

SPECTRUM

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MAGAZINE OF PULP & PAPER 

STARTING UP BIG

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Gasifier boosts green energy
(Page 6)

CLEAR ADVANTAGE

ShortFlow deaeration
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REINCARNATED PM

Second Hand machine
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ANDRITZ
Pulp & Paper



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On the cover: Olavi Filipecki, Woodyard Project Manager for ANDRITZ Brasil, stands at the top of the new stacker/reclaimer at Eldorado Brasil's greenfield pulp mill. The ANDRITZ fiberline, largest in the world, is in the background. (Complete story begins on page 12).

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The growth trifecta



Market growth comes by expanding in one of three ways: customer base, products offered, or geography covered. ANDRITZ continues its strategy to expand in all three.

A trifecta is a situation when three elements come together at the same time. The word comes from a betting term ("perfecta"). As you might guess, trifecta winners are rare and the payout is large.

We are business people and stewards of our shareholders' money – not bettors at a race track. Still, it makes sense to invest in the controlled expansion of our products and locations to align ourselves with the new dynamics of this industry. It is not a risk to do so. It is more of a risk NOT to do so.

For example, you will read in the interview with José Grubisich, President and CEO of Eldorado Brasil (page 12), that this market pulp producer sees his company growing more with a specific customer base (tissue) and in a specific geography (Asia). We at ANDRITZ share this view. We have our most modern pulping technology in Brazil, most of our tissue machines in Asia, and have recently expanded our presence in China to include competence centers for plastic film production and R&D for nonwovens.

Another area of growth is packaging grades. We expanded our product line to include not only new machines, but also the relocation and modification of secondhand machines. In the next issue, we plan to report on the new machine at Zellstoff Pöls in Austria (high-strength grades for shopping bags, medical packaging, and food packaging). In this issue, you can read about a project with the SFT Group of Russia to

relocate and convert an MG machine to a state-of-the-art packaging machine (page 36).

Market growth is also the result of expanding our services, such as rebuilds and retrofits. Our success comes not only from bolt-for-bolt rebuilds to OEM specs, but also by adding our own special technology to improve upon the "old" installation. You can read about the work at Varel (page 33) to upgrade the performance of a dewatering press and expand the drying capacity of an existing packaging machine.

As mills are transitioning to higher margin products and/or higher efficiencies, these transitions require changes to the technology. We at ANDRITZ have the expertise to assist – with new, rebuild, upgrade, or relocation. We hope you will continue to take maximum advantage of this expertise in the coming year.

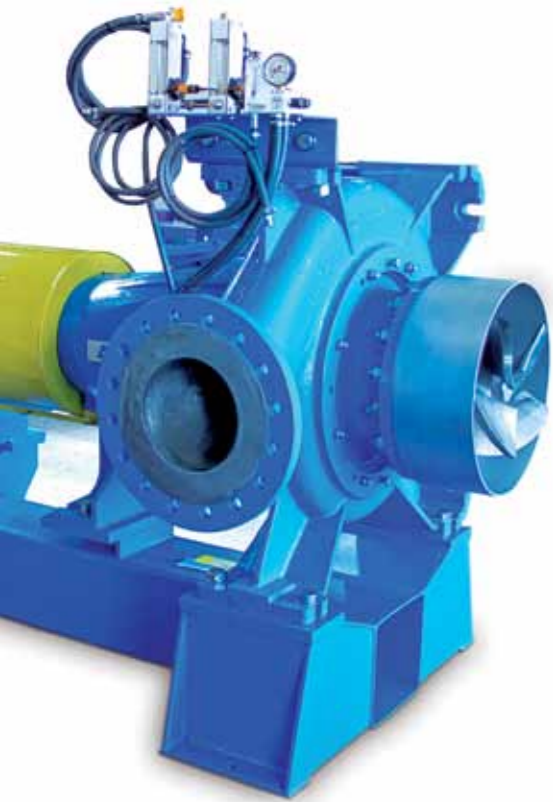


◀ Karl Hornhofer (standing) and Humbert Köfler.

Karl Hornhofer
 Member of the Executive Board
 PULP & PAPER – Capital Systems

Humbert Köfler
 Member of the Executive Board
 PULP & PAPER – Service and Units

NEWS



Largest MC pumps in the world

The pulp feed to a new washing line for a mill was massive – 4,400 t/d. Moving that much pulp requires some very large pumps – the largest ever made by ANDRITZ, and the largest MC (medium consistency) pumps in the world.

ANDRITZ received the order for six MC pumps early this year and has shipped the units. Although ANDRITZ's MC pumps can handle consistencies up to 16%, the units for this mill will operate in the range of 7% consistency.

The customer counted on a quick delivery from ANDRITZ. Only four and one-half months were required for manufacturing

and testing at ANDRITZ's workshop in Graz. Efficiency of the pumps was documented at 74% (BOP) at a consistency of 8%. This is far above the industry average (which is below 70%) and the best efficiency ever measured for an MC pump. The pumps were also tested at 12% consistency and were able to pump the equivalent of 7,200 t/d.

The MC pumps are equipped with the SMARTSEP system, which removes air from the pulp suspension while returning fiber to the pump. Degassing control is so incredibly simple. When the pump is running, the degassing valve is open; when the pump stops, the valve closes.

70 trucks and one vessel to the North

Recently, the equipment for JSC Arkhangelsk Pulp and Paper Mill's new semi-chemical pulping line in Russia, was shipped from ANDRITZ workshops to the site – on 70 trucks and one ship. In late May, the continuous steam-phase digester (75 tonnes) left Antwerp, Belgium and reached its destination port at Arkhangelsk. From there, it travelled by river barge to the mill site.



▲ ANDRITZ semi-chemical digester reaching its destination port of Arkhangelsk (Courtesy of APPM's "Bumazhnik" newspaper)

The other equipment shipped by truck included the chip washing equipment, refiners, washers, screw presses, gas treatment system, as well as instrumentation and control systems.

Once installed, the new plant will produce 1,000 t/d of semi-chemical pulp out of birch and aspen as raw material. Start-up is scheduled for the fourth quarter of 2014.

Highlights of new orders

COMPLETE LINES AND SYSTEMS

Haskell Co. for Drax USA
Chipping and screening lines for two pellet plants.

Rentech Canada (two locations: Atikoken, Ontario and Wawa, Ontario)
Wood pelleting systems (hammermills, pelletizers, and coolers).

Stora Enso Skoghäll, Sweden
Fiberline modernization (incl. TurboFeed and DD washers); sludge dewatering line; belt press rebuild.

Mjölby-Svartadalens Energi Mjölby, Sweden
EcoFluid BFB biomass boiler, fuel handling, flue gas cleaning, and steam turbine.

Suzano Papel e Celulose São Paulo, Brazil
New cooking plant, evaporation plant upgrade, and methanol liquefaction plant.

COMPLETE LINES AND SYSTEMS

Xuan Yuan Industrial Development Dobrush, Belarus
Woodyard, 450 t/d P-RC APMP plant, stock preparation, and machine approach system.

Emami Paper Balasore, India
Two OCC lines, deinking line, stock preparation, machine approach system, new headbox, and coating equipment.

Zhejiang Jingxing Paper Zhejiang Province, China
Two PrimeLineST tissue machines incl. PrimeDry Steel Yankees.

Shin-Ei Paper Shizuoka Province, Japan
Two PrimeLineCOMPACT machines incl. PrimeDry Steel Yankees.

KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS

Stora Enso Oulu, Finland
Fiberline modernization including new pre-steaming chip silo and DD washer.

Chuetsu Pulp & Paper Takaoka, Japan
O2-stage and bleaching modernization with ACE/BrainWave.

Celulosa Beira Industrial Celbi Figueira da Foz, Portugal
Cooking and screening line upgrade, new pre-evaporator and rebuild of pulp drying line.

Domsjö Fabriker AB Domsjö, Sweden
Rebuild of boiler to reduce fouling behavior and enhance efficiency 20%.

Papelera Guipuzcoana de Zicuñaga Zicuñaga, Spain
Upgrade of evaporation plant with Duct Stripper and the first modular box-type surface condenser.

PT Suparma Surabaya, Indonesia
FibreFlow drum pulper.

Weyerhaeuser Gdansk, Poland
Flash dryer and curing bin expansion.

Highlights of new start-ups

COMPLETE LINES AND SYSTEMS

Metsä Fibre Joutseno, Finland
Polysulphide cooking and MOXY plant. *World's largest single polysulfide cooking line.*

JK Paper Rayagada, Orissa, India
Major kraft mill modernization (woodyard, fiberline, white liquor plant, evaporators, and recovery boiler).

Mondi Frantschach St. Gertraud, Austria
Recovery boiler.

Graphic Packaging International Macon, GA USA
EcoFluid BFB biomass boiler.

COMPLETE LINES AND SYSTEMS

Nine Dragons Paper Industries Quanzhou, Fujian Province, China
1,000 t/d OCC line; paper machine approach systems; broke handling system.

Ganzhou Hwagain China
PrimeLine tissue machine with complete stock preparation plant incl. PrimeFlow headbox, PrimePress XT shoe press, PrimeDustEx W dust removal, PrimeReel advanced reel system, and machine control system.

Kamenskaya Paper & Board Tver Region, Russia
Relocated and rebuilt packaging machine (secondhand); new 800 t/d recycled fiber line and approach flow system.

KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS

OAQ Ilim Group Koryazhma, Russia
Lime stone kiln, white liquor plant, and recovery boiler modernization.

ENCE Navia, Spain
Evaporation plant capacity increase.

Chuetsu Pulp & Paper Satsuma-Sendai, Japan
MVR pre-evaporator. *First MVR system in Japan.*

UMKA AD Fabrika Kartona Umka-Beograd, Serbia
Stock preparation system. *Considerable fiber savings from ANDRITZ FibreWash.*

