, we are delighted to be creating growth that really matters to our customers."

ANDRITZ VENTURES AND WORLD EXPO 2025

ANDRITZ Wood Fiber Substrate started as one of the winning projects within ANDRITZ Ventures, a dedicated corporate innovation and start-up arm within the group with a vision to become the technology leader in their specific industries.

A clear confirmation of the effectiveness of the ANDRITZ Ventures approach and program is the selection of ANDRITZ Wood Fiber Substrate products Pressafiner and Refiner to be shown as part of Innovation Lab Austria at the World EXPO 2025 in Japan.

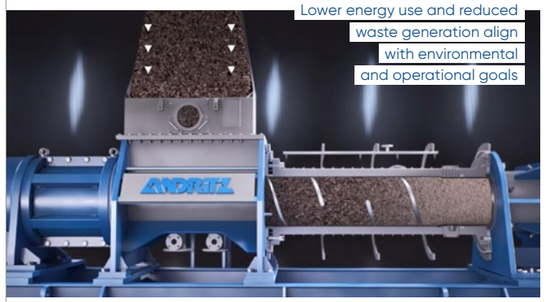
"With our latest innovations for the wood fiber substrate industry, we are delighted to be creating growth that really matters to our customers."

Christoph Leitner
Sales Manager, ANDRITZ Wood Fiber Substrate Team

*Prime*MSD IMPRESSAFINER

Superior pretreatment of chips for mechanical pulping

To obtain the best results in mechanical pulping, consistently high-quality chips are essential to ensure the efficiency of the whole pulping and paper production process. The ANDRITZ *Prime*MSD Impressafiner has been designed to pretreat chips in order to achieve the very best end results in the mechanical pulping process.



Lower energy use and reduced waste generation align with environmental and operational goals

"What you put in is what you get out when it comes to the mechanical pulping process," says Ernst Kubr, Product Manager, Fiber & Recycling at ANDRITZ. "If you feed chips with varying moisture content, uneven size distribution, and poor impregnation to the refiner, you will experience load swings, inconsistent fiber and pulp quality and, ultimately, inconsistent paper quality.

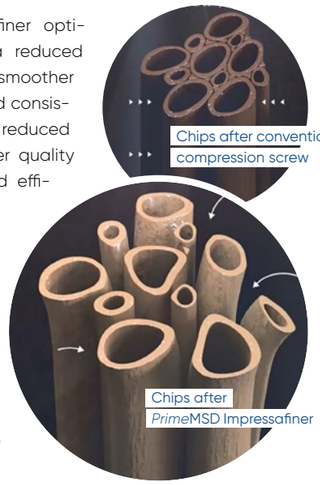
"However, if you put even sized chips into the refiner, with a uniform moisture content and good impregnation, this will lead to stable refining and you will get out fibers that are consistent, of uniform quality, and will lead to the best quality paper."

CHIP PRETREATMENT – A CRUCIAL STAGE

Chip pretreatment is a crucial stage in mechanical pulping as it sets the foundation for effective fiber separation during the refining process. ANDRITZ *Prime*MSD Impressafiner has been designed to enhance impregnation efficiency of chips, improve refining performance, and set a new benchmark for low energy, high performance pretreatment for the mechanical pulping process.

Furthermore, the *Prime*MSD Impressafiner optimizes chip maceration, leading to a reduced energy consumption of up to 25% and smoother refining that improves fiber strength and consistent pulp quality. The lower energy use, reduced waste generation, and improved paper quality align perfectly with environmental and efficiency goals.

Kubr adds, "With this latest version of the *Prime*MSD, we have the option to achieve controlled maceration by dewatering the chips more efficiently compared to a conventional plug screw feeder. This controlled maceration leads to a significant reduction of shives, therefore greatly improving the final quality of the paper.


Chips after conventional compression screw

Chips after *Prime*MSD Impressafiner

"ANDRITZ's deep knowledge and dedicated technology ensures top quality chips and low energy costs throughout the mechanical pulping process. The *Prime*MSD Impressafiner is a perfect example of how the pretreatment of chips can make a huge difference to the final output of the mechanical pulping process, as well as significantly reduce energy costs."

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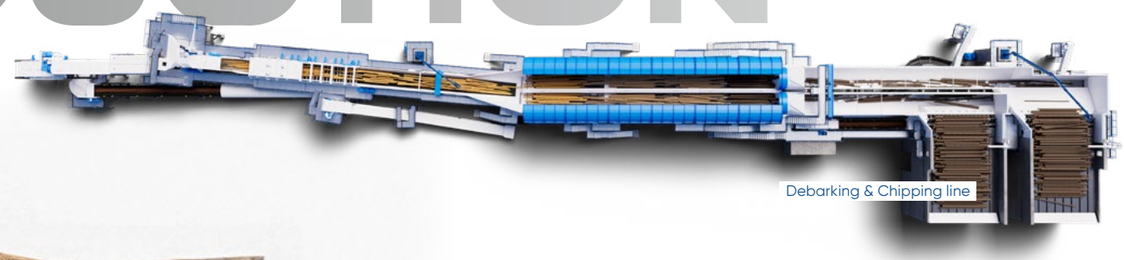
Listen to our podcast here

TECH NEWS

Optimizing wood chip quality:

BIG SAVINGS AND A LEAP IN PULP PRODUCTION

ANDRITZ's deep knowledge of woodyard operations combined with its state-of-the-art processing technology enables pulp producers to achieve remarkable financial results when it comes to reducing wood loss, improving chip quality, and optimizing fiberline performance.



Debarking & Chipping line

Are you aware of the major savings that can be made at a high-capacity pulp mill by simply improving and optimizing the quality of the wood chips going into the fiberline? The numbers are really quite surprising.

"A saving of $1.5 million per year is highly achievable by ensuring the minimum of wood losses in the woodyard," explains Harri Soila, Senior Vice President, Wood Processing Services, ANDRITZ. "And even more gains can be made in the fiberline by producing good quality, uniform chips."

Hannu Silventoinen, Wood Processing, Go to Market Management, ANDRITZ adds, "Improving the yield of the wood from the chipping line, as well as providing good quality, homogenous chips, will enable an increase of up to 12,000 t/y of pulp production at a large mill, which we conservatively estimate to be an increase of $3 million per year in extra revenue."

STABILITY IS KEY, WITH A GENTLE TOUCH

So how are these significant, minimized wood losses achieved? The impressive results are obtained by utilizing ANDRITZ's chipping philosophy, a straightforward approach to always deliver bespoke, customized solutions to meet individual mills' capacity and process needs. Soila explains, "Whatever the process at the mill, batch digester, continuous digester, or even a refining process, the key word is 'stability'. We want to ensure the best quality chip with the minimum wood losses across the woodyard processes."

Using its chipping philosophy, ANDRITZ looks holistically at ways to improve and stabilize woodyard operations across the whole process, from log management, to the debarking drum, chipper line, and the chipper itself followed by the screening process, oversize treatment, and bark processing and storage.

"Throughout each of these processes we can always find opportunities to prevent wood losses," says Soila. "For example, if you hear a crackling sound in your woodyard, it means you are handling your logs in an abrasive way, and a broken log will lead to wood loss. This means it is key for loaders to operate within the capacity limits as gently as possible causing minimum damage.

"When it comes to the debarking process, again, the key word is always stability and it is important that the mills operate at the right filling degree and rotation speed along with having the right retention times. This is critical for wood cleanliness, the main KPI in the debarking drum."

The same attention is also paid to the drum and chipper line where it is important to have effective bark separation, good washing, and stone and metal detection. "All of these factors are critical to maintain constant infeed to the chipper," says Soila. "Constant feed is essential, and the more stable the process the better the chip quality will be. All this also comes with reducing wood losses across the whole process."

PREMIUM CHIP QUALITY – PREMIUM RESULTS

To produce top quality pulp consistently, premium wood chip quality is essential. When it comes to the fiberline, uniform, homogenous chips with no pins and fines make for a much more stable process.

Silventoinen says, "More than half of the direct production costs at a chemical pulp mill come from the cost of wood. This means every increment saved in wood losses in the woodyard equals extra yield in the fiberline. However, even more important to the process is to improve the yield in the fiberline by having good quality chips.

"In general, variations in all aspects of chips will cause a mill headaches in the fiberline. If the chip size varies, controlling the cooking is difficult, especially if the chip thickness varies. ANDRITZ mill operation experience has shown that after introducing its latest modern chipping equipment and chipping philosophy, the stability of the cooking process is enhanced. This improves overall fiberline performance and allows increased fiber yield.

Silventoinen adds, "At the same time as improving the yield, fiber properties like strength are improved, bringing important gains when it comes to pulp quality."

ANDRITZ CHIPPING PHILOSOPHY – A COMPLETE SOLUTION

ANDRITZ provides a complete solution from debarking to chipping with the ultimate aim of producing high quality chips for the fiberline with minimum wood loss. Under its PartnerChip concept, which involves service of the chipper as well as tailor-made services for the rest of the woodyard, ANDRITZ can assure customers that their woodyard operations are fully optimized and create growth that really matters to a pulp mill.

As well as offering the PartnerChip service, ANDRITZ also provides state-of-the-art technology, including its HHQ Chipper, which has proven to be the most popular chipper on the market since its launch in 2001. ANDRITZ also supplies the latest in smart technology for the woodyard, including the ScanChip analyzer that measures the size and dimensions of the chips in real time, and the Chipper EKG that monitors the condition of the knives, all of which ensure optimum uptime.

If the moisture content or density of the chip varies, the cooking parameters need to be adjusted accordingly. Also, if there are pins or fines, they normally over-cook, consume chemicals, and reduce the chemical cycle of the mill.

