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Forward

VALMET'S CUSTOMER MAGAZINE | 2/2014

Hop on board!

Valmet's new boardmaking machine takes a major leap in Australia

Valmet

Editorial

Moving sustainable business forward

A recent brand survey revealed that the most important building blocks of a company's reputation are its products and services, sustainability performance and the transparency of its operations. These three dimensions were said to be the most powerful ones affecting stakeholders' support and trust towards a company.

Sustainability is an integral part of Valmet's operations and offering to customers. Responding to our customers' sustainability needs, such as safety, energy, raw material and water efficiency is at the core of our technologies and services. Our strong commitment and promise to move our customers' performance forward is embedded in everything we do.

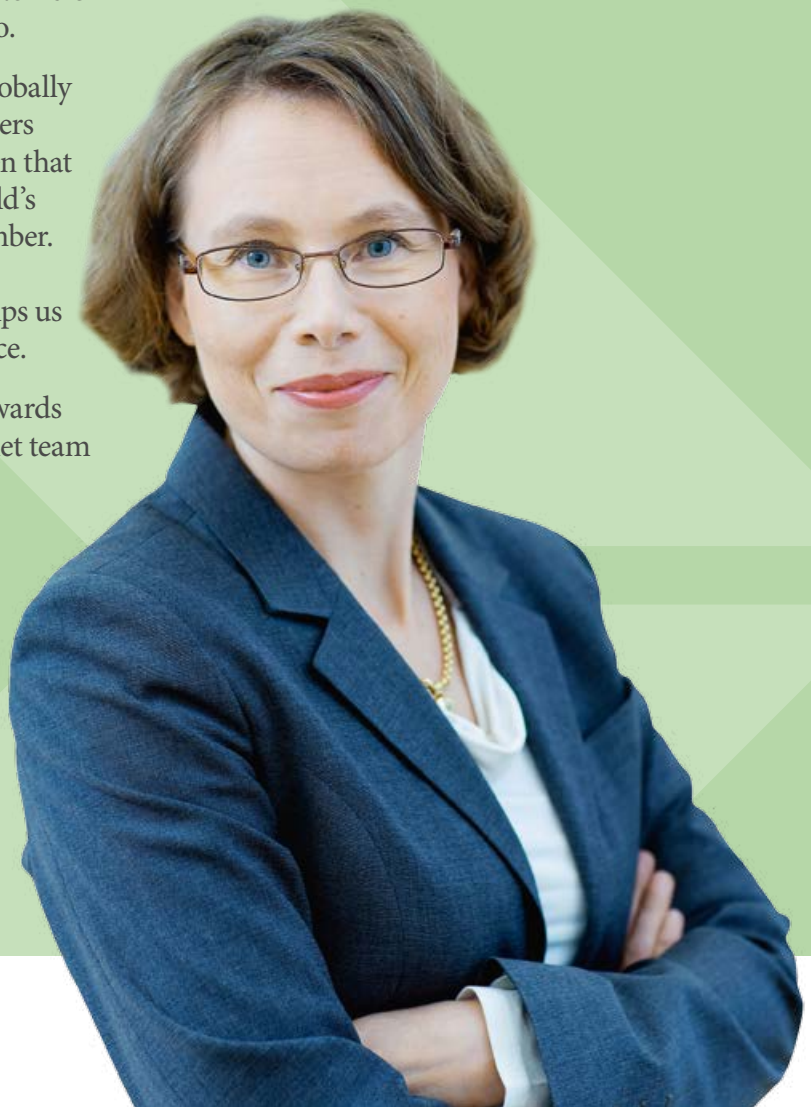
By fostering responsible practices, transparency and globally aligned ways to operate, we want to help our stakeholders evaluate Valmet's performance in all aspects. As a token that we are on a right track, Valmet was selected to the world's leading Dow Jones Sustainability Index in early September. This kind of external evaluation provides an effective means for our stakeholders to assess Valmet. It also helps us to continuously enhance our sustainability performance.

This recognition and the trust that you have shown towards Valmet around the globe are inspiring the whole Valmet team to go forward!

ANU SALONSAARI-POSTI
SENIOR VICE PRESIDENT
MARKETING AND COMMUNICATIONS

PS. Kindly, take a few minutes to give your feedback in our reader survey!

> Sustainability is an integral part of Valmet's operations and offering to customers.



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In brief


Södra/Ola Kjelbye

Valmet the main supplier for Södra Cell's major pulp mill rebuild in Sweden

Valmet has received an order from Södra Cell for the Värö pulp mill in Sweden. The order is part of Södra Cell's over 400 million euro investment to increase the Värö mill's pulp production capacity from 425,000 to 700,000 tonnes per year.

Valmet's delivery will contribute to Södra's performance by significantly increasing the Värö mill's capacity and energy efficiency. The order consists of a new continuous cooking plant and upgrades of wood handling, fiber line, evaporation plant, recovery boiler, recausticizing, flash dryer, pulp dryer and baling. On completion of the project, Värö will be one of the world's largest softwood sulphate pulp mills.