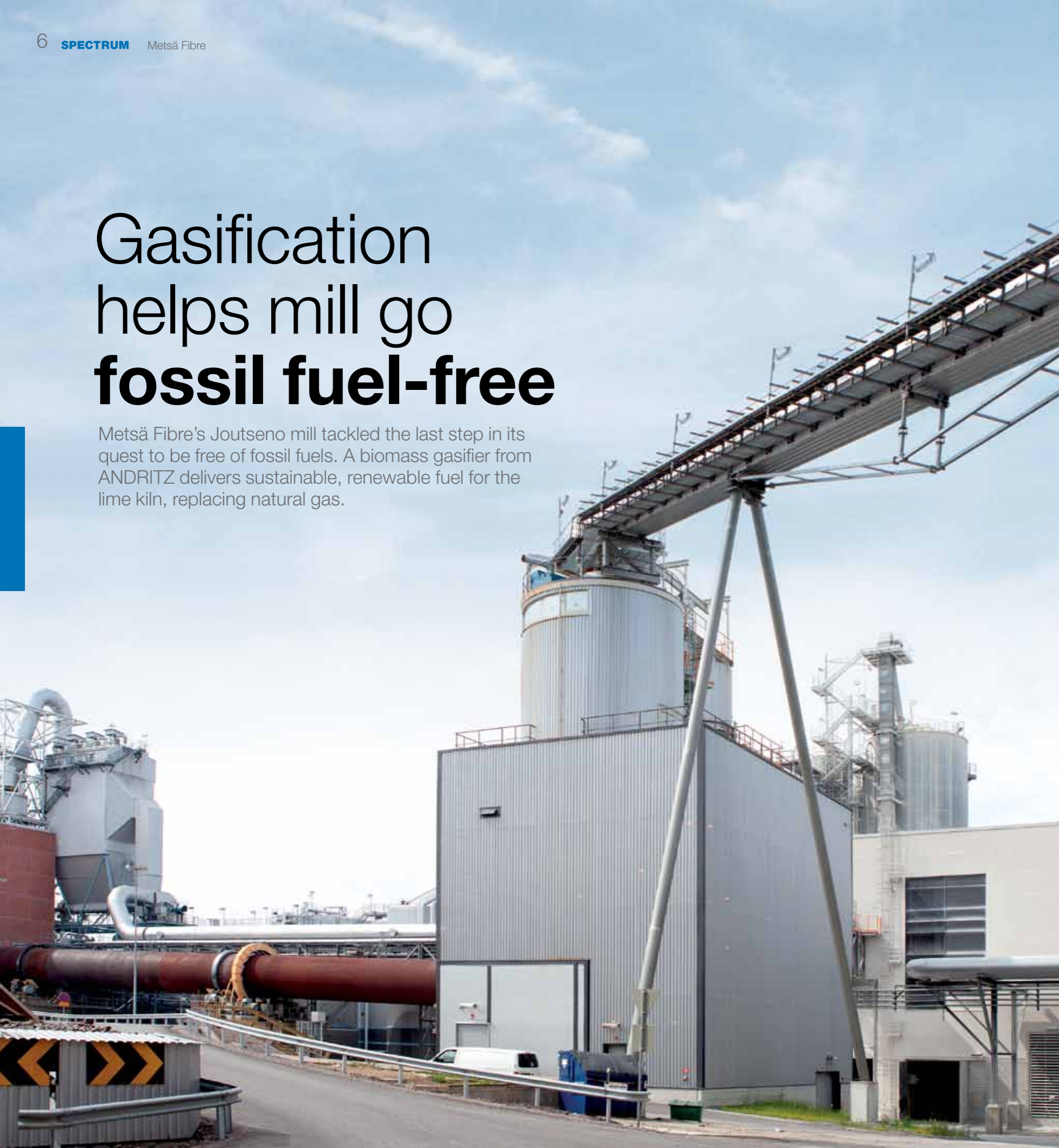
Vipap Videm Krsko Krsko, Slovenia
Deinking system upgrade.

Sappi Paper and Packaging Ngodwana, South Africa
Rebuild of pulp drying plant (wire/press section, new shoe press, dryer, heat recovery, cutter, and baling line).

Sappi Fine Paper North America Cloquet, MN USA
Pulp drying modifications (wet end, press, cutter/layboy, and baling line).

Gasification helps mill go fossil fuel-free

Metsä Fibre's Joutseno mill tackled the last step in its quest to be free of fossil fuels. A biomass gasifier from ANDRITZ delivers sustainable, renewable fuel for the lime kiln, replacing natural gas.



◀ The ANDRITZ 48 MW gasification plant at Joutseno (foreground) includes biomass handling system, dryer, feed system, CFB gasifier, ash handling, and the gas burner for the lime kiln (background to left).



◀ Mill Manager Risto Joronen (left) with Kari Salo, Managing Director of Carbona.

The availability of low-cost biomass at this mill was a key driver for us choosing gasification technology," says Pertti Lehmonen, Metsä Fibre's Project Manager. "We have a woodyard, but no bark boiler at the Joutseno mill, so we have plenty of wood residuals available."

And the selection of ANDRITZ as the technology supplier? "This mill site has lots of equipment from ANDRITZ and also an ongoing service contract," Lehmonen continues. "We have worked together for a long time and have very good cooperation."

The drive for fossil fuel-free

"One of our company targets is to make all our mills carbon dioxide-neutral," says Metsä Fibre's Vice President and Joutseno Mill Manager, Risto Joronen. "The Joutseno mill was a good place to start. Similar development is underway at our other three mills in Finland."

Metsä Fibre is no stranger to bioenergy. It accounts for approximately one-fifth of all wood-derived electricity generated in Finland.

"The motivation for doing this is both environmental and economic," says Lehmonen. "We replaced natural gas with green energy from a very low-cost fuel source. It was a smart move for us now, but will appear even smarter when energy prices rise in the future."

Manageable risks

The project was designed to replace all the natural gas required for fueling the lime kiln (600 t/d capacity) with renewable, sustainable biofuel. The kiln was the remaining piece of production equipment running on natural gas. To this end, ANDRITZ proposed a complete 48 MW gasification plant – including the biomass handling system, a belt dryer, the feed system, circulating fluidized bed (CFB) gasifier, ash handling equipment, auxiliary systems, and a replacement gas burner for the existing lime kiln. "This was a complete delivery from the foundations up," says Kari Salo, Managing Director of Carbona, specialist in the gasification technology.

"The kiln burner is critical," Lehmonen says. "We thought this might be a risk area. The product gas (biofuel) burns differently and is delivered in higher volumes than natural gas." After start-up, Lehmonen says that the burner has performed quite well and there are no worries about its continued performance. "That was one risk that never materialized," he says.

As for the gasifier itself, Metsä Fibre was convinced that the ANDRITZ Carbona technology was not a risk. "Although it is the critical item in the plant in terms of production, we were quite comfortable with ANDRITZ's experience and knowledge," says Joronen.

The other big question at the beginning was how the non-process elements (NPEs) in the gasifier gas would affect lime quality or the entire chemical recovery loop. "The chemicals in a modern mill, including inorganics, are recirculated over and over," Joronen explains. "These inorganics could build up and cause a dead load in the system. We didn't know for sure if the small proportions of ash formed during gasification would cause us problems."

According to Lehmonen, this risk also has been quite manageable. "Our lime is a slightly different color now," he says, "but the quality is the same. For the NPEs, we just open up the loop a bit and everything seems to be in balance."

In fact, if you look at charts showing operations before and after (natural gas vs. gasifier gas) there is virtually no change in lime kiln operations. Production rates, tempera-

Wet biomass is dried in a belt dryer from ANDRITZ, with an evaporation/drying rate of 12 t/h. Drying increases the heating value of the biomass fuel. ▼

“The motivation is both environmental and economic. We replaced natural gas with a low-cost green fuel.”

Pertti Lehmonen
Project Manager
Metsä Fibre

tures, and residual carbonates are almost identical.

The gasification plant

Circulating Fluidized Bed is a state-of-the-art technology for the partial combustion of fuels of differing qualities (such as woody biomass). The gasifier operates at about 750-800° C. The turbulent intermixing in the fluidized bed compensates for fuel quality fluctuations, accommodating low-grade fuels with variable moisture and ash content. The management of nitric oxides (NO_x) and

sulfur oxides (SO_x) is easily accomplished without adding post-combustion cleaning equipment. ANDRITZ CFB gasifiers have been in operation since the 1980's. The technology has been upgraded over the years to satisfy today's demands for reliability and efficiency.

The biomass fuel at Joutseno is a combination of pine, spruce, and birch bark. Moisture content averages about 50% (maximum 60%). ANDRITZ delivered a complete biomass handling and conveying system, including the fuel receiving pocket, bark screen, and conveying system to the gasifier, as well as the feeding system to the dryer at a rate of roughly 22 t/h. This equates to 175,000 t/a of bark.

The bark is dried in a belt dryer from ANDRITZ, with an evaporation/drying rate of 12 t/h. Drying increases the calorific value



▲ Inside the CFB gasifier, which operates at about 750-800° C. The large duct on the left feeds air to the gasifier.



▲ The biomass is a combination of pine, spruce, and birch bark. ANDRITZ delivered a complete biomass handling and conveying system.

of biomass. The heat sources for the dryer are hot water (waste water from the mill's processes) and also low-pressure steam from the mill. Wet biomass enters the dryer and is fed uniformly across the 8 m wide belt. Drying air is heated indirectly to about 95° C in heat exchangers arranged above the dryer belt. The warm air flows gently through the biomass without displacing it from the belt, and absorbs its moisture. Moisture is reduced from the 50% level to about 15% in the dryer. This equates to a fuel feed of about 11 t/h to the gasifier.

Develop and optimize

The plant was started up in 2012 and some modifications were made to the bark feeding system of the belt dryer. According to Joronen, the mill has been relying solely on the gasification plant to fuel the lime kiln for the last six or seven months.

Lehmonen says that the modifications in dryer bark feeding and particle size have improved the plant operation. The main challenge now is to improve the utilization of secondary heat in the bark dryer. "We can improve our economics considerably by using more of the hot water from the bleach plant instead of the more costly LP steam," he says.

“One of our targets is to make all our mills carbon dioxide-neutral.”

Risto Joronen
Vice President and Mill Manager
Metsä Fibre



▲ Heikki Valtokari, Sales Manager, ANDRITZ Wood Processing

It seems that the small things are important, according to Salo. "The bark handling and processing is critical," he says. "We have made adjustments to optimize the particle size, feed rates, and some other things to get the maximum performance."

Targets met

"This is a new kind of fuel for our lime kiln and there are new things to learn about maximizing the secondary heat from our bleaching line," Joronen says. "We didn't have much experience about these things. But we are fast learners!"

According to Joronen, the new gasification plant improves the efficiency of renewable energy usage and further improves environmental performance. "Joutseno is the first carbon dioxide-neutral facility in Finland during normal operations," he says.

Lehmonen lists the technical targets that have been met: replacing fossil fuels, using cheap biomass residue for fuel, controlling NPEs in the biogas, keeping kiln capacity at its high level, improving the kiln's flame radiation and heat transfer, and keeping residual carbonate low, etc.

"And on the environmental level, we can say that we are reducing CO₂ emissions by about 200 t/d, or 72,000 tonnes per year. On top of that, we are realizing a short pay-back time on the investment."

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◀ The distinctive orange color of polysulfide liquor. Conventional cooking liquor is white.

Joutseno sees benefits of polysulfide cooking

Metsä Fibre's Joutseno mill in Finland started up the world's largest single polysulfide cooking line. The technology for the preparation of polysulfide cooking liquor, and the digester modifications to take advantage of it, were delivered by ANDRITZ.

According to Metsä Fibre's Vice President and Joutseno Mill Manager Risto Joronen, who was also the Project Director for this development with ANDRITZ, the use of polysulfide cooking liquor enables his mill to improve pulp qualities that offer a real benefit to papermakers.

"Since we started polysulfide cooking, our customers are noticing a reduction in specific energy required to refine our pulp and they are seeing some enhancements in fiber bonding," Joronen says. "The bonding improvement is due to the retention of certain hemicellulose materials in the pulp."

For its own part, Joutseno has increased fiber yield, which reduced the solids in the black liquor, which in turn reduced the load on the recovery boiler. Like many mills, Joutseno is recovery-limited. So, this is a big benefit. "The increase in yield and overall pulp production makes the investment in polysulfide economically beneficial," Joronen says.



◀ The polysulfide cooking plant delivered by ANDRITZ is the largest in the world. It is a relatively compact layout. Shown here are the polishing filter, MOXY reactor, and storage tanks.

From white to orange

Polysulfide cooking stabilizes and preserves the carbohydrates (hemicelluloses) in wood. This improves yield. The most obvious difference in polysulfide cooking liquor is its unique orange color.

"Polysulfide cooking has been around for many years," says Mika Mäkelä, ANDRITZ Project Manager. "The first patent for polysulfide pulp cooking was granted in 1943,

so the idea is not new." In 1973, Mead Corporation introduced a white liquor oxidation process (MOXY process) in which sodium sulfide was converted into polysulfide with the help of an active catalyst (coal) and air.