Listen to our podcast here

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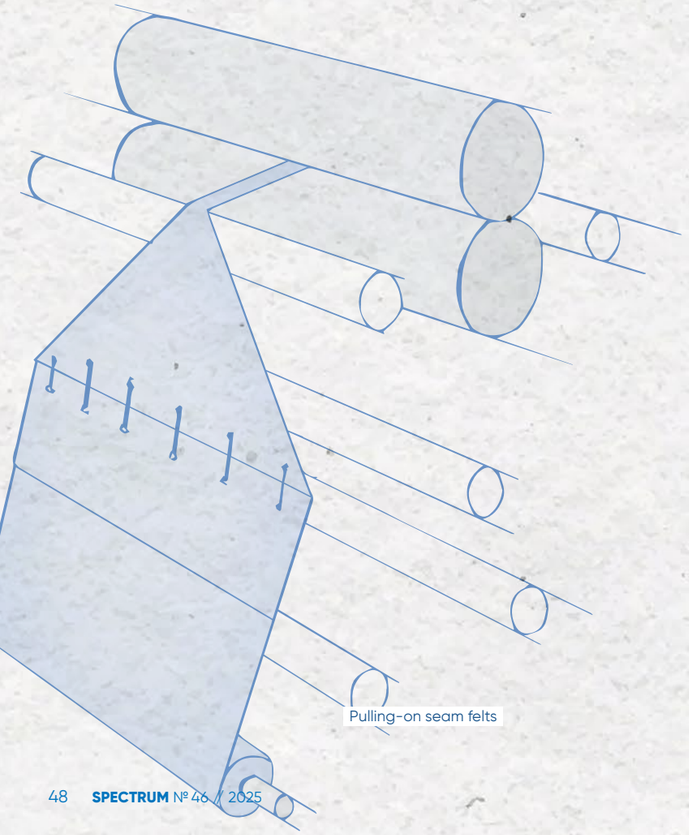
SAFER, EASIER FELT CHANGEOVERS

No matter how smoothly your paper or board machine runs, and how thoroughly you take care of your press felts, you will still need to replace them on a regular basis. And that is usually an awkward job, requiring a number of trained personnel. But it doesn't have to be that way – not anymore. When ANDRITZ introduced the Felt Master, the changeover process got a whole lot simpler, safer, and more reliable.



Pulling-on seam felts

Traditionally, changing a press felt requires a specially-trained team, to pull and manhandle the new felt into place, using know-how, physical strength, and skill. It can be a slippery, unpredictable, and tricky job with potential risk of injury.

THE ANDRITZ FELT MASTER HAS CHANGED ALL OF THAT.

This unique, new fabric installation system means you now only need one trained person to direct the team members, who attach up to six installation winches to the felt. The ANDRITZ Felt Master then safely does all the lifting and pulling for you, and it works every time. The operator manages the installation with a remote control unit, which means the whole process is effectively semi-automatic.

ALL FELTS WELCOME

The ANDRITZ Felt Master system can be used to exchange both seamed and endless press felts. (It can also be used in other areas of the paper/board machine, too, including the forming section, but we will focus on that in a separate exposé.)

With seamed felts, once the installation "kite" is attached to the unwinding belt, the Felt Master pulls the full width of the felt from the packaging tube, through the press rolls, into position for seaming. The packaging tube is supported on two consoles, where a mechanical brake further controls the unwinding process.

With endless felts, the new clothing is firstly laid out alongside the paper/board machine. It then has installation belt fasteners attached at predefined points, and these are attached to corresponding winches on the drive side of the paper/board machine. The operator then uses the remote control unit to tension the installation belts at whatever speed they choose. To help with this, the remote-control unit displays real-time torque and speed data, as the winches evenly pull the felt sideways into place on the machine.

WORK SMARTER, NOT HARDER

What all of this adds up to is a simpler, more reliable, and repeatable felt-replacement process, which significantly increases worker safety, while also requiring fewer specially-trained personnel.

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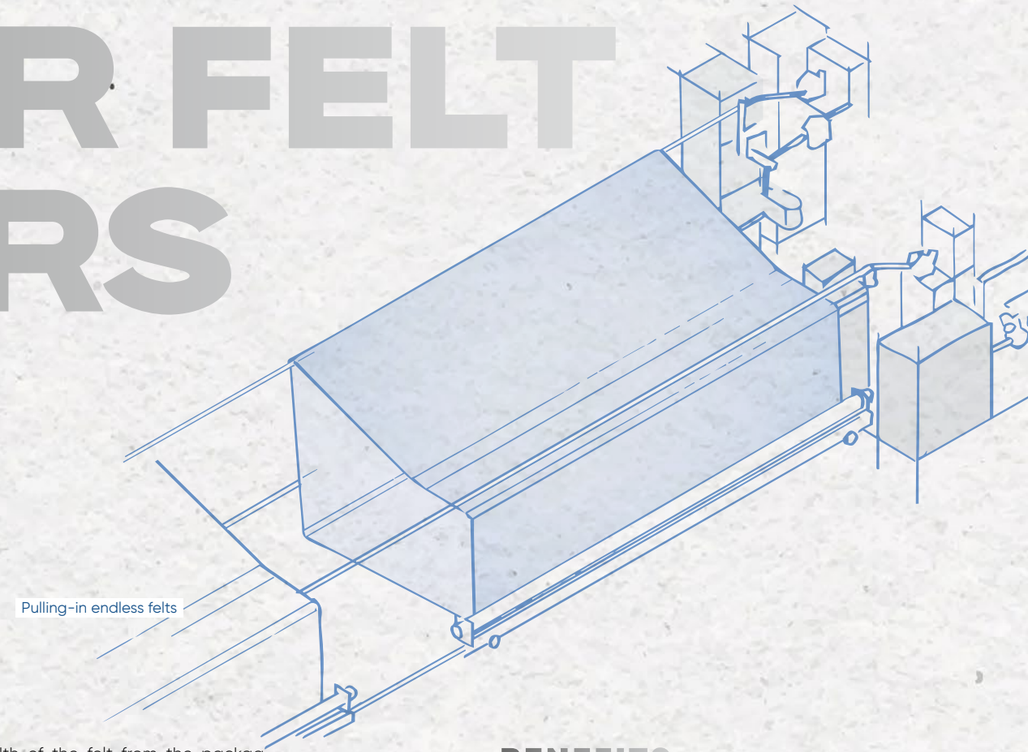


Pulling-in endless felts

BENEFITS

- Increased work safety
- Optimization
- Ease of use
- Improved resource management

Pulling-in endless felts

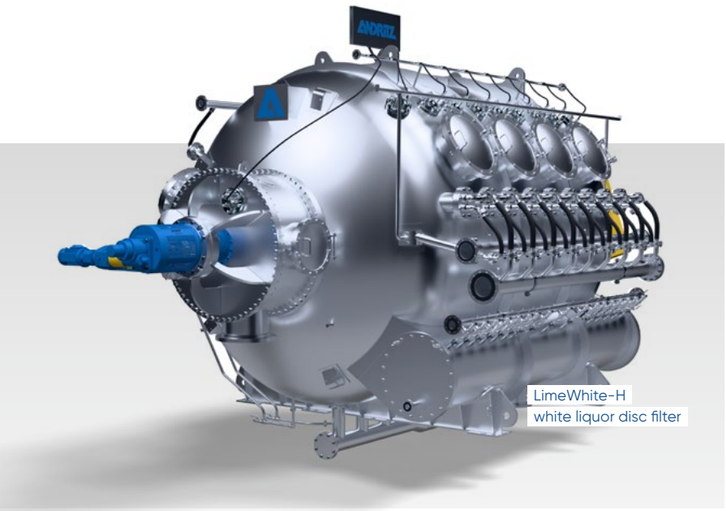
HIGHER AND HIGHER

EXPANDING THE LIMITS OF WHITE LIQUOR PLANTS

With the latest H family products for the white liquor plant now available, pulp mill operators can turn ANDRITZ's innovation into advantage. LimeWhite-H™ white liquor disc filter, LimeFlash-H™ feed head system and LimeDry-H™ lime mud drying system enable higher capacity and higher efficiency, elevating overall plant performance.

The pressures are great in the pulp industry to make sure every part of the mill is running to its maximum capacity and efficiency. The white liquor plant is a key area in terms of its effect on overall mill performance, which is why ANDRITZ experts have worked hard on identifying components of the plant that can be fundamentally improved. The ANDRITZ H family of products – with the H standing for "higher" – enables mills to improve productivity and fulfill environmental requirements for the entire lifecycle of white liquor plants.

Xiaoning Li, Senior Sales Manager, White Liquor Plant, ANDRITZ, says, "At ANDRITZ, we're more than just a supplier—we're the trusted partner. As industry leaders, we're committed to true collaboration, offering expertise and dedicated support every step of the way. With the H family of products, we are the only company in the pulp industry that is offering next-generation processes that enable operators of white liquor plants to increase capacity, optimize efficiency, increase availability, and dramatically improve overall performance."



LimeWhite-H
white liquor disc filter

LIMEWHITE-H
WHITE LIQUOR DISC FILTER

LimeWhite-H is a completely remodelled version of the existing LimeWhite filter. Major benefits include lower investment cost, increased capacity, and a smaller footprint. LimeWhite-H has undergone some important new technical advances including center shaft axial movement, a hollow shaft, a fixed scraper, and a higher vat level.

The remodelled technology comprises of a pressurized disc filter, which performs both white liquor filtration and lime mud washing. High discharged mud solids makes it an ideal selection for mills with tight water balances. The filters provide the best white liquor quality with high availability.

Advantages of the LimeWhite-H:

- The boosted capacity of the LimeWhite-H is more than 40% of the LimeWhite filter
- Continuous operation
- Clean and hot white liquor
- Fully automated
- Higher white liquor yield
- Reduction in water circulation
- Less white liquor dilution

Teemu Häkkinen, Project Manager, ANDRITZ says, "Together with our customers we have looked at the possibilities of improving the filter, particularly when it comes to efficient operation as well as increased capacity. We have also worked on having a smaller footprint of the filter, which gives flexibility in regard to mill layout in order to meet our customers' expectations and demands."