Paper machine grade conversion rebuild to Thai Paper

Thai Paper Company Limited in Bang Pong, Thailand will rebuild their PM 5 paper machine. The machine, currently producing printing and writing papers, will be modified for high-quality glassine paper production. Valmet's delivery will include modernization of key sections of the paper machine. The rebuild targets the highest end product quality and efficient production.

Boiler plant to supply energy for steel production in the Czech Republic

Valmet will deliver a complete boiler plant to ArcelorMittal Energy Ostrava s.r.o. in the Czech Republic. The plant will supply steam to existing turbines, producing electricity and providing process steam to the adjoining steel mill.

"The new plant will fulfill EU's future emission limits and provide us with higher boiler efficiency than the existing units," says **Vladimir Machat**, ArcelorMittal Ostrava. "The steel industry is very energy-intensive and needs energy at moderate costs in order to ensure competitiveness. Valmet was able to offer the well-proven and high-efficient CYMIC design of circulating fluidized bed (CFB) boiler with low maintenance and operation costs." The new unit will replace four existing pulverized coal fired boilers.

North America's first OptiConcept M board production line to Pratt Industries

Pratt Paper (IN), LLC has ordered an OptiConcept M board machine for their new greenfield paper mill in Valparaiso area, Indiana, USA. The mill will utilize recovered paper in the production of recycled linerboard and corrugated medium. The start-up of the new machine, PM 16, is scheduled for 2015.

"OptiConcept M is a new and modular way to design, build and operate a paper machine. Its modular approach enables short delivery times, quick start-up and low project costs. This will be Valmet's first OptiConcept M installation in North America and we are all proud to work with Pratt on this project," says **Mike Gray**, SVP Sales, Valmet North America.

Valmet's scope of delivery will comprise a complete OptiConcept M board production line from headbox to winder.

NEW FABRIC CLEANING SOLUTION

Valmet has signed an agreement to be the exclusive North American distributor for CrystalTek's BLAST cleaner in the pulp, paper and energy industries. BLAST is a patented neutral PH biodegradable cleaner used to significantly enhance paper machine clothing drainage and service life properties. It also finds use in paper machine dryer section for removal of natural and synthetic stickies from carrier screens. BLAST eliminates corrosive damage from high pH cleaning chemicals traditionally used.

Dear Reader!

In order to further develop the Forward magazine and make it as interesting reading as possible, we are conducting a reader survey on the issue you are just holding in your hands.

If you receive an e-mail questionnaire from us, we would really appreciate your taking a couple of minutes of your time to answer the questions presented in the questionnaire. Your opinions will give us guidelines along which we can make the magazine still better and more customer oriented. You can attend the survey also at **www.valmet.com/survey**

Thank you in advance!

First Advantage NTT line in the USA

von Drehle Corporation will be the first tissue maker in the USA to produce tissue with Valmet's flexible Advantage NTT technology. The new line will be installed at the company's facility in Natchez, Mississippi, USA.

The Advantage NTT technology is designed for maximum flexibility as well as enhanced product quality and can easily swing between productions of conventional tissue to textured tissue in just a few hours.

"Process and operation review made the Valmet NTT technology the obvious choice for production of tissue and towel products at our Natchez, MS Facility," says **Joe Pankratz**, V.P. of Manufacturing, von Drehle Corporation.

First "At the Mill" site in North America at Verso

Valmet offers a breakthrough service innovation called "At the Mill". In this novel approach, Valmet fully takes over operation and management of a customer's roll maintenance facility. The end result is improved roll rebuild turnaround time, improved roll life and improved paper machine maintenance reliability. The first NA "At the Mill" has been in operation at Verso in Jay, Maine since March 2014. **Greg VanHandel**, Valmet's North American Director of Roll Services, describes the program's value: "Within our "At the Mill" partnership with Verso, we have established Key Indicators that are focused on reducing Verso's reliability gap and lowering their Total Cost of Ownership. Valmet brings onsite expertise to solve problems around roll performance, allowing Verso to focus on creating value for their stakeholders by providing business solutions, and developing innovative products and services that exceed the expectations of their customer base".

CUSTOMER'S VOICE

Moving forward together

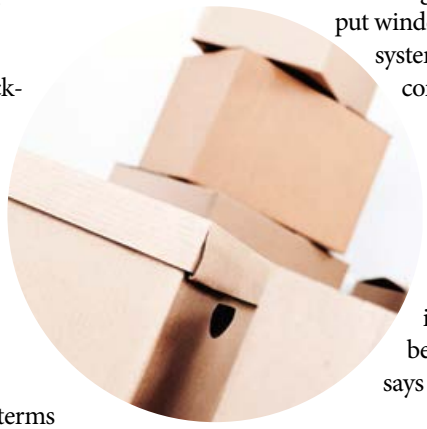
A MAJOR TOWARDS

Orora's Botany mill in Sydney, Australia, is home to one of the world's top-performing board machines. The Valmet-supplied machine along with a maintenance team have made the mill a benchmark for the papermaking industry. **TEXT** Robert Ryan

LEAP
RESPONSIBLE PACKAGING

In October 2012, Australian papermaking entered a new era with the start-up of Orora's Board Machine B9, a world-class boardmaking line. With a design capacity of 400,000 tonnes per year, B9 is the largest paper machine operating in Australia.