Mäkelä explains that while the process is proven, it has not been used that often. "We delivered plants in past years to Canada, Japan, and other countries," he says. "A



◀ Markku Lankinen, ANDRITZ Sales Manager for white liquor plant (left), with Risto Joronen, Joutseno Mill Manager, in front of the MOXY reactor in the polysulfide cooking preparation plant.

Johan Engström, ANDRITZ R&D Manager for cooking technology, oversaw the modifications to Joutseno's digester to take full advantage of the polysulfide cooking liquor. ▼



“Polysulfide cooking helps us deliver a pulp that has real benefits for papermakers.”

Risto Joronen
Vice President and Mill Manager
Metsä Fibre

new focus on increasing fiber yield of softwoods, and overcoming bottlenecks in the recovery cycle without major capital investments, is causing mills to take a new look."

Not traditional

"This was not a traditional mill-supplier project," Joronen says. "It is a high-profile project for us because it impacts pulp quality. Our people have been studying this for several years. About one year ago, we decided to implement it at Joutseno. We collaborated on process development and have been full partners with ANDRITZ. This kind of collaboration is very important to us."

Mäkelä can cite several examples of how this type of relationship is beneficial to both partners. "In almost any project, we face challenges that are best resolved with close

collaboration and a shared target," he says. "But in development work, where we are trying something unique, it is absolutely critical. We benefit from the give-and-take and sharing of knowledge."

More than a simple scale-up

The Joutseno mill, capable of producing about 2,000 t/d, is the largest single softwood line in the world. By volume, the poly plant at Joutseno is almost three times bigger than any other plant ANDRITZ has delivered. "Scaling up presented us with some challenges," says Johan Engström, R&D Manager for cooking technology at ANDRITZ. "It wasn't just a factor of making the physical size of the vessels and piping bigger. There is considerable science and process expertise involved."

The effectiveness of polysulfide liquor is dependent on the concentration, temperature, retention time, and where it is introduced into the cooking process, Engström explains. "Since polysulfide cooking can be performed at lower impregnation temperatures, we modified the Joutseno digester by adding heat exchangers and altering the cooking liquor circulations. The modifica-

tions are not expensive to implement, but are critical."

The poly process

Markku Lankinen, ANDRITZ Sales Manager for white liquor plant, explains that the MOXY process converts the sodium sulfide in conventional white liquor into sodium polysulfide with some sodium thiosulfate – forming the characteristic orange liquor. "But before this step," he says, "the white liquor is filtered to the highest possible degree by a polishing filter to prevent premature fouling of the catalyst."

The polished white liquor is pumped to the top of the MOXY reactor, where compressed air is also introduced. The mixture of air and white liquor is blown through activated carbon catalyst. The catalyst is arranged in layers, designed to prevent formation of channels. The catalyst is also surface-treated with Teflon to make it water repellent and to lengthen its life. "Joutseno can control its process to obtain just the right level of polysulfide," Lankinen says.

As orange liquor is pumped from the reactor, it passes through an air separator before arriving at a storage tank. The polysulfide reacts with carbohydrates in the wood at the beginning of the cooking process to stabilize them against alkaline decomposition.

Running well

"The project implementation was quite good," Joronen says. "We kept the time schedule, starting up in May of this year. The MOXY process started up perfectly. We produce 9,000 m³/d with an excellent level of polysulfide. There were a few small adjustments on the digester after start-up, but nothing significant. We can report that we lost almost zero pulp during the start-up. The digester is running very well now at full speed."

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A start-up starts up...

BIG.

You would think that the people at Eldorado Brasil would stop and take a breather. This start-up company (formed in late 2009) just built a new mill on an empty plot of land and started up the world's largest pulping line (which has already produced over 1 million tonnes of prime quality pulp). But, work is underway to secure an environmental permit for a second line – which at two million tonnes per year will be roughly 30% larger than the first.

In December 2012, Eldorado Brasil inaugurated the biggest single pulp line mill (1.5 million tonnes) near Três Lagoas, Mato Grosso do Sul state. Total investment in forests, plant, and infrastructure was more than US\$ 3 billion.

As President and CEO José Carlos Grubisich views it (see side story on page 17), while the first line propels the company to being the fifth largest producer of bleached hardwood pulp, it is only the beginning. "We designed this site to support three lines in parallel, producing roughly five million tonnes of pulp per year," he says.

ANDRITZ delivered the woodyard (three chipping lines), the fiberline (digester, washing, screening, and bleaching), the two-machine pulp drying plant with baling lines, and the white liquor plant. Plus, the IDEAS process simulator and web-based training tools, which the project team called "a great benefit for fast start-ups."





▲ View of the massive Eldorado mill from the woodyard. The new 360-degree Stacker-Reclaimer is in the foreground.

The right time

Timing, according to Eldorado Industrial and Technical Director Carlos Monteiro, was excellent. “New pulp projects were frozen during the economic crisis,” he says. “We felt if we could move quickly, we could get good pricing from suppliers and start up before other announced lines.”

Guilherme Araujo, Mill Manager, adds, “In the last year, mill closures took about 1.2 million tonnes of pulp from the market. Pulp pricing is good, and the devaluation of the Brazilian Real against the US dollar has worked to our favor. This puts us in a good position to satisfy our debt obligations and achieve a good payback on the overall investment.”

The right place

In terms of logistics, Eldorado is well positioned. “About 50% of our production moves by train and the other 50% by river barge and train,” Araujo says. “The barges come back loaded with purchased wood, so this is very cost efficient.”

Forest resources are close by. Plantings began in 2006 and Araujo estimates that it currently takes about 150,000 ha to support the mill (25,000 ha per year with a six-year growth cycle). The company is planting over 50,000 ha per year in anticipation of the



“Our timing was excellent. Pulp pricing is good and the devaluation of the Real against the US dollar is in our favor. This puts us in a good position.”

Guilherme Araujo
Mill Manager
Eldorado Brasil

second line. According to Araujo, 100% of Eldorado’s forests have received certification and are in compliance with FSC (Forest Stewardship Council) norms.

A forest technology center is being built in the Três Lagoas area. “We want to increase our fiber productivity,” Araujo says, “and will use biotechnology to develop clones that are more dense so that less land area is required. Our goal is to get about 55% yield in the digester.”

Well-operating woodyard

“We had some concerns with whether the woodyard would be of sufficient capacity

because we found that our wood density is not what we predicted it would be,” Araujo says. “But there has been no problem supplying the fiberline.”

The ANDRITZ woodyard has three chipping lines with log loading decks and horizontally fed HHQ-Chippers, gyratory chip screens, and a large stacker-reclaimer system that provides a consistent flow of chips to the massive digester. “There initially were some problems with the stacker-reclaimer,” Araujo says, “but these have been resolved. The three chipping lines are perfect – they run well. As an example, we fed the digester directly from the chipping lines at 70-90%

of nominal capacity for several weeks while work was being performed on the stacker-reclaimer. There was no chip storage. I’ve never seen this level of sustained output from a woodyard.”

Pulp quality – excellent

The fiberline features the world’s largest Lo-Solids digester and a DD Washer based bleach plant. “We are very pleased with the quality of the pulp and the stability of the fiberline,” Monteiro says. “Last month, we produced 100% top quality and, in fact, set a record for the fastest achievement of quality – 43 days to reach 95% top quality on a 30-day moving average. Our daily production record so far is 4,752 admt.”

ANDRITZ is adjusting some of the lines at the top circulation of the digester to reduce vibration. “Keep in mind this digester is HUGE,” says Newton Kozak, ANDRITZ Brasil’s Project Manager for the fiberline. “The chip pumps are large and the impact of any air in the system is magnified due to the size. But all the problems are manageable. We used the experience from other projects to make modifications during erection so disruptions have been minimal.”

Almost forgotten – the white liquor plant

“We almost forget about the white liquor plant – which is a compliment,” Araujo says



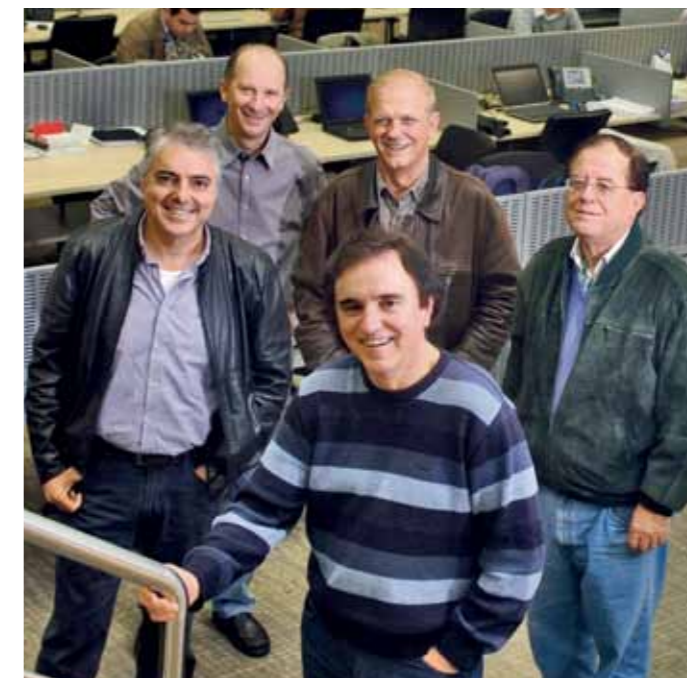
▲ ANDRITZ delivered the two-machine pulp drying plant with automated baling lines.

smiling. “We have not lost one tonne of pulp due to the plant. It is not a bottleneck, it does not cause environmental problems, and it does not require special attention. That means it is running quite well.”

Pasquale Neto, Eldorado’s General Project Manager for Recovery/Power, evaluates the project. “ANDRITZ had considerable challenges with the civil contractor (the com-

pany went bankrupt in the middle of the project),” Neto says, “but they were able to keep the schedule with very few problems during erection. We are very satisfied. This huge kiln (the largest in the world) is running with no problems.”

According to Alfredo Cunningham, ANDRITZ Brasil’s Project Manager for the white liquor plant, there is one other kiln of



◀ Carlos Monteiro, Eldorado’s Industrial and Technical Director (front center) and his team planning the second line. Left to right around him: Pasquale Neto, João Carlos Tonelli, Gilson Martins, and José Carlos Kling.

this size (165 m length and 5.5 m diameter) now under construction. "This however is the first that we have delivered with five bearing supports," Cunningham says. Other technology in the white liquor plant is the LimeGreen filter (green liquor filter), the LimeWhite white liquor filter, and the LimeDry system to wash and dry lime mud, improving heat consumption in the LimeKiln and reducing emissions.

Kid's football

Araujo says that the start-up was a time of high excitement, high activity, and long hours. "My job during a start-up is kind of like being a soccer coach," he says. "With all the new operators, it was like a kid's soc-

“Our goal was to produce 4,237 t/d on a 30-day moving average. We achieved that. I fully expect we can do better.”

Carlos Monteiro
Industrial and Technical Director
Eldorado Brasil



◀ Alfredo Cunningham, ANDRITZ white liquor plant project manager (left) and Murilo Sanches da Silva, Eldorado Recovery Island Superintendent, in front of the lime kiln, one of the largest in the world.

cer game where everyone runs around in a tight group chasing the ball. My job is to get people to stay in position and pass to one another. That is what we are doing now – positioning people in the right jobs.”

“Our team goal was to produce 4,237 admtd on a 30-day moving average,” Monteiro says. “We achieved that in August. With ANDRITZ’s continued support and a few small modifications, I expect we can get to 1.65 million tonnes per year.”