ANDRITZ has a number of references of successful LimeWhite-H operations in the industry including the first installation at Metsä Group's Äänekoski mill in Finland.

LIMEFLASH-H
FEED HEAD SYSTEM

Significant enhancements have been made to the LimeFlash solution through the introduction of LimeFlash-H, a next-generation feed head system designed for pulp producers.

The system is a completely new feed end technology in the industry for maximizing efficiencies of the lime kiln. The main focus of the technology is on further increasing the capacity of lime kilns at the same time as reducing energy consumption – and all without the usual large capital investment.

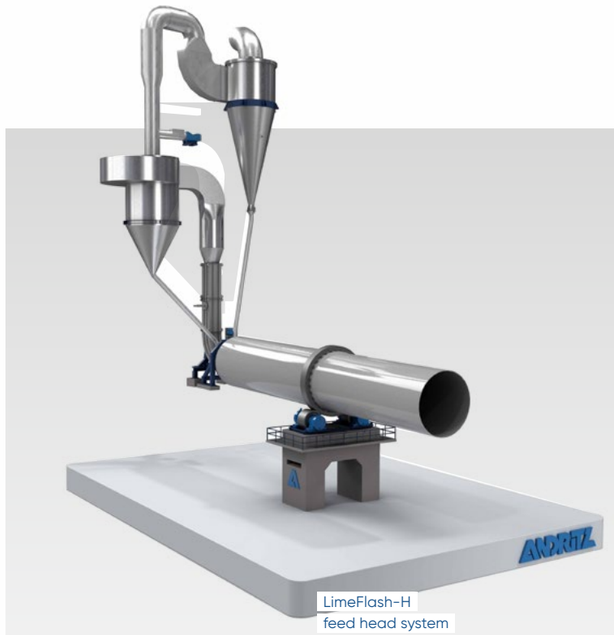
Specific energy consumption is decreased by recovering flue gas heat into preheated lime mud. It also gives the potential to run the same size kiln with a higher production, by using a two-cyclone system.

Advantages of the LimeFlash-H:

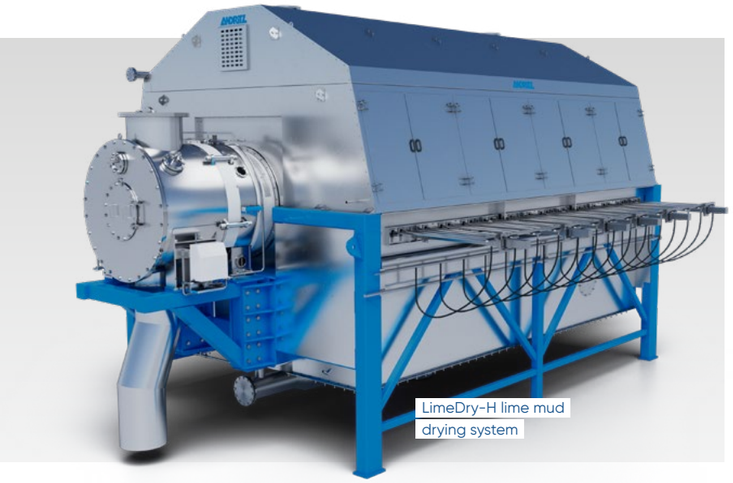
- Significantly higher capacity increase when compared to the original LimeFlash solution
- Highly efficient and environmentally friendly heat recovery system
- Enables operating at high feed head temperatures
- Flexibility to operate lime kiln with different process conditions
- Excellent availability and minimum maintenance cost
- Major investment savings for both equipment and civil works
- Applicable for both new lime kilns, and for increasing the capacity of existing kilns

"As LimeFlash has evolved over time, we have seen clear opportunities for more gains by applying the latest technology developed for LimeFlash-H, for instance, increasing capacity of the lime kiln by as much as 40% at the same time as decreasing energy consumption in the lime kiln. All this is achieved without major, expensive modifications to the existing kiln shell," says Mika Kottila, Head of Technology, White Liquor Plant, ANDRITZ.

Successful references of LimeFlash-H operating at pulp mills include: Papelera Guipuzcoana de Zicuñaga, Spain and Liansheng Pulp & Paper, China.



LimeFlash-H
feed head system



LimeDry-H lime mud drying system

LIMEDRY-H
LIME MUD DRYING SYSTEM

ANDRITZ has made significant improvements to its LimeDry mud drying system. Utilizing some of the proven concepts featured on the latest LimeWhite-H white liquor disc filter, for example, the implementation of center shaft axial movement, a hollow shaft, and fixed scraper - similar, tailored principles have been applied to the LimeDry-H lime mud drying system.

The end result is a more simplified vat construction and stable feeding system, providing increased homogenous lime mud that enables less swinging of temperatures in the flue gases of the lime kiln and, ultimately, savings in energy.

The new system comes with a smaller footprint, which saves space and investment costs, as well as an updated design, which improves maintenance access and provides a safer working environment.

Advantages of the LimeDry-H:

- Better, more stable running of lime mud feeding
- A simplified system
- Reduced footprint
- Reduced investment cost

Mika Mussalo, Head of Product Management, White Liquor Plant, ANDRITZ says, "An additional development applied to LimeDry-H is the introduction of a new feature in which the separation of filtrate and gas takes place in the hollow shaft. This alleviates the need for the usual large vacuum tank, while increasing capacity by up to 8%, and also reducing the footprint by 30%.

Trusted by industry leaders, LimeDry-H has a proven track record of success.

As demonstrated by the new features applied to the H product family, ANDRITZ experts have concentrated on pulp and paper customers' main demands of safety, cost, efficiency, and ease of operations, which ultimately enable peace of mind for operators.

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Discover more!

BE READY FOR THE FUTURE AND GO BEYOND WHITE LIQUOR

Turn our innovation into your advantage. With decades of experience and hundreds of references, ANDRITZ is the leading technology and solution provider for white liquor plants globally. With ANDRITZ you can maximize your productivity and fulfill your responsibility requirements for the entire life cycle of your white liquor plant.

DUO POWER-C

ANDRITZ'S AIR SYSTEM CONFIGURATION

ANDRITZ has developed a revolutionary approach to reducing energy consumption and emissions by controlling the Yankee hood air system operation mode in tissue and MG paper plants.

Tissue and MG paper machines are designed to produce at their top capacity, known as the dry limit of the system. However, when running with lower basis weights, the required dryness capacity is much lower, which is why a more flexible drying process can be beneficial to improve operating parameters like temperature and blowing speed across different production modes.

ANDRITZ has been granted a patent for its new "DUO POWER-C" air system configuration that helps to control the process air flows in hoods for tissue and MG paper drying. DUO POWER-C combines conventional duo-systems (wet end and dry end drying) with combo systems (wet end drying and dry end suction) and is therefore able to work flexibly according to production needs. ANDRITZ experts have developed this breakthrough system configuration for hoods heated by gas, syngas, hydrogen, or even electricity.

This comprehensive method for controlling the air system operation mode can be applied to both new and existing tissue machines and is equally applicable to MG paper machines.

COUNTING THE REWARD IN ENERGY AND EMISSIONS

Greater energy efficiency and lower emissions are the reward for implementing the solution. They reduce costs, including taxation on CO_2 emissions in many countries, and ensure that the environmental impact of the process is minimized.

ANDRITZ's patented "DUO POWER-C" solution for controlling the air system operation mode in tissue plants represents a significant, low-risk advancement in tissue drying technology. It offers flexibility, energy efficiency, and emission reduction, making it a valuable solution with the ability to benefit tissue and MG paper manufacturers worldwide.

Read the complete story online!

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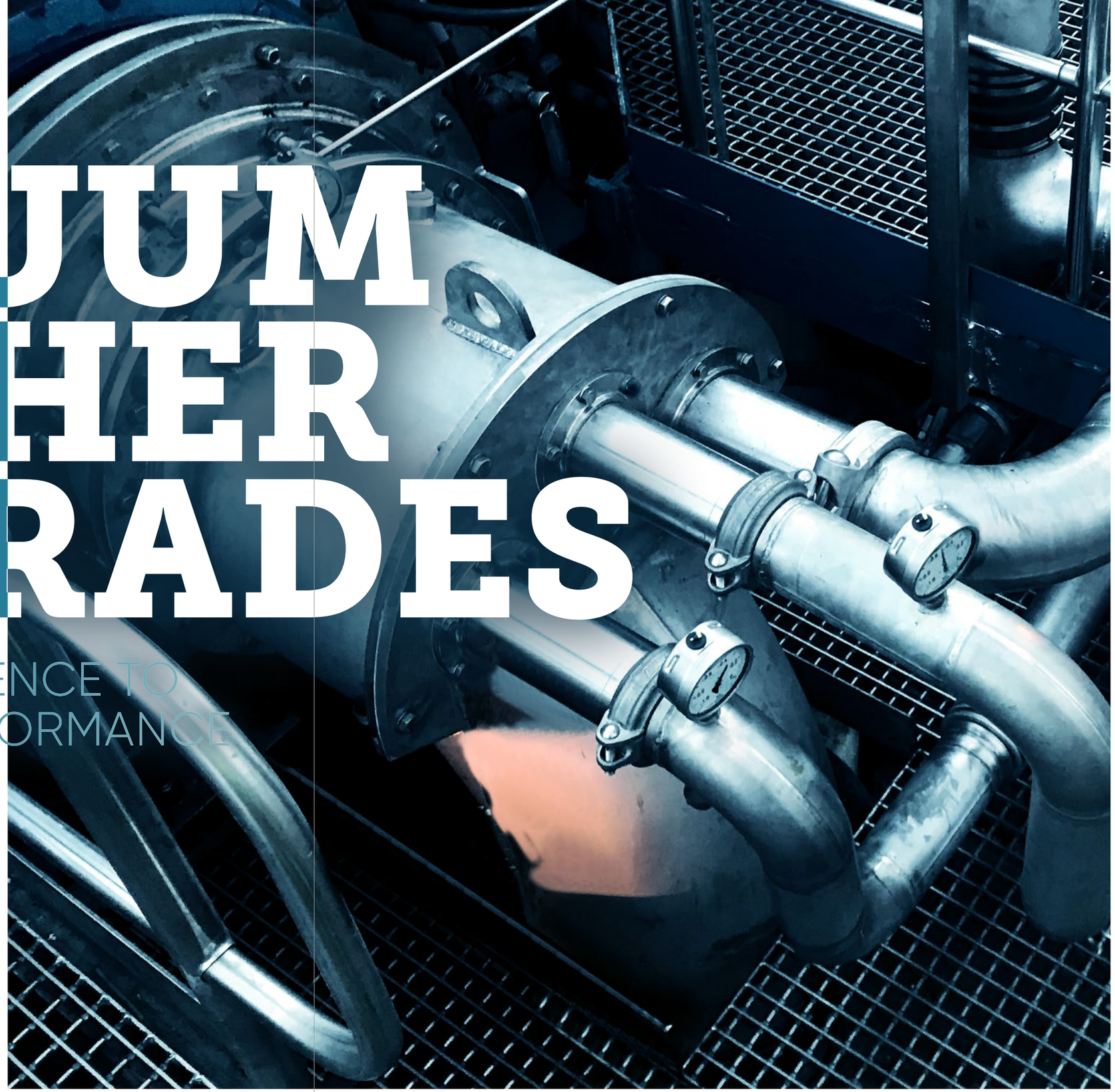
ANDRITZ *Prime*LineTM tissue machine focuses on sustainable and energy efficiency solutions, such as our "DUO POWER-C" air system configuration.