The B9 project represented a major stride towards efficient paperboard packaging production for Orora Limited, a company that demerged from Amcor in 2013. Within a year of B9 coming on stream, it was operating within the top quartile of board machines worldwide. That is quite an achievement, but Orora's mill management team is even more ambitious about performance. "We aim to be in the top three worldwide within three years, in terms of tonnes per meter," says Production Manager **Tero Ylikoski**.



B9 was a step up in size terms for the Australian papermaking industry. It was also a big step forward for Orora in energy efficiency, water use and the environment. As Orora's Managing Director **Nigel Garrard** noted during the B9 opening ceremony, scrapping three ageing machines in favor of a single modern paper machine has slashed energy use by 34%, cut water consumption by 26% and reduced waste sent to landfill by 75%.

Single supplier advantage

While machinery for most projects on this scale is supplied by several vendors, B9 was ordered solely from Valmet (known as Metso Paper at that time). **Jacob Chretien**, GM of Technical - Paper & Recycling, explained that Valmet was chosen to supply the complete line because it "had delivered a number of entire production lines which were similar to what we needed to meet the market requirements in Australia". More specifically, these lines included "a twin gap former, twin shoe press, a high-output winder and an integrated machine control system, process control system and quality control system".

Apart from an OptiConcept boardmaking line, the delivery included pulpers, electrification, and a Metso DNA automation package. This single supplier approach has paid off for Orora. "Having a single supplier significantly reduces the number of interfaces between service & equipment suppliers," says Chretien.

Recycled fiber-based production

B9 uses 100% recycled fiber from domestic containerboard and mixed waste. Some readers may not realize that Australia's few large urban centers are widely dispersed across a vast island continent. Geography like that would normally place a heavy transport cost burden on collecting recovered fiber. Fortunately most of the recycled fiber used at the mill is conveniently drawn from the Sydney area, says **Karl Achleitner**, General Manager of Operations. "Transport costs are not a significant issue," he says.

Production Manager Tero Ylikoski points out that recycled fiber can vary widely in terms of quality, and that sourcing mixed waste takes careful management, as well as making trade-offs between raw material cost and runnability. "There is a calculated risk in receiving mixed waste," Ylikoski points out, noting the greater likelihood of finding non-fiber material in cheaper supplies.

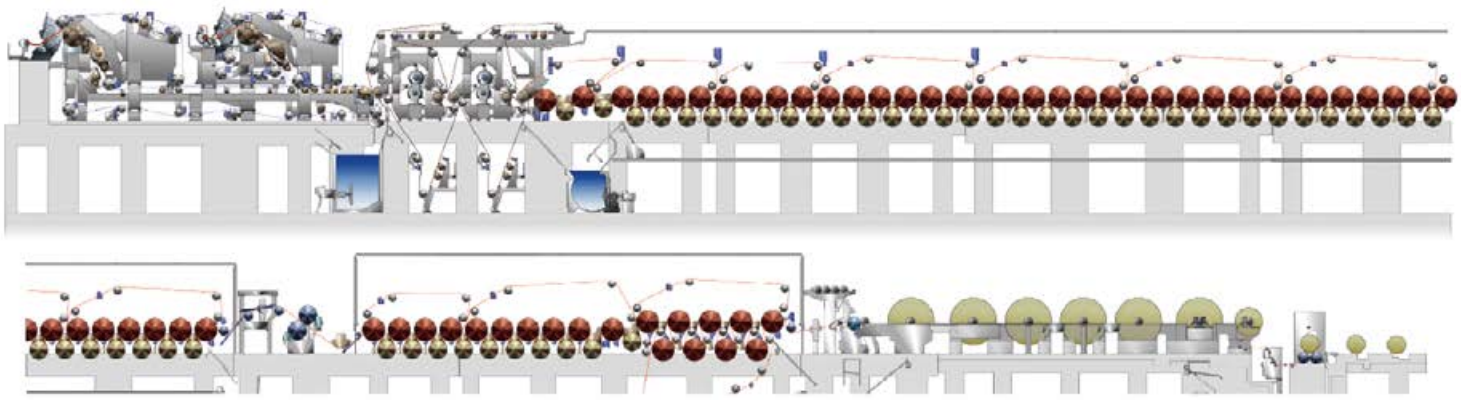
> A single modern paper machine has slashed energy use by 34%, cut water consumption by 26% and reduced waste by 75%.

Recycled fiber line

The recycled fiber (OCC) line at the mill has an OptiSlush pulper to break down the recycled material into fibers and remove most impurities. HC Cleaners remove coarse heavy particles, such as staples, stones and glass. The line has OptiScreen coarse screening, fractionation to separate long and short fibers, LF fine screening, and LC cleaners.

The line has a design capacity of 1,300 oven-dry tonnes per day into the high density towers. Due to exceptionally dirty raw material, the system features a three-unit de-trashing loop for efficient debris removal. The loop system is a world first and enables maximal outthrows removal and high capacity with only one pulper station.