With that, Monteiro pauses to reflect – something he has not had the luxury of doing for the last couple of years. “Think about it,” he says. “This began as an empty site near Três Lagoas in March 2010. I joined the company in January of that year, and in about two years we built the world’s largest pulping line. It started up on schedule in December 2012 and we are planning the next one. Not bad!”

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Interview with José Carlos Grubisich,

President and CEO of Eldorado Brasil

Are there any advantages to being a newcomer in this business?

“There are certain advantages to being a ‘newcomer.’ The Pulp & Paper industry is a very competent and robust industry. By nature, it is capital intensive with very low returns, and has a strong, conservative culture with preconceived paradigms and conclusions. In general, the global industry does not have a strong pattern of product development, the technology evolves in marginal steps, and there have been no major innovations in the setup of the industrial footprint or in market approach.

When you approach as a newcomer – with new eyes and new ideas – you may be able to address issues in a new way. And, you may be able to find new opportunities.

One major opportunity for Eldorado is our forestry operations. This is an area that can benefit greatly from technology and innovation. We need new varieties of eucalyptus with higher cellulose content per cubic meter; we need more mechanization in planting and harvesting; and we need more sustainable, competitive operations. This knowledge will help Brazil be an even more competitive platform for pulp, panelboard, and lumber.”

Are there best practices from other industries you can bring to the pulping industry?

“My experience is in the chemical and energy industries. Coming from this background I see opportunities to introduce best practices relating to health, safety, and the environment. While the chemical industry deals with complex, and potentially dangerous, materials, the focus on safety is complementary to what I have seen in the pulping industry.

The market orientation of other industries – getting closer to customers – can be applied here as well. There are opportunities also to streamline the supply chain so that it has more of a ‘pull’ effect, rather than the ‘push’ we traditionally see.”

What are your plans for growth?

“I have a very positive view of this sector. The pulp market is growing globally and will keep growing as disposable income increases in high-population countries. Consumers of disposable paper products rarely go back to more traditional products.

Eldorado has a very ambitious growth strategy. We just started up one line and

we think we can increase the capacity of this line by about 15% during our shutdown in 2014 with only minor investments (to 1.7 million tonnes). And we are already preparing to get the environmental licenses for a second production line which will produce two million tonnes per year, and we plan to bring this on-stream in 2017. Last year, we started an aggressive planting program for this second line. We also think there will be additional demand in the market to justify a third production line in 2020 or 2021. That is a clear vision and strategy we have for the end of this decade.

“When you approach as a newcomer, you may be able to address issues in a new way. And, you may be able to find new opportunities.”

José Carlos Grubisich
President and CEO
Eldorado Brasil

We have had a very good experience with this first line. Even as a newcomer, we were

able to attract very skilled, competent, and committed people to our company. Our project was implemented on time, below budget, and has started up well. On an annual basis, we are already producing about 1.45 million tonnes a year with close to 100% export quality. We have received very good feedback from our customers.

The second line will allow us to take advantage of the infrastructure we have already built and will allow us to reduce our investment cost. This will make it an even more competitive project when we take advantage of the synergies. If we continue to attract the best brains and spirit to our company, we will be well prepared for the future.

We chose the best available technology for this mill. ANDRITZ is one of the most well-regarded technology suppliers in the industry with its experience and financial strength. And I think ANDRITZ has been able, with our own team, to execute the project according to what we agreed at the beginning. The decision to have ANDRITZ as a partner will lead us to maximum asset optimization and operational excellence as we move to becoming the lowest cost producer in the world.”



◀ (Left to right): Kari Nikunen, Production Manager; Jukka Peltonen, Project Manager; Reijo Korhonen, ANDRITZ; and Otto Greis, ANDRITZ in front of Duct Stripper equipment.

Focus on evaporators

The evaporation plant (or in the case of Sunila, TWO evaporation plants) is a logical place to look for improvements, says Kari Nikunen, Sunila's Production Manager, because it handles a considerable volume of water, and the secondary condensates from evaporation contributed about 20% of the mill's COD load.

One evaporation line was installed in 1972; the other (from ANDRITZ) in 1983. The older line did not have modern condensate segregating and stripping capabilities, so the condensate, laden with methanol (MeOH) and sulphur compounds, was not useful. "We tried to use it in the bleach plant," Nikunen says, "but the odor was too intense, indicating a high level of volatile organic compounds."

So, all of the condensates at Sunila were fed to the effluent treatment system for processing, contributing to the volume and COD loading problems. "One scenario we

looked at was to replace the evaporators," says Jarmo Rinne, Development Director at Sunila. "However, this would have been a very costly solution."

Which brings us to ANDRITZ and the importance of good timing.

Timing was excellent

According to Nikunen, "While we were analyzing the best solutions for the COD loading issue, we had a meeting with Reijo Korhonen and his colleagues on another topic. "We mentioned our COD challenge to him and he told us about a product they were developing, the Duct Stripper."

Korhonen told about the first installation of the Duct Stripper at Metsä Fibre's Joutseno mill. "Joutseno was a retrofit installation as well," Korhonen says. "Their goal was to reduce fresh water consumption by purifying lower quality condensate (B-condensate) so it could be used as process water."

Taking the load off

Stora Enso's Sunila mill reduces effluent COD load, conserves water, and taps "free" energy with this unique evaporator feature.

A new and patented development from ANDRITZ, the Duct Stripper, helps the Sunila mill in Finland cut the water volume and COD loading to its effluent treatment plant impressively. The purified condensates are used as process water in the fiberline. Green energy, created from the stripped methanol, now burned in the dedicated NCG burner, is an added bonus.

The Duct Stripper can add a highly effective weapon to any pulp mill's arsenal for solving effluent challenges, according to Reijo Korhonen, Director of Development for ANDRITZ Services and Product Group

Manager for Evaporation. "The Duct Stripper is designed for evaporators with segregative lamellas – the type used in ANDRITZ evaporators which separate cleaner condensate from concentrated streams," he says.

This new development came at exactly the right time for the good people at the Sunila mill in Finland. Jukka Peltonen, Project Engineer and Stora Enso's manager for this unique project, explains.

"Environmental compliance and good stewardship drive us to continually reduce our emissions and effluent," Peltonen says. "We were getting close to the limits on our ef-

fluent treatment plant and wanted to lower the COD load and water volume going into the plant. We did not have a specific evaporator project in mind, but were looking at all kinds of scenarios for reducing COD."

COD (chemical oxygen demand) is one indication of water quality in that it measures the amount of organic compounds in the water leaving a mill. In Finland and most other countries, COD limits are routinely tightened by authorities. "We like to be ahead of the trend," Peltonen says. "Plus, we want to have a margin for error in case there is a process disturbance."



“ We did not have a specific evaporator project in mind, but were looking at all kinds of scenarios for reducing COD.”

Jukka Peltonen
Project Engineer
Stora Enso Biomaterials, Sunila Mill



“ The Duct Stripper came to our attention at the right time. It is an effective and relatively low-cost solution for us.”

Kari Nikunen
Production Manager
Stora Enso Biomaterials, Sunila Mill

As Rinne says, “The more ANDRITZ told us, the more it sounded like a good fit for us. We knew that this would be a development project and that we might encounter problems. Especially since we have two evaporation plants and high condensate volumes. But still, the concept was good – and the timing was excellent!”

The Duct Stripper concept

Otto Greis, a Process Development Engineer at ANDRITZ specializing in evaporation systems, gives an overview of the Duct Stripper technology.

“The Duct Stripper collects secondary condensates and sprays them into a secondary vapor duct in the evaporator train,” Greis explains. “The volatile organics are stripped by the vapor flow in the duct. Mills that have installed it are experiencing a 60-85% reduction in such compounds in the vapor duct. The stripped compounds and vent gases are handled in the conventional way and can be used as a substitute fuel for the lime kiln or recovery boiler. The clean condensate, which is heated in the vapor duct (from 60-90° C), can be used for pulp washing, recausticizing, or as make-up water for white liquor production. It is a simple and flexible solution.”



▲ A birds-eye view of the ANDRITZ evaporator line (in the foreground) that contains the Duct Stripper.

According to Greis, only minor modifications are required to the evaporator. “But there are major advantages in terms of methanol and COD recovery – and fresh water consumption,” he says.

Let's do it!

Greis and his colleagues studied the Sunila process and felt that the Duct Stripper could help. “We made some preliminary calculations about how much the COD load could be reduced and felt that it would be worthwhile to proceed,” Nikunen says. “There were no big technical risks for us if

it didn't work – we could always switch it off. Plus, we have worked with ANDRITZ for many years and we know each other.”

According to Greis, “We had to study how best to handle these condensates. It was not as simple as taking one condensate stream from one evaporator and putting it through the Duct Stripper.”

The main work was performed while the evaporation plants were in full operation. Then the tie-ins were made during the mill's annual shutdown (October).

The ANDRITZ solution takes the A-condensates from both evaporation plants to the bleach plant. This now makes up about 30-35% of the water used in the bleach plant, replacing an equal amount of fresh water. The B-condensates from both evaporation plants, plus some dirty condensate from the cooking plant, are collected in a feeding tank and sprayed at three places in the back end of the ANDRITZ evaporator line. This Duct Stripper condensate is used for brownstock washing.

According to Rinne, “Almost all of the water in the wash press is now provided by the Duct Stripper condensate. The combination of A-condensate and Duct Stripper condensate has allowed us to reduce our process water intake by about 20%, which is quite significant.”



◀ Clean condensate from the Duct Stripper makes up most of the water for brownstock washing. Shown are Nikunen (foreground) and Peltonen at a wash press.



▲ (Left to right): Nikunen and Peltonen of Stora Enso with Korhonen and Greis of ANDRITZ in front of Duct Stripper equipment that has been added to the ANDRITZ evaporator line installed in the mill in 1983.

The methanol, sulphur, and other volatile organic compounds which are removed in the vapor at these three locations are routed inside the evaporator's lamellas and treated separately. The methanol is recovered and used as a fuel in the NCG boiler.

“When we first did the project, we were mostly concerned with the COD loading,” Nikunen says. “Now I am really seeing the advantages of the Duct Stripper providing an additional, free fuel source for us. It helps us save money.”

Good work – more to do

“We now see that the methanol and sulphur compounds have been transferred to the foul condensate, as it should be, and that our A and B fractions are much cleaner,” Peltonen says. “We routinely use these hot, clean condensates in our fiberline, saving fresh water and energy. We have a lower volume of water to process in the treatment plant, and there is less COD in the liquid stream.”

The Duct Stripper has allowed Sunila to substitute clean condensate to reduce fresh water demand – which has reduced

effluent flow from the evaporators by about 60%, with a methanol flow reduction of about 75%. This corresponds to a savings of about 5.5 m³ of fresh water per tonne of pulp.

“By the end of this year, we hope to reduce fresh water consumption even further, hopefully to 7.2 m³/t,” Nikunen says. “After the start-up in January 2012, we found some limits with the condensate separators. At our next shutdown, we will make small adjustments that will enable us to collect the maximum amount of the clean condensate at all three positions, so we get the full benefit of this technology.”

What would Sunila have done if the Duct Stripper was not yet on the market?

“We had some ideas how to tackle the COD challenge,” Nikunen says, “but luckily this Duct Stripper came to our attention at the right time. It is an effective and relatively low-cost solution for us – and certainly easier to implement.”

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“I am now seeing the advantages of the Duct Stripper providing an additional, free fuel source for us. It helps us save money.”