VACUUM WASHER UPGRADES

A WORLD OF DIFFERENCE TO PULP WASHING PERFORMANCE

ANDRITZ experts have gained almost a century of experience in the manufacturing and optimization of vacuum washers and provide a series of upgrades that can make a remarkable difference to washer performance.

Two of the latest upgrade products ANDRITZ offers for vacuum washers are the MaxFlo drum for higher capacity and better washing, and MaxVac high-capacity valves that increase capacity and improve washing efficiency by applying extra vacuum to the critical stages of filtering, washing, and drying.



Good pulp mat formation with MaxFlo drum

Sappi Saiccor GasFree valves

"Vacuum washers have proved to be excellent and vital pieces of equipment for the pulp washing process over the years, and there are over 1,000 installations around the globe," says Jarkko Lintunen, Global Product Manager Vacuum washers. "However, there is a lot more ANDRITZ can do to increase the performance of existing vacuum washers, as well to assist in increasing the capacity of the washing lines at pulp mills."

BENEFITS OF THE MAXFLO DRUM INCLUDE:

- FEM analyzed structure ensures maximum lifetime of the construction
- Less internal pressure drop leading to more vacuum applied to pulp mat
- Higher discharge consistency
- Improved washing efficiency
- A higher dilution factor

THE MAXFLO DRUM

A lot of existing vacuum washers across the industry are being pushed to the limit when it comes to capacity, and many are operating beyond their original design specifications. ANDRITZ has used the latest calculation tools to optimize flow pattern and mechanical durability and have produced the new MaxFlo drum, which has high vacuum and a good pulp mat formation, essential to efficient pulp washing. However, the technology has extended beyond simulations and computations - current MaxFlo drum installations have demonstrated excellent performance and cost-effectiveness, already delivering a strong return on investment. Its modular and flexible design enables seamless integration with nearly all vacuum washers available on the market, making it a versatile and efficient solution for various applications.

Jarkko Lintunen concludes, "We have evidenced huge improvements in runnability with our MaxFlo drums. In best cases they have the ability to run almost double loading when compared to the original design value."

CASE STUDY: SAPPI SAICCOR BLEACHING PLANT UPGRADE

Sappi Saiccor mill, situated near Durban, KwaZulu-Natal, South Africa, produces 890,000 t/a of ECF dissolving wood pulp for the export market. In 2022 the mill was looking to increase its pulp capacity and chose ANDRITZ for the upgrade of its bleaching plants, including its vacuum washers.

"Basically we had three choices to enable us to reach the new capacity," says Wayne Weston, the mill's Project Director, "change the washing equipment completely, replace the retention tower, or upgrade the bleaching plant. Both of the first options were very expensive; however, ANDRITZ came to us with the idea of a vacuum boost by upgrading the vacuum washers in bleaching plant three and four with the MaxVac technology.

"The valves were installed on our existing washers and we were really pleased with the result. The performance test proved that all expectations in the bleaching plant were met, including the capacity increase and the reduction in chemical use. Another plus was that ANDRITZ assisted us with further service inspections that made sure the new valves were operating at their full performance levels."

MAXVAC HIGH-CAPACITY VALVE

High quality pulp relies on good washing efficiency and as capacity at a mill increases, negative impacts can occur if the production rate increases beyond design specifications. ANDRITZ has developed the MaxVac high-capacity valve replacement system that allows a mill to increase capacity at the same time as ensure washing efficiency.

BENEFITS OF THE MAXVAC GASFREE VALVE INCLUDE:

- Reduced defoamer usage
- Increased dropleg vacuum
- Increased effective filtrate capacity
- Increased drainage
- Improved mat formation

Importantly, mills facing high defoamer consumption can benefit from ANDRITZ GasFree™ technology to save on chemical costs and reduce air entrainment.

UPGRADE AND IMPROVE OPERATIONAL EFFICIENCY

It is clear that retrofitting the latest technology and upgrading vacuum washers is a more attractive financial alternative to replacing the whole washing line or equipment. With ANDRITZ's extensive experience in improving the operation and efficiency of existing equipment, major financial benefits are realized.

The experience and know-how that ANDRITZ provides goes beyond its own technology for vacuum washers, and the company is able to provide audits, upgrades, and retrofits on all manufacturers' equipment.

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ANDRITZ RECOVERY BOILERS

ANDRITZ is the leading supplier of recovery boilers to the worldwide pulp and paper industry with hundreds of units delivered since the 1950's. Each boiler has been individually designed for specific customer needs with a capacity range from the smallest, up to 20,000 tds/day in the future.

"Our recovery boilers are always engineered to meet exactly what our customers require," says Elina Suomalainen, Sales Director, Recovery Boilers at ANDRITZ. "With our numerous references and satisfied customers worldwide, we have gained a reputation for delivering the very best solutions when it comes to safety, smart operation, and sustainability.

"In particular, our customers are very pleased with the reliability and uptime of our recovery boilers - when we guarantee a performance value, we deliver what we promise."

SAFETY- NO. 1

The recovery boiler is one of the most hazardous areas in a pulp mill. To enhance safety and reduce operator involvement, ANDRITZ has introduced advanced monitoring systems and automated controls. These innovations minimize manual intervention, ensuring safer, more efficient, and reliable recovery boiler operation through increased automation and process oversight.

ANDRITZ has developed robot-based technologies especially designed to ease the daily work of recovery boiler operators and increase safety in hazardous and time-consuming tasks. One example is the Smart Smelt Spout Robot, an ingenious solution that automates the cleaning of the smelt spout.

Again, with the safety of the operator in mind, ANDRITZ supplies solutions that increase safety around black liquor burners. A new modular liquor burner rack, Modirack, enhances safety when working with the liquor burners. Modirack with a safety gate, quick burner ejection, and automatic burner cleaner results in less exposure to the risks arising from black liquor burner openings.

ANDRITZ also supplies smart measurements for smelt flow and char bed measurement to ensure safe operation of the furnace. Leakage detection is enabled by ANDRITZ Smart Water Leakage Advisor, where operators can be assured that the very smallest leakage can be detected.

As the world's leading supplier of large recovery boilers with capacities over 8,000 tds/d, ANDRITZ has introduced an increased tube size diameter for furnace walls to improve circulation and avoid leakages. The larger diameter of the tubes creates less pressure drop and allows the water to circulate better, thus cooling down the tubes more effectively.

"Due to the greater size of the boiler furnaces, ANDRITZ considers larger diameter tubes as the only safe solution to avoid leakages and possible explosions," says Rodrigo Tavares, Technology Director, Recovery Boilers at ANDRITZ.

Furthermore, for added safety, a smelt spout cooling system has been designed with a vacuum to ensure good water circulation so there is no contact with the smelt. The system also requires less manual interaction from operators.

SMART, INTELLIGENT DESIGN AND EASE OF OPERATION

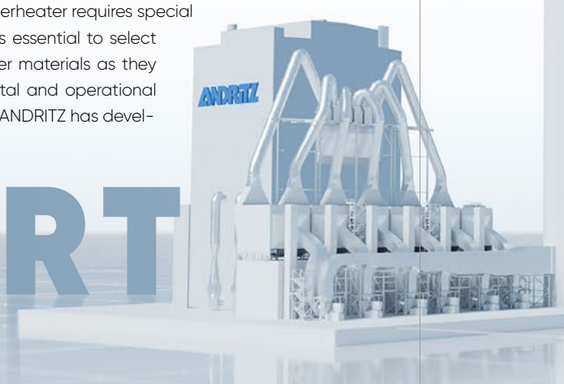
Smart operation of recovery boilers is not only limited to digital solutions; it starts with the basic design of the recovery boiler, as well as the materials used for reliable operation.

Modern mills now target continuous operation for up to 24 months, making boiler cleanability critical. The boiler bank is particularly susceptible to plugging. A key design priority is controlling flue gas temperature before it reaches the generating bank. To address this, ANDRITZ has developed an innovative solution: the pre-boiler bank.