Orora is pleased with the performance of the OCC



line. It produces very clean results with "few specks and very low stickie counts," says Jacob Chretien. It is efficient in energy terms: "energy consumption is as low as was designed," he says. Also wear is surprisingly low. "Wear-related issues on all components after the full-flow cleaners are much lower than we expected," says Chretien. "The pulper, fractionation and LF fine screening equipment are all exceptional and perform equal to or better than we expected."

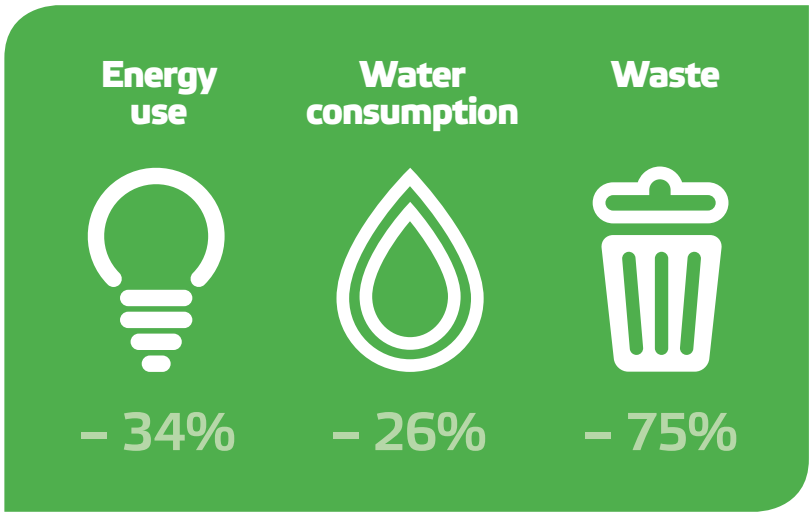
Wax is an issue for the mill. "We do struggle on occasion with wax, which is a function of the feedstock and the amount of waxed boxes used in the Australian market," Chretien explains. Fortunately, this is a much less significant problem than had been expected.

World-class board machine

Valmet's scope of supply included a complete OptiConcept boardmaking line from headbox to reel. It also included the approach flow system, air systems, press section clothing as well as a high-speed winder and roll handling. B9 has a wire width of 6.25 m, a designed speed of 1,600 m/min, and an annual capacity of 400,000 tonnes of testliner and corrugating medium.

Orora is very pleased with the performance of the forming section, which features two high-speed OptiFlo headboxes designed to deliver both good formation and strength properties. "The twin gap former design has allowed us to successfully manufacture high-strength papers very effectively across our wide grade range," says Chretien.

After forming, the web proceeds to dewatering on the two-nip press section, at nip pressures of 1,200 kN/m and



↑ RESULTS FROM BOTANY MILL Replacing old machines with new, efficient OptiConcept board making line has given savings in energy, water and waste amounts.

↓ TOP PERFORMER Orora's Botany mill is home to one of the world's top-performing board machines.

1,400 kN/m, respectively. The press performance has been trouble-free and efficient, according to the mill management. "We are routinely achieving dryness of more than 54% exiting the press section, which leads to high output and very low steam consumption," Chretien explains. The press section "has not missed a beat" since start-up, he adds.

A single-tier pre-dryer section follows the press section and the OptiSizer size press is followed by a double-tier dryer section. OptiSizer features an innovative TurnFloat device that allows the web to proceed to the dryer in a contact-free way.

The OptiSizer attracted praise from the mill management for its efficiency. Chretien says that it is very effective at applying starch across the mill's wide range of grades. The mill is now achieving high starch efficiencies that meet, or even exceed, customer expectations thanks to the sizer and starch conversion system.

A state-of-the-art OptiWin Pro winder that features short set change times and robust operation at high speeds completes the line. The mill personnel are impressed with the 3,000 m/min design speed of this advanced winder. "It's one of the world's fastest winders," says Ylikoski.

Meanwhile, Chretien is pleased with the innovative splicer. "The butt-joint splicer significantly improves winder uptime and the reduction in broke has easily paid for the additional technology on the winder," he says. Chretien also praises the uniform, consistent quality of the rolls leaving the winder. He believes it was an excellent purchase.

Uniform quality and wide basis weight range

B9 is now turning out testliner and corrugated medium in a wide range of grades between 100 g/m^2 and 170 g/m^2. It can make an even wider range of basis weights of between 80 g/m^2 and 200 g/m^2, says Jacob Chretien.

Orora is presently carrying out trials of light (90–95 g/m^2) and heavy (up to 200 g/m^2) grammages on B9. The mill is working towards producing lower grammages without compromising strength properties. "Eventually you can go to lower basis weights," says Tero Ylikoski. Another goal is to produce grades that offer properties comparable to those made from virgin fiber. "We are looking into producing higher basis weight grades that can replace kraftliner," he points out.

Corrugating and downstream box plant customers are

KARL ACHLEITNER, GENERAL MANAGER, OPERATIONS:

"We chose Valmet for maintenance outsourcing because of its intricate knowledge as original equipment supplier."

APPRECIATED QUALITY
Cathy Parra and Tero Ylikoski tell that customers appreciate the uniform quality of the board produced.