Kari Nikunen
Production Manager
Stora Enso Biomaterials, Sunila Mill

Benefits of the Duct Stripper

For one mill, the most important issue is to reduce the environmental load. For another mill, it is to reduce fresh water usage by optimizing the reuse of condensates. For another, it is to reduce energy costs. The patented Duct Stripper helps with any – and all – of these issues.

Optimal condensate quality and volume from the evaporation plant has millwide benefits:

- Less overall effluent volume
- Lower fresh water consumption
- Lower water treatment costs

And energy savings are obtained by:

- Additional methanol as a green fuel in the lime kiln or recovery boiler
- Duct Stripper condensate is heated up economically by secondary vapor

The Duct Stripper is included in all new ANDRITZ evaporation plants sold. It is delivered as a retrofit for existing lamella-based multiple-effect evaporation plants.

Glassine paper: Five Star's clear advantage

Five Star Group's Wuzhou Special Paper launched an 80,000 t/a specialty line in the fall of 2012 with glassine paper as the flagship product. ANDRITZ's pioneering ShortFlow deaeration system, the first in China, aids the mill in producing this glass-like sheet. It also provides the flexibility required for frequent grade changes while consuming less energy and chemicals.

Zhao Lei, General Manager of Wuzhou Specialty Paper (left), with Wu Xiaoyan, Marketing Specialist with ANDRITZ China, in front of the ANDRITZ ShortFlow deaeration system. At this mill, extreme grade changes from glassine to wallpaper base stock and blueprint grades happen fast. The ANDRITZ ShortFlow deaeration technology provides this flexibility. ▶



Wuzhou Special Paper's new facility in Quzhou (Zhejiang Province) in China is located near its sister company, Wu Xing Paper, which operates three machines producing specialty products from cup stock to packaging grades. Now producing over 320,000 t/a, the Zhao family, owner of both mills, continues to develop as a homegrown specialty paper producer.

Since launching their paper enterprise in 2002, the Zhao family has looked for market opportunities where growth is strong, and imported products are high. They captured a formidable share of the cup stock business, including self-serve containers of noodle dishes found at railway stations, small shops, and supermarkets throughout China.

More recently, the family decided to delve deeper into specialty grades: this time by producing low basis weight glassine grades – with the flexibility to switch to higher weight specialties on short notice. So, the flagship product of the Wuzhou Special Paper mill

is glassine, a very thin, usually translucent, paper used in food services, packaging, and other specialty products. In addition, the machine produces a limited amount of wallpaper base stock and blueprint grades.

“Our specialties focus, with a range of products and frequent grade changes, made us an ideal candidate for the ANDRITZ ShortFlow deaeration system,” says Zhao Lei, General Manager of both Wuzhou Special Paper and Wu Xing Paper. “Flexibility in meeting customer requirements is one of our core goals. The compact, multi-tasking ShortFlow system helps us switch from one grade to another very quickly. This way we can respond fast and efficiently to a wide range of customers.”

The ShortFlow difference

Complete deaeration of stock and wire water is standard practice on high-speed paper machines, particularly those producing printing and writing grades. Air removal, at least partially, has become increasingly important for other grades as well.



◀ The Zhao family's initial success has largely been built around cup stock and packaging grades. In 2010, the family made a bold decision to pioneer again with domestic production of glassine. Zhao Yunfu, President of the Five Star Group (left), and his son-in-law, Zhao Lei, General Manager, are holding samples of their new glassine paper. At center the happy, prosperous Buddha made of yew wood.

“Because we have invested in the best technology, we can modify our products according to customer specifications.”

Zhao Yunfu
President
Five Star Group

“We see a window of opportunity in China for glassine grades. Many of our customers now use glassine products inside of their packaging.”

Zhao Chenjia, Finance Leader
Five Star Group



▲ Even though the Five Star Group began only a decade ago, their Wu Xing operation is already a leading producer of cup stock. Shown are Zhao Lei, General Manager (left), with his wife Zhao Chenjia, Finance Leader.



▲ A complete paper machine approach system from ANDRITZ is also in place. A ModuScreen headbox screen plays an important role in delivering stock to the new machine.



◀ Papillon stock prep refiners reduce energy costs and gently treat the fiber to ensure desired properties in the sheet.



▲ Headquartered in Quzhou, Zhejiang Province, China, Five Star's Wuzhou Special Paper and Wu Xing Paper are located near their customer base.

“There are many applications where complete deaeration is not essential, such as specialty and packaging grades,” says Ari Pelkiö, Chief Technology Manager for stock preparation and machine approach systems at ANDRITZ. “However, removal of air and entrained gases in the wire water offers big benefits even for these grades. The ShortFlow deaeration system is an advanced solution for partial air removal, combining the functions of the white water silo and deaeration into one compact unit.”

The patented ShortFlow deaeration system collects water from the wire and former in a deaeration tank, where a vacuum is applied. Water from the machine is transferred to the deaeration tank through transition pipes and enters the tank through a vacuum space above the liquid in order to prevent air submergence. Unlike a traditional deaerator, such as the ANDRITZ Deculator, boiling point vacuum is not required. A single vacuum pump system is sufficient and no

condenser is required. Deaeration performance can be easily adjusted to match the requirements of the paper machine and the grade being produced.

According to Jiang Weiqiang, for Fiber Preparation, ANDRITZ China, “The ShortFlow deaeration solution at Wuzhou Special Paper simplified their ability to produce high quality paper with minimal energy consumption. And, with small tank volumes. The system itself is compact with a small footprint. It does not require a special mezzanine. Only short piping runs are needed because this compact unit is placed next to the wet end.”

Clear potential

Zhao Yunfu, President of the Five Star Group, says, “China consumes more than 100,000 tonnes of glassine paper annually, but only 50% is made domestically. We have already secured a large contract with a leading label producer, and have locked in business with various food brands which

use our products inside their packaging packages.”

This fast penetration in the domestic market is a direct result of Five Star Group's success in the pressure sensitive label market. Five Star supplies this label stock to factories in China and elsewhere. “Our customers have learned to expect consistent high quality, and appreciate our ability to meet their needs for short runs,” Zhao Yunfu says. “Because we have invested in the best technology from stock preparation through supercalendering, we can modify our products according to customer specifications.”

“We see a window of opportunity in China for glassine grades,” adds Zhao Chenjia, Finance Leader, who is the wife of Zhao Lei and daughter of Zhao Yunfu. “In addition to our labels, many customers can now use our glassine products inside of their packaging. Food products especially benefit from glassine's grease resistance and abil-

ity to slow the passage of air. Brand leaders of cookies and snacks like us for these reasons.”

Short response

“Critical to our ability to be competitive is quick grade changes,” says Zhao Lei. “This is challenging because our basis weights range from 30 to 80 gsm, and sometimes even higher. The ShortFlow deaeration system is a principal reason for our good sheet formation no matter what the grade, and the flexibility we have in making quick changes.”

Being smaller and simpler by design means less flow volume, which contributes to simplified operation. That is the essence of the ShortFlow deaeration technology according to Ari Pelkiö, Chief Technology Manager for stock preparation and machine approach systems at ANDRITZ. “The smaller volume of deaerated water represents a huge simplification compared to conventional systems,” he says. “In addition to faster

grade changes and less transitional paper or broke, less defoaming chemicals and biocides are required. Energy consumption goes down, too. These are all benefits that every papermaker wants.”

While Pelkiö is quick to point out that the ShortFlow technology is not suitable for applications that require complete deaeration (for example printing and writing grades on large, fast machines), it is beneficial for grades where partial deaeration is sufficient, such as specialties and packaging. “For Wuzhou's machine running at about 750 m/min and producing these specialty grades, it is a perfect match at a much lower investment,” he says.

Another factor in the success at Wuzhou Special Paper is clean pulp, achieved with the stock preparation system from ANDRITZ. In addition to delivering the ShortFlow deaeration system, ANDRITZ provided thick stock screening, a stock

blending system, machine screens, broke handling, and stock refiners.

Look for more pioneering and growth

Looking forward to growth in glassine paper sales, as well as the production of additional cup stock capacity at the mill, Wuzhou Special Paper is already considering installation of a second machine.

“Since we are a family, we are able to make important decisions quickly,” says Zhao Lei. “We are all in this business together, so we share the credit when it's deserved, and we accept responsibility when we don't meet goals.

“Two generations give us another advantage,” concludes Zhao Yunfu. “Perhaps you will see even a third generation at Five Star a few years from now.”

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Wood 2012 prepares Skoghall for the future

The Wood 2012 project replaced an old woodyard at this Stora Enso mill in Sweden – improving the fiber supply and creating a modern, safe wood processing operation. ANDRITZ delivered the key production equipment in the woodroom.

This EUR 90 million investment modernized the fiber infrastructure at Skoghall, one of the world's largest manufacturers of packaging board for foodstuffs. It is estimated that one in six paperboard packages in the world containing liquid is made from paperboard produced at Skoghall. In addition, the mill produces CKB, a paperboard for packaging dry foodstuffs. The integrated pulp mill produces 330,000 t/a of kraft and 260,000 t/a of CTMP.

After the Wood 2012 investment, chip capacity and quality increased, while the overall operation was made more efficient. Skoghall consumes about 2.3 million m³ of logs and sawmill chips per year. After the project, the mill's capacity to produce chips increased 40% to about 1.9 million m³ per year.

Equipment at end-of-life

It was in 2008 that the mill began planning for a new wood processing facility. "We were running into a dead end with our old woodroom," explains Eva Reiner, Skoghall's Project Manager. "It was built in 1971 and modernized in stages, but much

of the equipment was at end-of-life. Logs were fed to the debarking drum by an overhead crane. Authorities advised us that it would have to be replaced in 2012 as it had reached the limits of safe operation."

Another challenge was that the capacity of the old woodroom was too small and a significant amount of chips were purchased. "Our chip supply was affected by seasonal factors," Reiner explains.

A better location

According to Reiner, by moving the wood processing operations from a cramped location inside the mill to land adjacent to the mill, she and her team could create adequate space for log receiving, chipping, storage, and conveying.

"A big challenge for us was finding the right location for a modern woodyard," Reiner says. "It was decided to utilize some land just north of the mill (site of a former sawmill and a paper chemical preparation plant)."

A 700 m long conveyor bridge, partially over water, would be required to transport chips between the new site and the mill,



“We were running into a dead end with our old woodroom. Much of the equipment was at end-of-life.”

Eva Reiner
Project Manager Wood 2012
Stora Enso Renewable Packaging, Skoghall Mill



▲ Eva Reiner, Skoghall Project Manager

where a new chip screening room would be constructed. In total, around 5 km of conveyor belts were built.

"The relocation was definitely worth it," Reiner says. "Storage volumes of logs and chips increased dramatically, and more logs can be delivered directly to the mill without being reloaded at wood terminals. About 45,000 m³ of wood can be stored here now, corresponding to a full week's production."

In the starting blocks

"At first we looked at a two-line concept, but this would have had too much capacity and the investment cost would be high," Reiner says. "So, we finally decided on one large debarking drum with two chippers – one for CTMP chips and one for kraft mill chips."

In order to meet the schedule for overhead crane shutdown, Skoghall would have to do the tie-ins during the annual shutdown in November. So, backing off that date, the planning team determined that the project would need to start in the spring of 2011. Skoghall received Board approval for the

◀ Eva Reiner and Stefan Marklund, ANDRITZ Sweden's General Service Manager for wood processing, inspect the new ANDRITZ Waplans debarking drum. The hydrostatic components in the drum replace rubber tires or steel wheels.