"ANDRITZ pays extra attention to the optimized location of the sootblowers in the boiler bank, which ensures the boiler is kept clean for maximum uptime," explains Tavares. "For larger recovery boilers, a boiler bank with two sootblower cavities is supplied to ensure the range covers all areas."

Effective combustion air systems have an impact on reduction rate, carry-over, and emissions and ANDRITZ incorporates more room for optimizing and adjusting air flows according to different capacities or black liquor characteristics. As an example, primary and secondary air openings can now be controlled one by one.

Material selection of the superheater requires special attention. Tavares says, "It is essential to select exactly the right superheater materials as they have a big impact on capital and operational costs. To serve this purpose, ANDRITZ has developed a tool to calculate the material temperatures in each part of the superheater and thus make the precise material selection."



"In particular, our customers are very pleased with the reliability and uptime of our recovery boilers - when we guarantee a performance value, we deliver what we promise."

Elina Suomalainen
Sales Director, Recovery Boilers at ANDRITZ

Demand for shorter shutdown times is increasing as maximizing the pulp mill availability and production is essential. With ANDRITZ's lower furnace design that has a refractory-free floor, customers are able to shorten the shutdown time by 24-48 hours.

While design features are vital, operator ease-of-use and effective training are equally critical. ANDRITZ supports this with e-learning modules that complement classroom sessions. Advanced simulators, ranging from theoretical scenarios to full-scale recovery boiler models, accelerate operator learning and enhance preparedness for abnormal situations, thus benefiting both operators and supporting personnel.

SUSTAINABILITY – THE FULL RANGE OF SOLUTIONS

ANDRITZ recovery boilers cover the full range of sustainability demands for the 21st century customer.

Energy production is maximized from the recovery process and achieves a high steam-to-liquor ratio, which not only enhances the overall efficiency of the boiler, it also contributes to the production of green energy and often eliminates the need for fossil fuels.

With ANDRITZ recovery boilers, atmospheric emissions of harmful pollutants such as sulfur oxides (SOx) and nitrogen oxides (NOx) can be reduced to below regulatory demands according to customer requirements. Combustion air systems serve as a primary method for NOx emission reduction.

Tavares adds, "Further reduction of emissions is made possible by secondary flue gas treatment methods such as selective catalytic reduction (SCR). ANDRITZ experts have configured a set-up where an SCR is used in combination with an Electrostatic Precipitator (ESP) and fabric filter. This system also contributes to SOx and dust reduction to a minimum. One of the added benefits of the technology is that no water is used so it reduces costs and environmental impact."

Suomalainen concludes, "We are able to design and tailor-make our recovery boilers specifically for individual circumstances, and are able to reach even the highest of stringent environmental permits and regulations. Our customers are assured of receiving safe, smart, and sustainable solutions for all their needs."

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"Due to the greater size of the boiler furnaces ANDRITZ considers larger diameter tubes as the only safe solution to avoid leakages and possible explosions."

Rodrigo Tavares
Technology Director, Recovery Boilers at ANDRITZ

SAFE SMART SUSTAINABLE

BILLERUD FRÖVI

A NEW RECOVERY BOILER BUILT FOR THE FUTURE

Futureproofing pulp mills has become a necessity as requirements on safety and the green transition increase. These challenges were firmly in mind when Billerud chose ANDRITZ to supply a new recovery boiler for its Frövi mill in Sweden.

When the environmental permit for Billerud's Frövi mill was coming to its end in 2023, the management had to make an informed decision on replacing its aging recovery boiler. With increasing environmental regulations, as well as a competitive business landscape, the new recovery boiler had to be fit for the future when it came to efficiency, availability, and environmental performance.

The mill, located near Örebro in central Sweden, has a long and colorful past, with the site first being industrialized in 1550. Paper production began in the early 1900s, with the latest board machine added in 1981. The mill produces a combination of high-quality liquid packaging board and folding boxboard and has a capacity of 500,000 t/a. The site makes around 330,000 t/a of chemical pulp and 150,000 t/a of CTMP.

Despite its long history, the mill focused on the future with a new recovery boiler investment. Mill Director Richard Morén, says, "We had ongoing challenges with our existing recovery boiler simply because it was so old. Supplied in the 1960s, the boiler faced ongoing issues and couldn't meet stricter 2023 environmental regulations, making its replacement essential for compliance and continued operational efficiency."

PRICE, QUALITY AND FLEXIBILITY

In 2021, Frövi got the green light from the board at Billerud to invest in a new recovery boiler for the site with ANDRITZ being chosen to supply a solution to meet the mill's environmental and future production needs.

"ANDRITZ was chosen for a variety of reasons," says Morén. "Price, of course, is always important; however, it was much more than that. We were impressed with the quality of the equipment the company supplies, its ability to meet our environmental requirements, as well as the flexibility shown in the sales phase to help us meet our future needs."

The complete scope of supply to the Frövi mill project included:

- The world's leading recovery boiler technology from ANDRITZ to ensure stable pulp production and increased steam production. Benefits include fossil-free fuel operation, increased energy efficiency, lower emissions, and greater flexibility in production.
- A High Density (HD) concentrator to enable stable and optimal energy efficiency.
- Smart Smelt Spout Robot for improved operator safety. The Smart Smelt Spout Robot automatically cleans the smelt spouts and spout hoods without requiring human intervention, which significantly reduces operator time spent on the spout deck.
- Metris ACE for managing recovery boiler process, emissions, and operational flexibility.

Kari Liukko, Vice President, Recovery Boilers at ANDRITZ, says, "This new recovery boiler solution enables the mill to more than comply with existing and upcoming demands when it comes to environment and operational safety. It will also allow the mill to confidently increase the capacity of its production well into the future and provide real value to Billerud."

HD CONCENTRATOR – MAXIMIZING ENVIRONMENTAL BENEFITS

The HD concentrator from ANDRITZ was supplied to enable optimal conditions for efficient operation of the new recovery boiler.

"This was one of the examples of flexibility displayed by ANDRITZ," explains Morén. "The HD concentrator being installed in the evaporation plant a year before the recovery boiler enabled us to broaden our production window at the same time as prepare for a future increase in capacity."

"Another advantage was the involvement of our production and maintenance teams in the project right from the start, with the result that the learning curve has been much shorter than usual."

Richard Morén
Mill Director, Billerud Frövi Mill

Liukko, adds, "The target with installing the HD concentrator was to prepare the mill in advance for the start-up of the recovery boiler, and immediately maximize the benefits of the new installation."

With the HD concentrator, the dry solids content of the black liquor is increased from 72% to 82%, which enables higher steam and power production in the recovery boiler plant.

SMOOTH PROJECT IN A CHALLENGING ENVIRONMENT

Despite challenges encountered due the second wave of the pandemic and the start of the war in Ukraine, the recovery boiler project started up on time and on budget. Morén says, "Close collaboration with the Frövi and ANDRITZ teams meant we had a completely transparent relationship during the project, dealing with challenges and finding solutions together."

The recovery boiler started up in the summer of 2023 during the mill's annual shutdown, and apart from the usual teething problems, the boiler start-up and ramp-up went smoothly. Morén says, "We are delighted with how this project went and we are now concentrating on optimizing the operation of the recovery boiler. One advantage we had with the start-up was the use of ANDRITZ's comprehensive e-learning solution in Swedish, as well as a simulator of the recovery boiler for training purposes.

"Another advantage was the involvement of our production and maintenance teams in the project right from the start, with the result that the learning curve has been much shorter than usual."

Petri Pynnönen, Global Principal Engineer at ANDRITZ says, "The collaboration between Billerud and ANDRITZ was strong from the start, enabling a clear understanding of Billerud's goals and a smooth equipment start-up. Excellent co-operation continued after start-up by optimizing boiler performance for the current mill capacity."

The recovery boiler is now successfully running at its first phase design capacity and well under the environmental regulations that were set. The mill is now also ready and prepared for expansion in the coming years. Morén adds, "We have already pushed the boundaries of the new recovery boiler at all levels and we are very pleased with the performance.

"This recovery boiler solution from ANDRITZ has really been designed for the future, and complies perfectly with our own sustainability goals of recyclable, reuseable, and renewable production."

Read the complete story online!

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FROM THE HEART OF ITALY TO THE WORLD

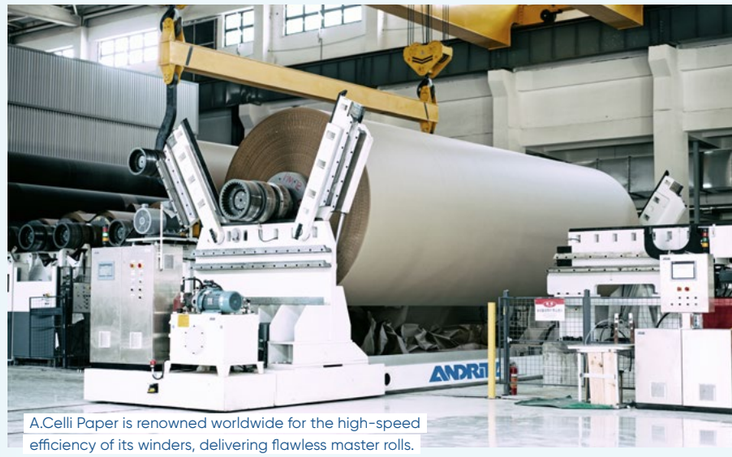
A.CELLI PAPER IS NOW A MEMBER OF THE ANDRITZ FAMILY

ANDRITZ recently acquired A.Celli Paper, a significant technology and equipment supplier to the global tissue and paper industries. The acquisition is strategically important for ANDRITZ as it now becomes a full-line supplier of technology for its tissue, board, and paper customers.