JACOB CHRETIEN, GM OF TECHNICAL - PAPER & RECYCLING:
"Valmet was chosen to supply the complete line due to its numerous good earlier references."

impressed with the quality of the grades made on B9. Customer Support Manager **Cathy Parra** says that customers describe board produced on B9 as having more uniform strength, better CD profile, and better print definition than grades made on Botany's retired machines. "They tell us that quality is much more uniform than liner and medium produced on the older machines," adds Tero Ylikoski.

Maintenance outsourcing agreement

Valmet also signed a multi-year maintenance agreement in July 2011 in which Valmet takes full responsibility for maintenance, the management of improvement projects for B9, and the mill utilities. The Valmet team has adopted a reliability-centered maintenance approach to ensure efficiency and cost optimization.

The outsourcing deal was not unusual for the Botany site. In fact, the mill has a long history of outsourcing maintenance and engineering activities with other vendors. Valmet provided a comprehensive strategy for the maintenance of the site and demonstrated its maintenance success at other mills through reference visits. Jacob Chretien also sees the value of vendor-supplied maintenance. "We have Valmet people working on Valmet equipment," he says.

Karl Achleitner also sees value in vendor-delivered maintenance. "We chose Valmet for maintenance outsourcing because of its intricate knowledge as original equipment supplier," he says. Valmet's maintenance staff are "absolute specialists," Achleitner adds, in such key areas as hydraulics. Having Valmet maintenance experts on hand makes the Botany mill the "the envy of the paper industry", according to Achleitner. Part of the Valmet maintenance concept for B9 is operator maintenance. Valmet provides training for operators in order to enable them to perform selected preventive maintenance tasks during their shifts.

Apart from its original equipment manufacturer and maintenance role, Valmet also supplies a large proportion of the mill's consumables. This includes doctor blades, screen baskets and sizer rods.

A bright future

Manufacturing in Australia is going through challenging times in an era of globalization and intense international competition. But Orora is defying the gloom through its investment in global-scale production and cutting-edge technology, backed by its technology and maintenance service partner Valmet. ■

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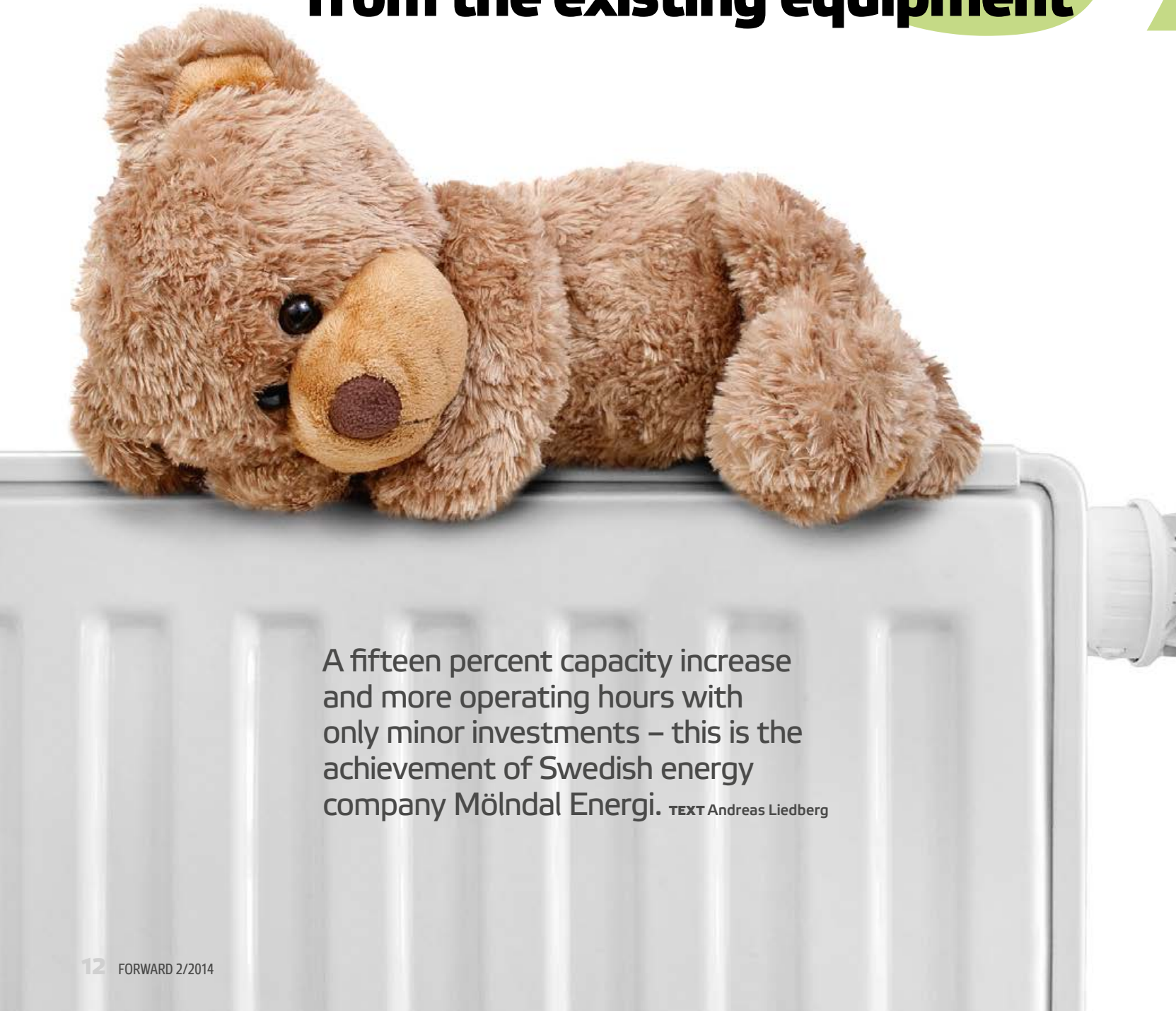
More energy