▲ There are two parallel HHQ-Chipper units at Skoghall – one for kraft and one for CTMP chips. A unique switching arrangement allows logs to be easily conveyed to either of the chippers depending on production needs.



▲ Reiner and Marklund talk with operators in the modern control room.

investment in April. “We were in the starting blocks ready to go, just waiting for investment approval,” Reiner says. “As soon as we got it, we signed contracts with suppliers – and they began immediately on the work.”

On time, high quality

From an implementation point of view, Reiner is pleased with the work of ANDRITZ. “The erection proceeded well,” she says. “We had a good and open relationship with Taisto Salakka (ANDRITZ Project Manager) and his team. The woodroom started up well and on time. We faced some challenges together during the checkout phase, and we have had some challenges after start-up, but ANDRITZ has been very supportive. We get good support from their local people as well.”

The wood processing operation started up as planned in November 2012. “We cut the conveyors from the old woodroom and then started up the chip handling equipment on the mill side on November 5, 2012,” Reiner says. “Then we brought the new systems on this side online on November 8, 2012.”

This was Reiner’s first experience working with ANDRITZ and was, in fact, her

first major project at the mill. “ANDRITZ is certainly well-known to me,” she says. “The company has good technology and has made some good improvements to that basic technology over time.” Reiner and her team visited the ANDRITZ reference site in Varkaus, Finland (another Stora Enso mill), where they met with the mill production team.

Scope of the project

All the wood used at Skoghall comes by road or rail. Transporting wood by rail is more economical. “The Wood 2012 project gives us the opportunity to increase the proportion of wood that comes by rail to the mill,” Reiner says. “A significantly larger woodyard also provides logistics improvements that save us money.”

Log stacker trucks are now used instead of an overhead crane. “The trucks weigh 80 tonnes each and can lift an entire load of logs from a train or truck,” Reiner says. “Our operators are multi-disciplined and rotate jobs. They now have a new skill – stacker truck drivers!”

The investment also brought a de-icing system to the mill for the first time, with the equipment coming from ANDRITZ. The de-

livery includes a 60 m long PowerFeed in-feed conveyor, where the logs are sprayed to wash away impurities. Hot water is used in the winter time to de-ice the log surface.

An ANDRITZ Waplans type debarking drum (5.5 m diameter and 42 m length) is used for debarking. This Waplans drum has a single drive and two hydrostatic support units. The hydrostatic design replaces rubber tires or steel wheels. “The drum literally floats on water as it rotates,” say Stefan Marklund, ANDRITZ Sweden’s General Service Manager for Wood Processing, “with very low wear and high reliability. Most of the mills in Sweden prefer this type of drum design.”

After the debarking process (up to 6 m length logs), it is a rather unique switching arrangement where the logs can be easily conveyed to one of two ANDRITZ HHQ-Chippers – one for CTMP and the other for kraft. “We run the CTMP chipper about 25% of the time,” Reiner says.

Logs are fed horizontally into the HHQ-Chippers. CTMP chips are cut to a length of 23 mm and kraft chips to 28 mm. The beauty of this switchable input to the chippers is that the mill can keep producing

chips during a knife change on one of the chippers. The chippers are provided with HQ-Plus knife systems and the mill has a knife service contract with ANDRITZ.

ANDRITZ also delivered the bark and water handling systems for the woodroom. Bark is crushed with ANDRITZ BioCrusher, pressed to reduce moisture, and then conveyed to the mill’s biomass boiler.

Problems solved

“This project solved a number of problems for us,” Reiner says. “First, it improved our fiber supply and put more of it in our direct control. We can handle up to three railway deliveries per day instead of just one. Chip quality is much improved since we are now using state-of-the-art production equipment.”

Performance tests were recently completed. The debarking drum performed well in quality and capacity. The capacity

With its new woodyard, Skoghall can now handle up to three railway deliveries per day instead of just one. ▼



▲ Reiner (left) and Marklund in the new woodroom at Skoghall.

“Chip quality is much improved since we are now using state-of-the-art production equipment.”

Eva Reiner
Project Manager Wood 2012
Stora Enso Renewable Packaging, Skoghall Mill

is 345 m³ sub/h under bark for kraft and 265 m³ sub/h for CTMP.

Recently, Skoghall ordered an online ScanChip analyzer from ANDRITZ and is in the process of installing it now. According to Marklund, “ScanChip helps operators produce consistently high chip quality while minimizing unwanted chip fractions or waste. It includes the world’s first optical chip analyzer that works online. Chip samples are taken at regular intervals. Through laser triangulation, the computer measures the length, width, and thickness of each sample chip with absolute exactness. Operators can calibrate knife chipping angles, fine-tune feed rates, and determine exactly when to make knife changes. This will help Skoghall get maximum yield from their wood raw material and improve their profitability.”

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New OCC line for “Satay Town” packaging producer

Muda Paper is a well-known name in the Malaysian market and has been a pioneer in producing many packaging grades in the region. Muda selected ANDRITZ to supply a new OCC processing line for its Kajang mill.

Kajang, a town just 21 km from the Malaysian capital of Kuala Lumpur, is known as “Satay Town,” famous among tourists and locals alike for its skewered barbecued meat. A few townships have been developed in Kajang, such as Sungai Chua, where Muda Paper’s Kajang mill is located.

Muda Paper started its presence in Penang in 1964 and is considered a Malaysian pioneer producer of various paper grades such as testliner, corrugated medium, laminated chipboard, coreboard, grey chipboard, yellow wrapping paper, insertion paper, manila paper, and machine-finished kraft paper.

The merger of the two mills, Tasek and Kajang, six years ago formed Muda Paper. With a recently installed second-hand machine (PM6) at the Kajang mill, the production capacity of Muda Paper is now 500,000 tonnes per year, 300,000 of which comes from the Kajang mill.



▲ Ang Lee Yan, Advisor to Muda Paper

The Kajang Mill

Tan Sri Lim Guan Teik, Chairman of Muda Holding, played an important role in determining the location of Kajang mill. He and his team surveyed several locations before

selecting the site near Sungai Chua. “Paper mills require big volumes of water,” says Ang Lee Yang, Advisor to Muda Paper. “So, when our Chairman visited this site, his first priority was to see the nearby river.”

The presence of a 2.5 acre pond further influenced the decision to build the mill near Kajang. Using a channel and gravity to flow water into the mill, it lowered costs and promoted energy efficiency at the beginning. Later, the pond was filled in with dirt and now the building for PM6 is on top of it.

With the environment in mind, the management of the Kajang Mill has ensured that the quality of water discharges from the mill meets the highest standard, with an investment of RM 30-40 million (EUR 7-9 million) spent on treatment of wastewater. “The fact that our mill is upstream



◀ ANDRITZ supplied a full OCC line – from pulper to thickener – as well as the machine approach system, headbox screen, and the silo design for PM6 which produces corrugated medium.

“The fact that we are located upstream of a water catchment area ensures that our wastewater discharge quality is Standard A.”

Soi Gar Lock
Mill Manager
Muda Paper, Kajang Mill

of the government area ensures that our wastewater discharge quality is Standard A,” says Soi Gar Lock, Mill Manager of Muda Paper.

The Kajang Mill takes full advantage of the waste paper resources in nearby Kuala Lumpur. The waste paper supply is able to provide the raw material for PM6. Prior to the installation of PM6, the mill consumed about 500,000 tonnes of waste paper every year.

PM6 – From Wales to Kajang

Coming from a small town in Wales, PM6 was previously owned by the St. Regis Group. It was connected to a pulp mill operation, so it would have to be reconfigured for the production of Muda Paper’s packaging grades. The machine was purchased at the end of 2007. However, the dismantling was put on hold for five months until the end of the winter season in Wales. In June 2008, the dismantling of PM6 began.

The most difficult task was to match-mark all the parts so that they could be properly reinstalled. In total, 120 containers were used to ship the dismantled machine to Malaysia.

The impact of the US economic recession also slowed the installation of PM6 at its new home. During the recession, Muda Paper’s sales dropped by 30%. Installation of PM6 began in late 2009. The process was completed in December 2010. The start-up began the following year and production has been going since.

A team from Muda Paper evaluated potential suppliers. “We put ANDRITZ on our shortlist because they had very good references, especially in China,” Mr. Soi says. “Initially, we had an opinion of ANDRITZ as being high-ranking and high-priced. Many years ago they proposed some modifications for us, but at that time our suppliers were mainly from Japan and Taiwan.”



▲ Soi Gar Lock, Mill Manager at Muda Paper

The situation changed after ANDRITZ China was established and began to build up capabilities. A positive factor, according to Mr. Soi, was the quality of ANDRITZ’s proposal and the cost structure permitted

by delivering some of the key equipment from China. The appointment of a local sales agent, Ro-Quip Engineering, also convinced Muda Paper to take a new look at ANDRITZ.

The OCC project with ANDRITZ

ANDRITZ supplied a full OCC line – from pulper to disc filter – to process furnish for the production of corrugated medium. ANDRITZ also delivered the machine approach system, headbox screen, and the silo design for PM6.

The capacity of the LOCC (local old corrugated containers), AOCC (American old corrugated containers), and MW (mixed waste) line is 600 admt/d. The furnish is dedicated to PM6, running at 650 m/min with a basis weight range of 105-180 gsm.

The pulping is accomplished with an ANDRITZ FiberSolve pulper. Following the pulper is a high-density cleaner plant (Ahl-Cleaners) to remove coarse contaminants, followed by a coarse screening plant (Modu-Screen units). A ModuScreen is also used for fiber fractionation and then the stock is fed into a low-consistency cleaner plant before fine screening and thickening in an ANDRITZ disc filter. Rejects are dewatered, while the clean stock is fed into a Modu-Screen headbox screen before entering PM6.

The start-up went smoothly and was on time. On October 22, 2010, the pulper began operation. Within one-half hour, the rejects handling system was activated. Stock was being fed to the storage tower in a matter of hours that same day. PM6 began operation with stock from the new OCC plant on the wire on October 28, 2010.

Good support

In addition to the support and training from ANDRITZ during commissioning and



◀ Soi Gar Lock, Mill Manager (left), and Huo Xianzhao, Sales Manager for ANDRITZ China, inspect the corrugating board produced on PM6.

“ANDRITZ has been very responsive. Any problem we encounter, they are ready and able to help.”

Ang Lee Yang, Muda Paper Advisor

start-up, Mr. Ang was impressed with the responsiveness of the local organization. “The local agent provides us good support and service,” explains Mr. Ang. “And also very fast response because this is always important.”

Mr. Ang was particularly impressed when ANDRITZ China hand-delivered some spare parts needed for the project. “In addition to reliable equipment,” he says, “one important consideration is long-term service. ANDRITZ has been very responsive. Any problem we encounter, they are ready and able to help.”

Future collaboration

Happy with the stock preparation technology and ANDRITZ China’s service, Mr. Soi hinted at future collaboration. For its part,

ANDRITZ succeeded in installing the OCC line in the shortest possible time with a very smooth start-up, and the usual ANDRITZ quality. An important element of the start-up was the training of the mill’s operators and maintenance people to maintain the quality and minimize wear.

The relationship between Muda Paper and ANDRITZ for this project was one of efficient supplier and satisfied customer. It is like the situation of a satay seller and a satisfied diner who comes back again for more delicious skewered barbecued meat which has made Kajang famous among locals and foreign tourists.

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Keeping it simple. Making it profitable.

To enable this cartonboard producer to increase production of containerboard, ANDRITZ retrofitted a Twin Wire Press and supplied new drying cylinders. The retrofits were not complex, but exceptionally effective.