In the summer of 2025, ANDRITZ acquired the Italian tissue and paper specialist A.Celli Paper. The company offers turnkey tissue plants and tissue machines, including key components and services, as well as winders, unwinders and rewinders, and packaging solutions for all kinds of tissue, paper, and board production.

With more than 150 employees, A.Celli Paper is active in more than 60 countries. Its headquarters and main production facility is located in the Lucca region, known as the "tissue valley" in Italy, due to it being a significant center for tissue production, accounting for around 20% of Europe's output.

"This is an important acquisition for us," says Alexander Wassermann, Executive Vice President, ANDRITZ Paper & Textile. "In the tissue area, we have been friendly competitors with A.Celli Paper for a number of years; however, we were only partly overlapping in our deliveries of tissue machines. A.Celli Paper has a strong presence in single width tissue machines across the globe and ANDRITZ has concentrated more on the faster and double width machines – so this is a really good fit.



A.Celli Paper is renowned worldwide for the high-speed efficiency of its winders, delivering flawless master rolls.

"The real advantage to our tissue, paper, and board customers with this acquisition is that it enables ANDRITZ to become a full-line supplier and to be able to supply full plants from stock preparation all the way to the packaging of the final goods due to the addition of winders to our portfolio."

"This is another major implementation step of our strategy and shows our ambition to be a leading full-line supplier – from woodyard to finished rolls."

Alexander Wassermann
Executive Vice President, ANDRITZ Paper & Textile

Chiara Allegrini
Operations Manager, A.Celli Paper

The main production facility is located in the Lucca region, known as the "tissue valley" in Italy.

Read more online!

A.Celli Paper's Sales Director, Luca Billi says, "A.Celli Paper has a long history in the supply of tissue and paper machinery, offering advanced solutions for complete plants, tissue machines, as well as winders and rewinders for tissue, paper, and board. Furthermore, with the acquisition of PMT Italia in 2020, A.Celli Paper has extended its range of products and services to the specialty paper, graphic paper and packaging industries.

"We are excited about joining an international company such as ANDRITZ as it will enable us to further develop and grow in all the areas in which we operate."

SYNERGIES BRING EVEN MORE CHOICE TO ANDRITZ CUSTOMERS

As well as becoming a full line supplier of new tissue, paper, and board plants, the synergies between the two companies also open up major opportunities when it comes to rebuilds and upgrades.

Wassermann says, "This is an area where ANDRITZ is also active and together with A.Celli Paper there are certain competencies adjacent to each other. We believe that the field of comprehensive rebuilds will grow quite a lot in the future as the investments for big and large machines or plants will be reduced and many customers who have older assets are thinking about rebuilds.

"This is another major implementation step of our strategy and shows our ambition to be a leading full-line supplier – from woodyard to finished rolls."

Tune in to our podcast

Luca Billi
Sales Director, A.Celli Paper

Laslo Monte
Vice President, ANDRITZ
Global Process Group Manager
Paper Machine Service

Georg Krogger
Vice President, ANDRITZ Automation and Digitalization
Paper & Textile

Laslo Monte, Global Process Group Manager, ANDRITZ Paper Machine Service, about the service offerings, "Our installed base has now been significantly increased and our engineering know-how extensively enriched. We are in a strong position to provide an enhanced level of Service encompassing Wear and Spare Parts, Onsite and In-house services, products, rebuilds and upgrades.

"Automation and Digitalization combines our particular expertise in tissue, paper and board to automate and digitalize the entire production process – boosting reliability and efficiency and advancing plant autonomy for customers worldwide."

"Our global reach means we can support any project, big or small," says Georg Krogger, Vice President, ANDRITZ Automation and Digitalization. "With our Smart and Digital Tools, we help mills run at their best."

Chiara Allegrini, Operations Manager, A.Celli Paper adds, "A.Celli Paper joining ANDRITZ means together we offer innovative solutions and comprehensive services to the tissue and paper industry, including consultancy and engineering services to upgrade and retrofit existing machinery, thus enhancing productivity and efficiency.

"There are strong synergies between the two companies. From the outset, our focus has been on identifying and transferring best practices across sites. The ultimate aim is to achieve operational excellence on a global scale, to guarantee the best solutions for our customers, and to keep being flexible and remain competitive."

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A.CELLI PAPER

Founded in 1944, A.Celli Paper is a brand that is present worldwide in the paper industry, with around 1,000 installations of its technology, including 100 tissue machines, 400 winders for tissue, paper and board, and 100 roll handling systems.

A.Celli Paper specializes in the design and production of technical solutions for the tissue, paper and board industries, and offers complete plants, rebuilds, components, and automation software. The company's headquarters are in Tassignano near Lucca in Italy, with additional offices in Pinerolo near Turin, Italy and Shanghai in China. The company employs around 150 tissue and paper industry experts.

A VERY SPECIAL PULP MILL IN MANY WAYS

AMBITIOUS AND FAST GROWING

Liansheng Pulp & Paper (Zhangzhou), located on the southeast coast of China in Fujian province, established a pulp mill to ensure full integration with its new paper, cartonboard, and tissue production facilities.

Read the complete story online!

Family-owned enterprise Liansheng Pulp & Paper has rapidly emerged as one of China's most dynamic operators in the pulp, paper, and tissue sector. The company entered the pulp and paper industry in 1998, and has grown to be a significant producer of board, paper, and household products, with an emphasis on large-scale integrated pulp and paper operations and a focus on environmentally friendly production.

In 2021, Liansheng Pulp & Paper decided that a wise commercial decision would be to set up an integrated mill, including a kraft pulp facility, at a new 300-hectare site in Zhangzhou, which would supply pulp to its newly set-up packaging and tissue operations. Thomas Schmitz, President of ANDRITZ China, says, "This mill is very special in lots of ways. The owners are extremely ambitious, and the site has grown very quickly to produce coated ivory board, printing and writing paper, and has launched into tissue with two ANDRITZ *Prime*Line machines.

"The decision to set up a kraft mill as the center of this integrated mill made perfect sense. The mill is close to the sea for the import of chips, and also close to plantation areas for the supply of eucalyptus and acacia logs – China holds the largest plantation areas outside of Brazil, so fiber challenges are not an issue here."

SPECIAL TECHNOLOGY FOR THE LARGEST KRAFT PULP MILL IN CHINA

Liansheng Pulp & Paper proved its ambitions for the future by deciding on building the largest kraft mill in China. ANDRITZ was chosen to supply equipment for all the main process islands with an impressive lineup of groundbreaking technology. The full scope of supply included a chip handling plant with the world's largest 360° Stacker Reclaimers, the very first complete fiberline with COMPACT PRESS wash presses, China's largest recovery boiler, the world's largest single lime kiln plant in terms of capacity, and the world's largest gasification plant. ANDRITZ also delivered all process pumps and MC pumps for this project.

Liansheng site personnel celebrating the start-up of the first 360° Stacker Reclaimer

Xue Rongjun, General Manager Liansheng Pulp & Paper, explains, "The choice of ANDRITZ to participate in the Liansheng chemical pulp project is mainly based on its profound technical accumulation and rich project experience in the chemical pulp field. ANDRITZ's equipment stands out in terms of stability, energy consumption control, and environmental protection performance, which can meet our production requirements for high capacity and green environmental protection."

"This was a special project in all kinds of ways," adds Schmitz. "The customer was extremely demanding in terms of technology, which needed to be the best when it came to capacity, efficiency, and environmental footprint, and all had to be packaged within a competitive price range."

Zhang Yong, Vice President & General Manager, Pulp & Power ANDRITZ China, confirms, "The technology at the mill pushes the limits in terms of capacity, efficiency, and sustainable operations. For example, the recovery boiler enables the pulp and paper production facilities to be virtually self-sufficient in energy. The COMPACT PRESS wash presses in the fiberline are a valu-able asset, as they are extremely advantageous when it comes to lower effluent discharge and being manufactured in China makes them cost competitive.

"Furthermore, a mill this size would usually have two lime kilns. However, in this case we have supplied the world's largest lime kiln by capacity, →

"Liansheng Pulp & Paper is now ready to fulfill its ambitious plans for new paper, board, and tissue machines and ANDRITZ is delighted to be part of growth that really matters to our pulp and paper customers."

Thomas Schmitz
President of ANDRITZ China

enhanced by ANDRITZ's LimeFlash-H™ - an innovative, high-efficiency technology."

In May 2023, ANDRITZ also received a follow-up order for the mill to supply two debarking and chipping lines, including horizontally fed HHQ-Chippers.

SUCCESS FROM START TO FINISH

The kraft pulp mill project was announced in March 2020 and started up in July 2024. Liu Junwei, Vice General Manager of Chemical Pulping Liansheng Pulp & Paper, says, "The overall progress has been smooth, and it has now basically reached the designed production capacity. The ANDRITZ team demonstrated strong professionalism and a collaborative spirit. From the design, installation, to the commissioning stage, they could respond quickly to our requirements. Their technical support and on-site services were timely and efficient. The smooth communication between the two sides ensured the timely completion of key project milestones."

Liu adds, "ANDRITZ provided advanced technical equipment support. Coupled with the experience of the Liansheng team, it has outstanding performance in pulp line efficiency and energy consumption optimization. We would like to express our gratitude to ANDRITZ's professional team."

For ANDRITZ the project was unique in that it was the first time the Chinese project team had embarked on a mission of such a scale. Zhan Zhiyan, Project Director (today General Manager of Pulp Services ANDRITZ China) says, "This was a really successful project from start to finish. The key factors in the success are down to working under the "One ANDRITZ Way", which maintains a strong customer focus, openness of communication, and quick action, and establishes solid relationships across the whole project.

"The entire production line at the mill was started up and put into production 27 months after the contract was signed. Currently, the mill is running very well and is close to the full production capacity," says Zhan.

Schmitz concludes, "Despite a few equipment supply challenges related to the pandemic at the early stages of the project, we succeeded in starting up the mill on schedule with the first chips cooked in the digester in July 2024.