from the existing equipment



A fifteen percent capacity increase and more operating hours with only minor investments – this is the achievement of Swedish energy company Mölndal Energi. **TEXT** Andreas Liedberg

EFFECTIVE DISTRICT HEATING
In 2009, Valmet supplied a new boiler to Mölndal Energi, starting up at 70 MW_{th}. The same boiler has been upgraded and is now running at 80 MW_{th}, or 15% above design capacity.

Mölndal Energi, a Swedish energy company, has greatly improved the production in their new biomass-fired boiler since it was supplied by Valmet in 2009. Valmet has helped with advice, studies and equipment upgrades but the main driver behind the achievement is the philosophy of always trying to improve. This moves the limits of what's possible. Mölndal Energi CEO **Christian Schwartz** explains that the company strategy is focused on getting more from the existing equipment:

"The three parts of our strategy are increased capacity, better availability and longer operating season. What we've done around our new boiler is a good illustration of this. We bought it from Valmet and started it as planned in January 2009. During the project, I was often asked what our capacity would be and I always answered that I knew what the contract said, but that I would know what we would have in our yard only after the performance tests."

Higher capacity

"We realized that we should increase our capacity, so after the warranty period, we turned to Valmet for advice. We got good help and today we can run the boiler at 80 MW_{th}, instead of the 80 MW_{th} that we had in the contract. That's 15% more production every hour we run at maximum capacity. I always say that there might be another MW or so in there, so let's see what happens next."

Higher availability

Part two of Mölndal's strategy is plant availability. This indicates how much of the planned operating time the plant actually spends producing. "During our first operating season, we had 98.4 availability. This was a good start, but we have been able to improve on that. Last year we only had one outage of about one and a half hours. This gave us 99.96% – now that's a very good number!"

Longer operating season

Increasing the length of the operating season is a challenge because this is controlled by the weather:

"On warm days the output from the turbine is lower, which means that we have to lower the load on the boiler. The boiler performance at low loads therefore has a direct effect on how long our operating season is. When we chose the supplier for our new boiler we paid close attention to this because the better the performance is at low loads, the more electricity we can produce during spring, summer and autumn. We have also installed coolers that

"WE ARE ALWAYS ON THE LOOK-OUT FOR WAYS TO GET MORE."

Mölndal Energi in a nutshell

Mölndal Energi is a Swedish energy company owned by the city of Mölndal. The company has a boiler plant, an electricity grid and a district heating network.

Some facts:
95 000 customers
440 GWh of district heating per year
124 GWh of own electricity produced per year
834 GWh of electricity sold per year
www.molndalenergi.se

The goals of Mölndal Energi are to be of good service to the society, efficiently satisfy the needs of its customers and minimize the burden on the environment.

we use on warm days. Our boiler has great performance at low loads, and together with the coolers we get a very long operating season, more than 7,100 hours a year. We only stop the plant during the two hottest months."

Long-term thinking, outside the box

"In order for us to make progress, many different organizations and lots of people have to contribute. First we did the easy upgrades – the 'low-hanging fruit' if you like – but after this things became more difficult. When this happens, you have to focus on the long-term perspective and keep going. If we can improve a little every year, we will produce great results."

To think 'outside the box' is an expression for being creative and finding new ways. This seems to be common practice at Mölndal Energi: "Today we look for entirely new opportunities. We have an old boiler that is not used much, and so far we've come up with 13 different alternatives for how to develop it. It's exciting to think of what the future may bring." ■

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Increasing output

Mölndal Energi ordered a study from Valmet to find ways to increase the energy output from its designed 70 MW_{th} to as much as 77 MW_{th}. Shortly afterwards, a second study was ordered with the aim of finding ways to increase energy output to 80 MW_{th} – 15% above the designed capacity. **Thomas Nordin**, Sales and Project Manager at Valmet, comments on some of the important steps in the work:

"The plant has to remain safe when the energy output increases, so I recommended getting an independent third party involved from the beginning. Consequently, we at Valmet, our customer Mölndal Energi and Inspecta were able to work together from the beginning. I think this made the work easier for all of us."

Increasing capacity is not always an easy thing to do. Thomas continues:

"Each plant is unique because the boiler is built to match local demands. For example, the fuel mix, all the auxiliary systems and the turbine are chosen based on the design as well. It's not always easy to increase the energy output. In this case, we went through all the critical systems and described what steps could be taken. We calculated new flows for things like flue gas and steam, and also new operating parameters for air and oxygen. Some equipment also needed to be upgraded before we could start. It's professionally rewarding to get good results like this. It's always nice."