▲ ANDRITZ replaced more than 30 cast iron dryer cylinders with new steel ones to increase the throughput of PM4.

The Varel mill is located in the north-western corner of Lower Saxony in Germany. It is one of the largest paper and board producing facilities in Europe – using recycled fiber to produce 850,000 t/a of paper and board on its four production lines.

Even with this high level of output, mill management was eager to increase production of testliner and white-top liner. ANDRITZ assisted in the expansion.

Market-driven

Based on marketing studies showing increased demand for the higher grades

of testliner, fluting, and white-top, Varel’s management decided to invest in a capacity expansion of PM4, a 5.10 m wide machine producing a wide range of grammages (100 to 200 g/m²).

Uwe Wollschläger, one of the four managing directors of the mill, and his colleagues sought advice from ANDRITZ and what could be upgraded to increase throughput of PM4. ANDRITZ had been a supplier of technology and services to Varel for many years, delivering a Twin Wire Press for dewatering recycled fiber in the stock preparation plant in 1987, as well as screens, screen baskets, and refiner plates on a regular basis.

“We make it a point to periodically improve our key machines to obtain the newest technological advantages and increase our output and quality,” Wollschläger says. “This helps us extend the life, and the economic return, on our existing equipment.”

Working within constraints

The project scope around PM4 included expanding the amount of pulp available (by eliminating bottlenecks in the dewatering process) and extending the drying capacity of the machine. Like virtually any retrofit and upgrade project, the work at Varel would be constrained by space and time.

According to Oliver Kern, Varel's Production Manager: "We have been happy with the Twin Wire Press as it has been operating well for many years. While we needed to increase throughput from approximately 220,000 to 300,000 tonnes, we also needed to maintain the outlet dryness of at least 30%."

The other potential complication, according to Kern, was that the drying capacity expansion on PM4 would be constrained by the location of other downstream machinery. "We were not going to move our slitter rewinder operation," he says. "So the space limit for machine extension was no more than 15 meters."

Dewatering upgrade

ANDRITZ had a ready solution for expanding the capacity of the old Twin Wire Press while maintaining the high outlet dryness required. According to Karsten Laatz, ANDRITZ's service sales manager for Germany, "One key to increasing capacity in an older press is to modify the wedge sec-



"We make it a point to periodically upgrade our machines to obtain the newest technology."

Uwe Wollschläger
Managing Director
Papier- und Kartonfabrik Varel

tion," Laatz says. "Older presses have a rigid wedge zone where the inlet and outlet gaps are fixed. We have an innovation for this which is standard on new presses, but can also be retrofitted to existing ones."

That innovation is called a Floating Wedge. Laatz explains: "In our design, the bottom part of the wedge is fixed and the top part is separated from the machine frame so that it can self-adjust to the pulp mat. At the outlet end, the top wedge virtually floats on the mat. This allows smooth, fine adjustments of the inlet gap and the dewatering pressure."

Variations in the flow or consistency of the pulp feed are compensated to increase throughput, consistency, and process stability. This helps increase the effectiveness of the dispersing system.

According to Ewald Kulhanek, Product Manager for wire machines at ANDRITZ, the drive roll system was also upgraded.

ANDRITZ rebuilt Varel's Twin Wire Press which was installed in 1987 to increase capacity from approximately 220,000 to 300,000 tonnes while maintaining the desired outlet dryness. This included an upgrade to a Floating Wedge design, rebuild of the drive roll press nip, a new wire regulation system, and re-cladding of all the press rolls. ▼



◀ (Left to right): Karsten Laatz, ANDRITZ's Service Sales Manager for Germany; Hartmut Langner, Varel's Paper Production Manager; Oliver Kern, Varel's Production Manager; and Georg-Michael Sautter, ANDRITZ's Director of Sales for paper and board machines in front of the newly rebuilt drying section of PM4.

Extended drying capacity

"With PM4 now upgraded, we see about approx. 40% capacity increase," Kern says. "We expect to be able to go even further when we see the right signals in the market."

Replacement of more than 30 of PM4's cast iron dryer cylinders with new steel ones manufactured by ANDRITZ – together with the addition of more cylinders – led to a considerable improvement in throughput and efficiency of the machine.

According to Georg-Michael Sautter, Director of Sales for ANDRITZ's paper and board machine business, the cylinders were custom-designed to fit the Varel machine. "Due to the special design of our manufactured steel cylinders, compared to the old cast iron ones, Varel can now use the width of the cylinder surface to create a uniform drying profile across the sheet, especially at the edges," Sautter says. "These cylinders have a high-performance design to increase drying rates without increasing energy consumption."

Sautter explains that steel is a better heat conductor than cast iron (5-7% improvement). "Fewer steel cylinders are required than cast cylinders to achieve the same drying capacity," he says. This was a real advantage for the PM4 project, since space was limited. Then, too, there is the safety issue. Even the smallest crack in a cast iron unit can be potentially dangerous due to the explosion tendency of cast. The elasticity of steel is a major safety factor."

"The ANDRITZ upgrades to our Twin Wire Press and the upgraded drying cylinders are simple and effective," Kern says. "It is amazing to think sometimes just how much keeping it simple really works."

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"Usually, the outlet dryness of the press will drop as production of the machine is increased," he says. "The drive load required for increased production rates will be higher, making it impossible to transmit enough torque by the angle of wire wraps only. The wires will start to slip."

So, ANDRITZ's solution was to rebuild the existing drive roll to a drive roll press nip system. Nipped drive rolls create a stronger grip on the wire which, in turn, increases outlet dryness due to the additional high-performance nip.

Actually, the entire drive system was improved. Each drive roll is now driven by its own gearbox, motor, and frequency controller. The master drive is speed-controlled from the production rate setpoint and control of the slave drives is synchronized. In addition, the upgrade included the addition of a new wire regulation system and the re-cladding of all press rolls with stainless steel. Three of the press rolls were grooved to handle the higher filtrate quantities created by higher production.

Seamless installation

"It is a simple solution, but one that has worked perfectly for us," comments Hartmut Langner, Paper Production Manager at Varel. "We got the results that we expected, and in the time required. Good communications and good cooperation with ANDRITZ helped us work seamlessly."

Service and upgrade work on the Twin Wire Press was completed in June 2012. "ANDRITZ did virtually all the work on-site, with the exception of the re-cladding and grooving of the rolls," Langner explains. "The actual time for the rebuild was about one week. The work was completed without delays."

"We are now getting considerably increased production, precisely along the lines we originally demanded," Kern points out. "We are seeing greater efficiency in the disperser following the upgraded press. The filtrate from the press is very constant and stable, so the processes utilizing this filtrate as dilution water have improved. ANDRITZ's innovations are performing just as expected."

A reincarnation in Russian packaging

The SFT Group and ANDRITZ have completed a remarkable project together. They took on a major challenge of dismantling a graphic paper machine in Finland, transporting it, and reincarnating it as a packaging machine in Russia.

▲ The SFT Group produces 460,000 t/a of paper and board and 460 million m² of corrugated packaging. It is vertically integrated from recovered paper collection to converting.

As soon as you enter the gates of the SFT Group's Kamenskaya paper mill midway between Moscow and St. Petersburg, you come to the realization that this is no ordinary manufacturing site. This mill has been through a huge amount of change. The signs and relics around the mill speak of a very colorful past. The mill started in 1799 as a writing paper plant and has been bought and sold a number of times. Once it was lost as part of a gamble. It was even completely dismantled, moved, and re-erected in the Ural Mountains.

Stability arrived when the SFT Group bought the mill in 2003. The Group currently produces 460,000 t/a of paper and board, and 460 million m² of corrugated packaging. Stepan Khomyakov, CEO of the SFT Group, says: "Our Group is focused on the packaging business – vertically integrated with wastepaper collection, mills, and converting facilities. It is a challenging business, but a good business. Russia is becoming more and more a country of



"We needed more capacity, but a brand new machine was out of the question due to the capital required."

Roman Steinberg
Director for Investments
SFT Group

consumers, and more consumption means more packaging."

To meet this growing need, the SFT Group's products are used for packaging everything from food to televisions. Because the Russian recovered paper market is underdeveloped – with a collection rate of only 5% per household and a high ratio of virgin

fibers used in containerboard production – the quality of the raw material is excellent.

Stability doesn't mean standing still
The SFT Group has high ambitions: to produce some 700,000 tonnes of paper and board and 800 million m² of corrugated packaging annually by 2018, which will make in number one in Russia.



▲ PM originally came from Finland, where it produced machine-glazed kraft paper. ANDRITZ integrated parts of the old machine, including sections that required refurbishing and upgrading, with its own paper machine technology to deliver a state-of-the-art packaging machine.

Working towards this goal, Roman Steinberg, Director for Investments for the SFT Group, explains the latest project. "We needed more capacity, but a brand new machine was out of the question due to the capital required," he says. "So we kept a close eye on the secondhand market, and eventually a shuttered graphic paper machine in Finland came to our attention."

The machine came from UPM's Kymi mill, where it produced machine-glazed kraft paper. With a trim width of 4.6 m and speed of 1,050 m/min, the machine seemed to be the perfect choice for the SFT Group's expansion requirements. The decision was made to purchase what was to become PM7 at Kamenskaya.

ANDRITZ was chosen as the company that would be instrumental in handling the complex project. Says Steinberg, "We chose ANDRITZ because we had a successful association with the company, and they were capable of taking the whole project



◀ Left to right: Raisa Zaikova, Kamenskaya Paper Mill; Karl Eickhoff and Klemens Unger, ANDRITZ; and Roman Steinberg, SFT Group; check the formation of the finished product.

from dismantling in Finland to erection and optimizing in Russia, and everything in between.”

“We needed a master plan”

ANDRITZ received the order in June 2011 and soon afterwards dismantling of the machine began. But, this was no ordinary dismantling, according to Klemens Unger, Lead Project Manager for ANDRITZ. “Not only did the thousands of parts from this 1970’s machine have to be painstakingly catalogued and marked for re-assembly,” Unger explains, “but all the parts needed to be checked and overhauled quickly to keep the very tight time schedule.”

Karl Eickhoff, Senior Vice President, Second Hand Solutions, and a key player in the project explains: “For a complex project like this, we developed an overall master plan document where we basically broke the machine down into functional sections, and then analyzed each part to make sure we could salvage as much as possible from the old machine. The goal was to save the SFT Group as much money and time as possible, while still getting the parts ready in time for installation.”

Overhaul of the old machine began in August 2011 in Finland. “In the case of this machine,” says Eickhoff, “since it had been



shut down for five years, there were quite a few parts that needed rework.”

The transportation of the machine to its new home in Russia took place in November and December of 2011. The logistics required 280 containers and 20 specially adapted trucks for the two-day journey. After the civil work, which included the dismantling of two old paper machines, installation of PM7 started in May 2012.

Turbo-boosting and future-proofing

To help establish the Kamenskaya mill as a world class packaging producer, ANDRITZ added its own technology to turbo-boost the production line. The machine was built up to state-of-the-art by integrating cur-

“ We were told by a consultant that this project would take a minimum of three years. Together with ANDRITZ, we completed it in 23 months.”

Raisa Zaikova
Executive Director
Kamenskaya Paper Mill

rent technology from ANDRITZ with refurbished and upgraded sections from the old machine. “It was not just a matter of putting old and new together,” Eickhoff explains.

“The UPM machine contained equipment from Metso, Voith, Honeywell, and others,” explains Unger. “It was our challenge to integrate parts from these various suppliers with our own ANDRITZ paper machine technology. But the result speaks for itself.”