"Liansheng Pulp & Paper is now ready to fulfill its ambitious plans for new paper, board, and tissue machines, and ANDRITZ is delighted to be part of growth that really matters to our pulp and paper customers."

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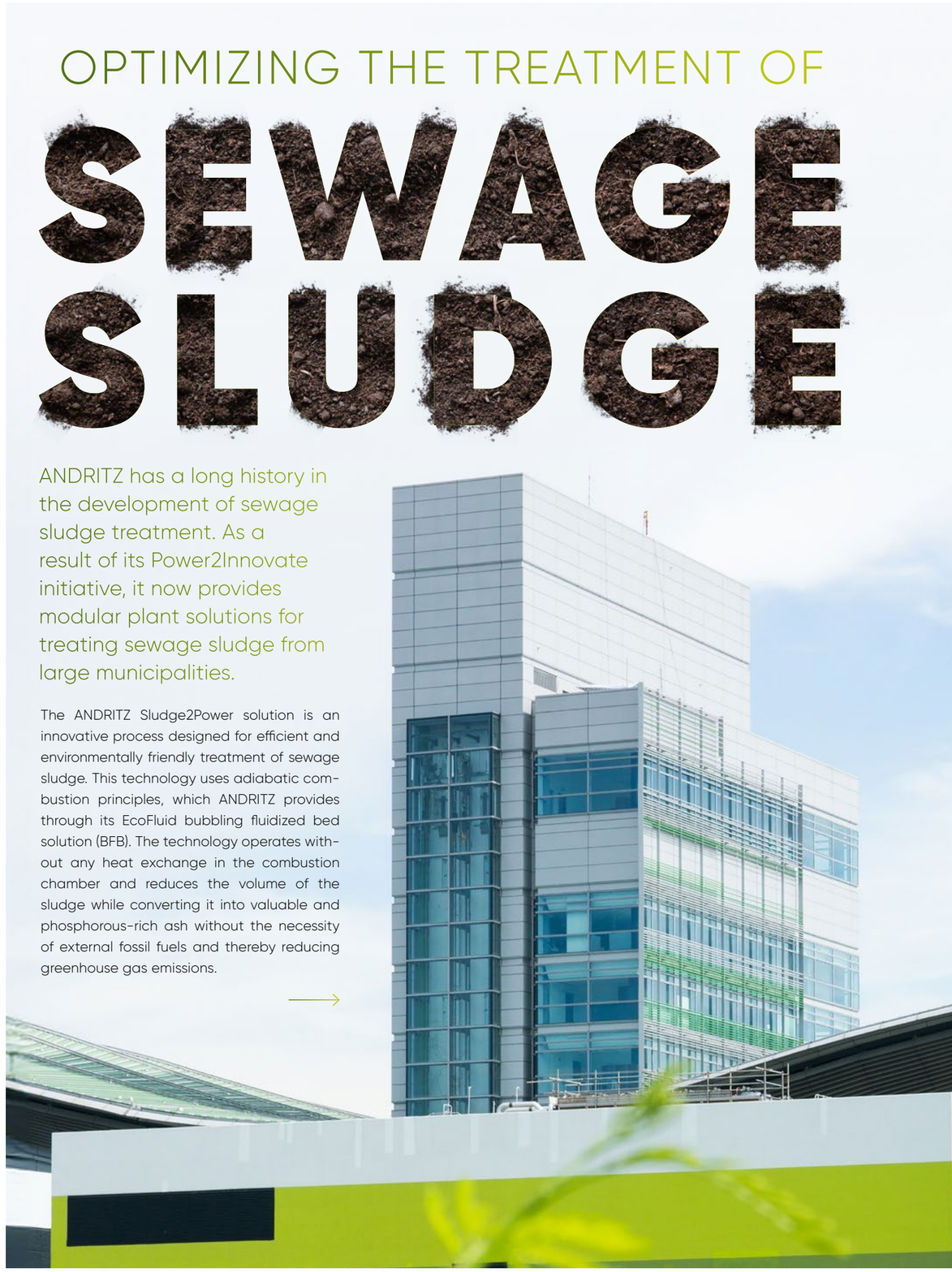
"Technically, ANDRITZ's equipment performs outstandingly in automated control and process optimization. Its technology can effectively ensure the continuity of production and has obvious effects in energy conservation and consumption reduction, providing strong support for us to achieve efficient and green production."

Xue Rongjun
General Manager, Liansheng Pulp and Paper (Zhangzhou) Co., Ltd.

OPTIMIZING THE TREATMENT OF SEWAGE SLUDGE

ANDRITZ has a long history in the development of sewage sludge treatment. As a result of its Power2Innovate initiative, it now provides modular plant solutions for treating sewage sludge from large municipalities.

The ANDRITZ Sludge2Power solution is an innovative process designed for efficient and environmentally friendly treatment of sewage sludge. This technology uses adiabatic combustion principles, which ANDRITZ provides through its EcoFluid bubbling fluidized bed solution (BFB). The technology operates without any heat exchange in the combustion chamber and reduces the volume of the sludge while converting it into valuable and phosphorous-rich ash without the necessity of external fossil fuels and thereby reducing greenhouse gas emissions.



Consequently, the combustion process enables a climate-friendly circular economy - sewage sludge that contains bacteria, medication residues, micro plastic, and other pollutants is turned into a pre-product for the recovery of the precious resource phosphorus instead of being directly used as a fertilizer on agricultural land. The Sludge2Power concept is the result of ANDRITZ's Power2Innovate initiative that focuses on customer-centric thinking.

Thomas Strasser, Director of Sales, Multifuel Boiler Plant at ANDRITZ says, "The real advantage of our adiabatic solution is the modularity that enables us to have flexibility and agility. With the modular concept, we are able to provide sludge boiler plants with a very efficient layout arrangement for wastewater treatment facilities serving local populations from 500,000 to 5 million inhabitants."

The ANDRITZ adiabatic sludge treatment technology is designed to utilize the energy of municipal sewage sludge for production of district heat and/or electric power. This is realized by pre-heating combustion air to a high degree and utilizing this recovered heat to enable a self-sustained combustion even at heating values as low as 3MJ/kg.

"The compact design facilitates the exploitation of site-specific synergies such as the mono-incineration of sewage sludge at the location of a municipal waste incineration plant," continues Strasser. "In addition, we provide ANDRITZ's cutting edge combustion technology that fulfills the strictest environmental regulations by reaching the lowest emission values (e.g., N_2O). We are able to deliver a broad range of ANDRITZ solutions such as sophisticated flue gas cleaning solutions, driers, burner technology including automation and digitalization systems, as well as other products as a one-stop-service."

ANDRITZ also provides long-term service agreements and expanded life cycle services for operational reliability for sludge plants.

SIGNIFICANT ORDERS FOR MONO-INCINERATION PLANTS

ANDRITZ has already received significant orders for its modular adiabatic sludge solutions, including most recently from two German companies, MVA Bielefeld-Herford GmbH, Bielefeld, and Kommunale Nährstoffrückgewinnung Niedersachsen GmbH (KNRN), Hildesheim.

The scope of supply to MVA Bielefeld-Herford includes an ANDRITZ EcoFluid bubbling fluidized bed (BFB) boiler system for a new sewage sludge mono-incineration plant. The installation will ensure the reliable disposal of sewage sludge and enable the recovery of valuable phosphorus. Furthermore, the steam generated by incineration will be supplied to the existing waste incineration plant that produces energy for the national grid and heating for the local district heating system.

The KNRN order for its plant at Hildesheim includes equipment for sewage sludge reception, conveying, drying including vapor condensation, and incineration with an adiabatic EcoFluid bubbling fluidized bed (BFB) boiler system. The scope of supply also includes a multi-stage flue gas cleaning system, steam turbine, generator, water-steam cycle, and additional auxiliary systems.

Benjamin Klammer, Sales Project Manager, Multifuel Boiler Plant, at ANDRITZ comments, "The feedback from the market and especially our customers shows that we did our job. These contracts prove that we are well prepared for future developments in key market segments that are fully in line with ANDRITZ's corporate strategy and commitment to deliver sustainable technologies and solutions to our customers and support decarbonization, sustainability, and a circular economy."

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ANDRITZ TECHNOLOGY POWERS THE WORLD'S LARGEST SEWAGE SLUDGE TREATMENT PLANT

POWER2INNOVATE
TRANSFORMING WASTE INTO VALUABLE RESOURCES

Power2Innovate is an internal innovation program launched by ANDRITZ Power Boiler Plant division to foster customer-centric thinking and entrepreneurial spirit among all employees. The program focuses on renewable energy transition, CO_2 reduction, recycling, and hydrogen and renewable fuels as our customers' current and future challenges.

The program aims to lead to the development of advanced technologies that can be implemented on a larger scale. By doing so, ANDRITZ hopes to contribute significantly to environmental sustainability and resource efficiency and to set new standards in waste management and energy production.

Sebastian Kaiser, Director of Technology, Multifuel Boiler Plant, ANDRITZ, explains, "Power2Innovate is a systematic development process, starting from the customer's view to the business plan and ending in technological development. The initiative invites every team member to contribute ideas, develop business models and—only after validation—transition into structured R&D projects. This two-phase approach ensures that innovation is both market-driven and technically feasible."

The initiative included 25 volunteers out of 130 employees who came up with more than 25 ideas on new innovations relating to multifuel boiler plants. Kaiser continues, "We filtered all the ideas down to six, which have been further developed by the teams. The selection of the winning ideas was made by division management. Due to the success of the Sludge2Power solution, the Power2Innovate initiative has been continued and is already working on the next innovation with a focus on recycling."