IMPROVEMENT IN MIND
Christian Schwartz, CEO at Mölndal Energi: "As long as we improve a little every year, we will produce great results".

GOOD RESULTS ARE REWARDING
Thomas Nordin, Sales and Project Manager at Valmet, was project manager for the upgrade at Mölndal: "It's professionally rewarding to get good results like this. It's always nice."

VALMET'S NEW LIGNOBOOST TECHNOLOGY gaining foothold

UPM to become exclusive distributor of Domtar's BioChoice™ lignin in Europe.

TEXT Andreas Liedberg

THE LIGNOBOOST PLANT AT DOMTAR'S PLYMOUTH MILL IN NORTH CAROLINA. The plant, supplied by Valmet, has a capacity of 75 tonnes of lignin per day. It started up in 2013.

Domtar Corporation and UPM announced on July 10, 2014 that the companies have entered into an agreement in which UPM will become the exclusive distributor of Domtar's BioChoice lignin in Europe.

BioChoice is a 100% bio-based sustainable alternative to fossil-based products, and also has the "USDA Certified Biobased Product" label.

BioChoice lignin is produced at Domtar's biorefinery in Plymouth, North Carolina in the USA. This mill was the first in the world to install Valmet's patented LignoBoost technology. The LignoBoost plant started up in 2013 and can produce up to 75 tonnes of high-quality lignin per day as a by-product of the kraft pulping process. When the lignin is extracted, the load on the recovery boiler is lowered, enabling increased pulp production.

"Our lignin separating process is groundbreaking, as it allows us to offer high-quality kraft lignin in commercial quantities," says Domtar's **Richard Mullen**, Vice President of Market Development and Analysis. "UPM is an ideal partner for Domtar in many ways, as they have a strong presence in the European market and years of experience with biomaterials."

"We at UPM are truly excited about this agreement, not only because we get to add a great product to our range, but also because we can work with Domtar to develop the market and offer our customers sustainable, value-added products for a growing variety of end uses," says UPM's **Juuso Konttinen**, Vice President of the Biochemicals unit.

"Versatile use of renewable wood biomass combined with innovation and sustainability are the cornerstones of UPM's Biofore strategy. We have developed profound expertise and intellectual property in the area of lignin-based products, such as resins that are typically used as binders in wood-based products," Konttinen concludes. ■

BioChoice lignin is a bio-based alternative to petroleum and other fossil fuels. There are a wide range of potential applications for BioChoice lignin, including in the energy, materials and chemicals categories:

- Adhesives
- Agricultural chemicals
- Carbon products (e.g. carbon fiber, graphite, activated carbon)
- Coatings
- Dispersants
- Fuels and fuel additives
- Natural binders
- Resins

Finding a better w forward

"Gaining a competitive edge requires a creative mindset. Adopting new technologies first is a brave move that can help to differentiate your product in the marketplace. But being first does not last forever. That's why you have to find a better way forward every day." That is what Jin Doo Kim, Vice President of South Korea's Dong Il Paper believes.

TEXT AND PHOTOS Kaisamaija Marttila

Dong Il's strategy for survival is to adopt new technologies and make continuous small improvements all the time. "My point of view is simple: if you want to stay alive in the market in the future you have to differentiate," explains **Jin Doo Kim**, Vice President of South Korea's Dong Il Paper. "Our company can't rely on big capital, so we have to be smarter. Talking is easy, but making a difference in the world requires hard work. I want to encourage our people to look for new things."

The latest project that Dong Il took on was to invest in Valmet's advanced headbox technology. PM 1 in Wolsan started up again after a wet end rebuild in January 2014. Valmet's delivery covered the key components: an innovative new two-layer headbox and vacuum-assisted forming board for middle ply. Dong Il had plenty of confidence to go ahead with the rebuild, as the new type of headbox was not the first new piece of technology they had adopted. Dong Il and Valmet have been cooperating for more than a decade already, which has helped Dong Il establish a competitive edge in the Korean market.

New aqua layering technology

"We are lucky to have demanding customers that want to get better-quality linerboard" Kim explains. "But using old corrugated containers as raw material naturally involves variations in quality. We want to eliminate variations from the end product as much as we can. To solve this challenge we realized we needed something totally new. Otherwise we would be just increasing our costs by using better fiber, more expensive chemistry, or more refining and thus more energy consumption."

The answer was Valmet's OptiFlo Fourdrinier headbox, featuring the new aqua layering technology. This novel solution provides excellent layer coverage, excellent CD profiles and excellent formation with no streaks or tiger stripes. Aqua layering technology guarantees layer coverage with a thin water layer as a headbox wedge that stabilizes the layers. The new layering technology also enables more efficient wet end starch application: starch can be fed between the layers. This provides a chemically optimal feeding point for active starch interaction and improved end product strength.

30% less starch

Jin Doo Kim is pleased with the new headbox combined with the new VacuBalance forming board. The new technology has proven to be beneficial, and the mill has already seen a significant increase in the strength properties of the end product. "Unlike with conventional technologies, a rapid starch feeding response can be measured when starch is fed through the aqua layer. In both cases compression strength can be improved by 15%, but almost 30% less starch is needed with aqua technology. Even in chemically challenging process conditions, this technology produces great results," Kim says.