In the press section, a *PrimePress X* shoe press was installed to obtain maximum dryness and improve sheet properties. More improvement in drying comes with an extension of the original dryer section, adding new and refurbished dryers, and installing a *PrimeRun* web stabilization system. ANDRITZ also upgraded the winding diameter up to 2.7 m and automated the roll transportation and reel spool return.

There was also some future-proofing incorporated into the wire section of the machine. Since the SFT Group’s plan is to produce a two-ply liner, ANDRITZ lengthened the dewatering area of the wire to allow for the addition of a top layer forming unit in the future.

The end result, according to Eickhoff, is a state-of-the-art system. “Not only the packaging paper machine itself, but the entire line,” he says. As part of the project,

“ Russia is becoming more and more a country of consumers, and more consumption means more packaging.”

Stepan Khomyakov
CEO
SFT Group



▲ Left to right: Sergey Semyonov, Kamenskaya Paper Mill Technical Maintenance Manager; Mikhail Kozlov, Kamenskaya Paper Mill Production Manager; Roman Steinberg, SFT Group Director for Investments; Raisa Zaikova, Kamenskaya Paper Mill Executive Director; Karl Eickhoff, ANDRITZ; and Klemens Unger, ANDRITZ, in front of PM7.

ANDRITZ delivered a new recycled fiber processing line with a capacity of 800 t/d of 20% mixed waste and 80% OCC. ANDRITZ also installed a new machine approach system, including three-stage headbox screening, a save-all disc filter, and under-machine pulpers.

Commissioning of the machine began in March of this year, and the first paper was on the reel June 11, 2013.

“We are already influencing the Russian market”

Raisa Zaikova, Executive Director of the Kamenskaya Paper Mill, says: “This was a very big project for us, but it was one of the biggest of its kind for ANDRITZ as well. In terms of the timeline, we are completely delighted. We were told by a Finnish consultant that this project would take a minimum of three years. Together with ANDRITZ, we completed it in 23 months. We are delighted with the quality, and so are our customers. We are not yet up to the design speed 1,050 m/min, but we know that ANDRITZ will help us achieve that in the near future.”

“ANDRITZ Automation’s control systems have contributed to our quality improvement,” says Steinberg. “We can control the quality more easily. This is not only noticeable to our customers, but to our competitors as well. We are seeing signs that they want to follow us down this route, and already they are offering special deals. This project shows that the SFT Group is having a major influence on the market.”

Working together – we create the future

Before this project, the Kamenskaya mill was rarely visited by others from around the world, and English was mostly unrecognized. Steinberg explains, “With ANDRITZ involved, the many meetings about the project were a new arrangement for us. ANDRITZ was patient with us, sharing their knowledge. We reached a common understanding. I can’t say that the team speaks English now, but they can communicate well with the assistance of Google Translator!”

“This was not just an equipment supply deal,” Unger remarks. “A true spirit of partnership was a common goal. Yes, it was full



▲ ANDRITZ also delivered a new recycled fiber processing line and machine approach system with a capacity of 800 t/d to bring high-quality stock to PM7’s new headbox.



▲ It was a challenge to integrate parts from various suppliers with ANDRITZ paper machine technology.



▲ ANDRITZ Automation integrated existing and new features into its DCS and QCS systems.

of challenges but both teams were committed and both shared a common vision.”

It seems the project can be summed up with the SFT Group’s own mission statement: “Working together – we create the future.”

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GREEN POWER SHOW

In March 2013, Iggesund Paperboard's new biomass boiler came online with the result that the mill is now virtually fossil fuel-free. The bubbling fluidized bed boiler and complete woodyard were delivered by ANDRITZ.

The drive to Iggesund Paperboard's Workington Mill, part of the Swedish Holmen Group, takes you through some of England's most dramatic and natural scenery – mountains, lakes, and sparkling streams flowing down to the coast of the Irish Sea. Situated on the edge of the county of Cumbria – the "Lake District" as it is more popularly known – the Workington Mill sits right in the middle of what can only be described as a "green power show." Wind turbines dot the shoreline, generating power for energy giant E.ON. Renewable energy is very big around here.

Igesund's Paperboard's mill with its brand new woodyard may look to the uninitiated just like any other big new factory. However, to those in the know, this is one of Britain's

showcase examples of manufacturing valuable products in the greenest and leanest way possible. And underneath the gleaming mill façade is the centerpiece of Workington's own "green power show" – a new biomass boiler supplied by ANDRITZ.

Luxury board

Over the years, Workington has developed a reputation for satisfying the higher end of the luxury board market. In fact, some of its top-of-the-range bright white boards are used for the glitzy celebratory side of life – including the packaging of chocolates and champagne or example – under its Incada brand. Important to supplying this market is the ability to produce good solid boxboard with the potential to print, foil block, and emboss. It is a highly com-

petitive market to be in. Environmental excellence and sustainability have become increasingly important to the buyers of such board products.

Ola Schultz-Eklund, who has been Managing Director of the Workington Mill for 12 years, has overseen many of the changes that have taken place at the mill. "Making paper and board in the modern world is a tough business," Schultz-Eklund says. "You have to be lean to survive – even when you are in a niche business like we are. We have continually invested in product quality while making sure we are as lean as possible. In that space of time, we have become the benchmark for quality and printability in the boxboard market."



The right strategy

The Holmen Group decided in 2011 to boost the efficiency and profitability at Workington by investing in a new biomass power boiler. The boiler would not only reduce the amount of purchased energy, making the mill self-sufficient with self-generated green energy, it would allow the company to participate in the UK government's program where green energy producers can sell their Renewable Obligation Certificates (ROCs) to companies which continue to use fossil fuel. Says Schultz-Eklund, "There is no doubt that this project was the right strategy for the future of this mill. It would make us more sustainable, more efficient, more profitable – and would open up new revenue streams."

In March of that year, the Board approved the investment. By early April, the contract for PB 195 was in place with ANDRITZ. The design called for a fuel input of 147.5 MW. In terms of steam flow, the boiler would produce 195 t/h on wood-based biomass and 98 t/h with natural gas. Steam pressure was targeted for 102 (a) at a temperature of 540° C.

The ANDRITZ version of Bubbling Fluidized Bed technology was chosen specifically for the Workington mill as it had the flexibility to deal with the variety of biomass available in the mill – recycled sawmill chips, bark, effluent cake, and washings.

Anna-Maija Harju, ANDRITZ Product Engineer, says: "Our BFB boiler technology fits perfectly for Iggesund Paperboard because of its versatility in firing different biomass fuels and sludges. The design maintains combustion and evens out fluctuations caused by varying fuel qualities. The technology is very environmentally friendly, with emissions that are below, and sometimes far below, EU, domestic, and local regulations."

As a follow-on in May, ANDRITZ received the order from Workington for the biomass re-

ceiving and handling system. This included all the equipment for receiving and storing biomass fuel up to a capacity of 1,000 m³/h as well as all the conveying equipment to supply the boiler. Part of this delivery was the installation of a horizontally fed HHQ-Chipper for chipping logs, and a horizontally fed crushing line for other wood wastes. The storage facility delivered by ANDRITZ is an A-frame structure with a capacity of 20,000 m³ of biomass.

The A-frame building is an essential ingredient in the whole mill operation as it helps regulate the moisture content in the wood in a range of 37-57% depending on the materials. The mill at Workington uses around 800,000 t/a of wood, a combination of sawmill chips, roundwood, energy crops, and other biomass, mostly from Scotland and northern England.

From the A-frame, the chipped and crushed biomass is transferred into two holding silos before entering the boiler.

No option for delays

The plan was to allow 24 months for the complete project from demolition of existing buildings to start-up. Crucially there was a strict deadline – the new boiler had to be synchronized to the national grid by February 15, 2013. The pressure was really on.

"There was quite a lot of work to be done before the installation could begin, as we had to decommission one of our board machines, remove it, and demolish the building to make way for the power plant," says Timo Nieminen, Workington's Power Plant Manager. "Then there were foundations to pour and construction of all the housing for the new boiler."

As Nieminen recalls, there was a sudden flurry of activity around the mill as the deadline began to loom in the distance. "A whole host of different nationalities began arriving to concentrate on their part of the project," he says. "This was a really intriguing part of



▲ (Left to right): Mikko Hänninen, ANDRITZ Boiler Commissioning Engineer; Manne Koskinen, ANDRITZ Woodyard Technician; Timo Nieminen, Workington's Power Plant Manager; and Ville Virtanen, ANDRITZ Commissioning Engineer in the boiler house.

Anna-Maija Harju, ANDRITZ Product Engineer for power systems ▼



▲ ANDRITZ delivered the biomass receiving and handling system as part of the project. This included a chipping line for logs and a crushing line for wood waste. The A-frame building in the background stores 20,000 m³ of biomass. The Workington Mill uses around 800,000 t/a of wood, mostly from Scotland and northern England.



▲ Manne Koskinen, ANDRITZ Woodyard Technician, talks with an operator as they observe wood chips being fed to the BFB boiler.



“Our competitiveness was being affected by poor power and steam output. Now we are energy self-sufficient, even exporting to the grid.”

Ola Schultz-Eklund
Managing Director
Workington Mill

the project for me, the way that Spanish, Polish, Swedish, and Finnish technicians – at one time 400 contractors – worked alongside the British mill team, and very impressively got the job done.”

The first gas firing of the ANDRITZ boiler took place on December 22, 2012. This was followed by the first solid fuel firing on February 1, 2013. "But the really good day came on February 15, 2013 when we synchronized to the grid and reached our goal," Nieminen says. "We were completely operational and producing power in April, and took over the boiler from ANDRITZ on May 15th."

Throwing down challenges

The Holmen Group, it seems, likes giving challenges to its employees as well as its suppliers. Instead of importing a group of biomass energy experts to run the new power plant, Holmen selected team members from the Workington Mill. This included Bill Williams, Lead Technician, who enjoyed

the retraining in the art of power and steam generation. "This project has been an amazing experience for me," says Williams. "We watched as the boiler was built, then fired up. It was incredible to see how the suppliers sped up towards the end to make the start-up deadline. The learning curve for us has been steep and fast, but the ANDRITZ team has been great in helping us move up the curve. They are very knowledgeable and professional."

Have the targets been hit? "Absolutely!" exclaims Nieminen. "We use the same amount of energy in production that we used a year ago, but now it all comes from renewable sources. Our team has achieved great things. The boiler availability has been near 100% since we took it over. With the continued support of our supplier partners, we intend to keep uptime high."

The Workington Mill management and work force make it abundantly clear that they are extremely proud of the mill being entirely

self-sufficient in terms of energy – and that by doing so, they have cut carbon emissions by more than 190,000 t/a. Or, as they like to tell customers, "We cut our annual emissions by 60,000 automobiles a year."

Schultz-Eklund concludes: "This project has had some immense challenges, but ultimately we went from a situation where our competitiveness was being affected by really poor power and steam output to a situation where we are self-sufficient and even exporting power to the national grid."

Clearly, Iggesund Workington is the brightest star in the Cumbria area's "green power show."

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Service is more than having the right tools ... it is also about having the right people



Specialized tools are important, but having the right service people is even more crucial. Our people are skilled at raising the production efficiency of your mill. We help you maintain, repair, and upgrade your assets. Our expertise – from

replacement parts to comprehensive maintenance programs – helps protect and extend the life of your equipment and lower your lifecycle costs. The right tools – the right people. Good reasons that ANDRITZ should be your service partner.