BURNING FOR MAXIMUM ENVIRONMENTAL EFFICIENCY

A green transition doesn't need to be complex and costly. When burners are designed to utilize a wide variety of fuels and industrial side streams, it is possible to significantly improve the plant's environmental efficiency from the next shutdown onwards.

Burners are an often forgotten but essential element in industries requiring heat in boilers, furnaces, and other processes. These crucial pieces of equipment play a major role in ensuring plants operate smoothly and efficiently, burning a full range of fuels to enable the generation of heat and energy for internal use or to supply the grid. Today, burners also play a major environmental role as many industries switch to renewable fuels, and they are often installed to handle side streams from production processes.

ANDRITZ develops, designs, and installs tailor-made burner systems capable of burning almost any fuel available, which is appealing for any industries and companies looking to transform away from fossil fuels.

"We have a great team designing and tailor-making burners to suit a wide variety of applications," says Lauri Tuominen, Director Recovery and Power Side Streams Services at ANDRITZ. "These burner solutions are vital to our projects related to reducing odor emissions at pulp mills, and to reducing carbon emissions by performing a fuel conversion to biofuels."

ANDRITZ provides the whole range of burner systems across many industries, including pulp and paper, energy, metallurgy, and process industries. With a deep understanding of the customer processes and the ability to deliver bespoke burner solutions including erection, piping, pressure pipe modification, and automation, ANDRITZ sets itself apart from other suppliers.

"When customers have very demanding and harsh process conditions, we ensure our equipment is the perfect fit for their needs. We can achieve fuel flexibility without needing to carry out significant modifications to the main process. In addition, we can assist customers in the introduction of side streams to bring additional value to their mills and plants," says Perttu Jukola, Product Director, Burners at ANDRITZ.

SUSTAINABLE FUELS – SIGNIFICANT BENEFITS TO CUSTOMERS

As well as burner systems for boilers in pulp, paper, and energy, ANDRITZ supplies burner solutions designed to utilize industrial side streams, biofuels, and other sustainable fuels. Generating green energy results in the reduction of CO_2 at mills and plants. Even streams previously considered as waste can be processed to produce valuable chemicals and raw materials instead of going for incineration.

"The use of side streams has become an important area of focus at pulp mills, in particular, as they are being rapidly transformed into biorefineries. This is due to the ability these mills have to recover chemicals and biofuels from the pulping process," says Jukola. "This has a number of financial benefits to our customers as it means they can avoid emission penalties set by the regulators, as well as use recovered side streams in internal processes."

Prime examples of burners in action at mills now include:

- Gathering concentrated non-condensable gases (CNCGs) and combusting them with burners installed in ANDRITZ SulfoLoop plants to produce sulfuric acid
- Using methanol and turpentine recovered from the pulping process to fire recovery boilers and lime kilns
- Utilizing powdered wood from woodyard waste to power the lime kiln by installing ANDRITZ LimeBio-Powder lime kiln biofuel plant

EnviroBurner™ multifuel solutions

COMPLETE OFFERING FOR ALL BURNER NEEDS

Thanks to ANDRITZ's vast experience in burner technologies, pulp and paper operators and energy companies now have a considerable range of options for burning almost any fuels available, including waste streams. Furthermore, ANDRITZ offers a complete burner replacement service for existing boilers at mills and energy plants by installing the latest technology to improve performance.

Tuominen says, "Simply replacing older burner technology in existing mills and plants can make a huge difference to the availability of processes when it comes to start-up times, and efficient operability. With burner upgrades we can increase availability from below 90% up to 99% with the installation of our latest burner technology, and it can be completed during a normal planned shutdown."

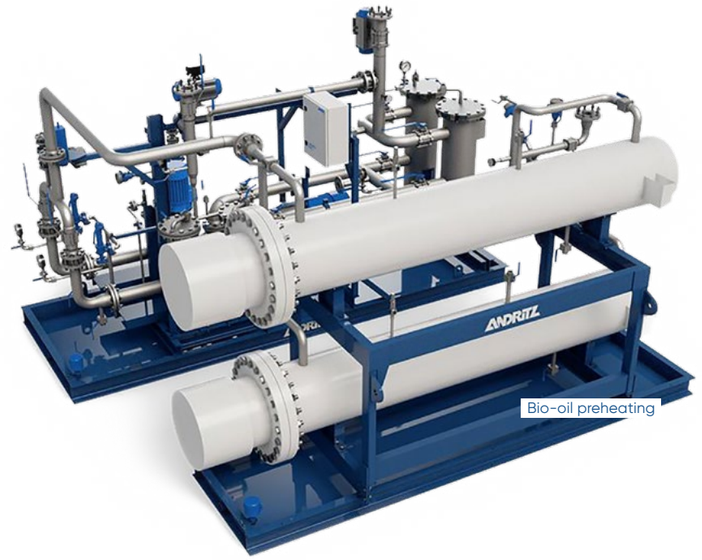
Jukola concludes, "There are many benefits our customers can take advantage of when utilizing side streams across mills, including new products, fuel savings, and efficiencies, as well as reducing CO_2 emissions. ANDRITZ can supply complete burner solutions across mills and energy plants to ensure our customers have the very best in sustainable solutions."

Our experts ensure a smooth project.

ANDRITZ burners are made to last in extreme conditions.

ANDRITZ has over 250 references of its multi-fuel burners worldwide, including:

- Billerud – Frövi, Sweden
  Bio-oil as boiler auxiliary fuel
- Klabin – Ortigueira, Brazil
  Sulfuric acid production
- Resolute – Saint-Félicien, Canada
  Bioheat from wood
- Sofidel – Kisa, Sweden
  Syngas for tissue drying with a CO_2 reduction of up to 10,000 t/a
- Tornion Voima – Tornio, Finland
  Air emission and CO_2 reduction



Bio-oil preheating

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GETTING TECHNICAL
ANDRITZ BURNER PORTFOLIO

START-UP AND LOAD BURNERS

- Designed for the demanding environment in fluidized bed and recovery boilers, mainly for Bubbling Fluidized Bed (BFB) and Circulating Fluidized Bed (CFB) technology boilers and biomass gasifiers
- Structures and materials developed to withstand mechanical wear, chemical erosion, and the furnace heat for each specific

BURNER SOLUTIONS FOR BIOFUELS AND ALTERNATIVE FUELS

- Burner technology for bio-oils, e.g., tall oil, pitch, vegetable oils
- Burner technology for biomass powders, e.g., wood and sander dust as an auxiliary or stand-alone fuel
- Compact burner solution for combustion of low calorific value gases without additional fuel, e.g., gasification product gas and process gases
- Burner technology for hydrogen, methanol

BURNER SOLUTIONS FOR SIDE STREAMS

- Burners for non-condensable gases, especially pulp mill concentrated NCG (CNCG/LVHC gas)
- Combined sulfur-CNCG burner for SulfoLoop™ sulfuric acid plant
- Incinerator technology for pulp mill concentrated and diluted NCGs, as well as other gases and liquids
- Enclosed flare incinerators for back-up with rapid start-up

SPECTRUM PODCAST

FOLLOW AND SUBSCRIBE TO OUR SPECTRUM PODCAST!

Season four of our podcast explores the trends, challenges, and solutions shaping the pulp, paper, and bioproduct industries. We feature in-depth discussions with leading experts on the most important topics impacting our customers and the sector as a whole.

We also examine recent acquisitions, important industry start-ups, and forward-looking business models. Through these conversations, we provide valuable insights and practical perspectives to help industry stakeholders navigate change, seize opportunities, and drive sustainable growth.

Tune in to our podcast

What you can expect to learn in a single episode.

Mark Rushton, Host of the SPECTRUM Podcast

Season 4

DID YOU **KNOW** THAT...

... ANDRITZ IS DESIGNING THE PULP MILL OF TOMORROW – TODAY?

With its Pulp Mill of Tomorrow concept, ANDRITZ is redefining the future of pulp production as a fully integrated, zero-waste biorefinery. The goal? To maximize raw material utilization by minimizing waste, enhancing yield and efficiency, and transforming side streams into high-value products such as bio-based chemicals and biofuels.

This vision is made possible through the integration of cutting-edge digital automation, advanced side-stream utilization technologies (e.g., SulfoLoop™ Sulfuric Acid Plant), and comprehensive mill-wide process integration. The result: significantly reduced emissions, minimized waste, and a more sustainable pulp industry.

Contact us to learn how your mill can become the Pulp Mill of Tomorrow – today.

GET MORE INFORMATION!

... THE ANDRITZ UTURN ROTOR CAN REVOLUTIONIZE YOUR SCREENING PROCESS?

The UTurn Rotor is an innovative solution designed to significantly reduce energy consumption in pressure screen operations. Traditional pressure screens typically rely on a single rotor and basket unit, with energy usage managed primarily through rotor design and operational speed. However, the UTurn Rotor introduces a unique split rotor design that allows for dual-speed adjustments, and optimizes energy use based on specific screen requirements.

This advanced technology can achieve up to 30% energy savings, thus lowering operational costs and providing a rapid return on investment. Additionally, the UTurn Rotor minimizes wear and maintenance needs, which extends the lifespan of equipment and enhances screening efficiency.

Join the dual revolution with the ANDRITZ UTurn Rotor and experience the benefits of cutting-edge energy efficiency and superior performance in your screening processes!

WATCH THE UTURN VIDEO!

... ANDRITZ OFFERS TECHNOLOGIES FOR THE ENTIRE BATTERY LIFECYCLE?

From mineral processing to cell assembly, formation, aging, testing, and recycling – ANDRITZ supports every stage of the battery lifecycle. As the industry moves toward circular solutions, ANDRITZ focuses on battery recycling with advanced technologies for mechanical pre-treatment – also known as black mass production – including safe discharging, shredding, drying, and sorting. This process produces black mass, a concentrated mix of valuable materials such as lithium, nickel, and cobalt, and forms the basis for downstream recovery.

GET MORE INFORMATION!