The new type of layering allows the quality and strength properties to be adjusted for cost savings. Dong Il has been carrying out raw material optimization testing, such as feeding functional additives or even reject between the layers. "There is a lot of potential with this technology, and I believe we haven't yet found the ideal combination to capitalize on the benefits of the aqua layering. Cost savings can be achieved while maintaining strength."

Power of co-operation

"We at Dong Il believe that working together with Valmet has increased our people's skills. Even I have grown and learned!" Kim laughs. "Valmet always have the right people with a deep understanding to resolve any issues with paper technology." Jin Doo Kim explains that over the years the mill has made quite a big technological leap. They started by buying a small machine running at 400 m/min and set the target of getting it to run at 800 m/min

"To compete against plastic or metals we need to create fiber packages with functional layers like a water barrier."

with Valmet's help. "I don't think anyone in the Korean market thought this would end well. They all believed that the investment was too big and the target was impossible," Kim says. "Just two weeks after start-up we reached 800 m/min, and have been continuously modifying the machine so that now it's running at 1,100m/min. The production has grown from 350 tonnes per day to 1,300 tonnes per day. This is what we can achieve when we are supported by Valmet. We have developed a certain confidence in each other. If we are working on a project with Valmet, we have no doubts."

A LONG-LASTING COOPERATION
The cooperation between Dong Il and Valmet has lasted almost two decades.

OCC AS RAW MATERIAL
Wolsan mill uses OCC as a raw material and turns waste paper into new containerboard products.

Creating a brighter future

Going forward is a core value at Dong Il. "I really do my best to prepare for the future. We're currently number one in Korea, but we keep on moving forward," Kim explains. "We produce a million tonnes a year for the Korean market and the target for the next few years is to boost that by 50%."

Jin Doo Kim also sees the complexity of the industry and change in customer needs. Paper is one packaging material among many, and it has to compete against glass, plastic and metals. "Fiber-based materials account for 30% of the industry, and a little bit over 30% are plastics. The percentage of fiber-based packaging is falling every year, and the metrics for plastics is going up.

This is a worldwide trend at the moment, but why? To compete against plastic or metals we need to create fiber packages with functional layers like a water barrier. Then we can combine the two best elements – recyclability and product functionalities. It all comes back to thinking differently and to having a pioneering mindset. I believe there is great potential and we should actively develop new concepts to help us survive. It is important to build a view for the future, without hesitation." ■

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JIN DOO KIM
Vice President of Dong Il Paper.

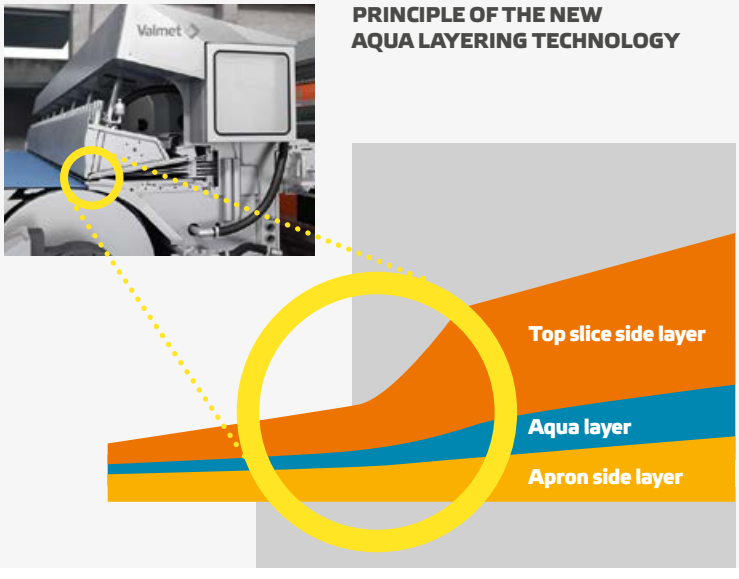
HIGH-QUALITY LINER
After the rebuild the Dong Il Wolsan mill is able to produce high quality recycled liner with lower costs.

OptiFlo headbox with aqua layering technology

Valmet's new OptiFlo headbox with innovative aqua layering technology makes it possible to produce a two-layer sheet with very good layer coverage using only one headbox and forming unit. The aqua layering technology has been developed for the most challenging stratified solutions where layer purity is a key feature. It produces a perfect, disturbance-free, purely layered structure that boosts strength properties.

The new aqua layering technology uses a thin water layer as a headbox wedge to stabilize layers and to form an even film while layers of stratified paper are being joined together. It prevents mixing of stock layers and also enables feeding of functional additives between the stock layers.

This type of layering provides possibilities to adjust quality and especially strength properties. Cost savings can be achieved, for example, by using different furnish qualities, cheaper raw materials, and functional wet end additives between the layers. Furthermore, as layering is done with one headbox and forming section only, the investment is both cost and energy efficient.



PRINCIPLE OF THE NEW AQUA LAYERING TECHNOLOGY

Holmen Paper teamed up with Valmet in order to support and speed up the performance of PM 11 at Holmen's mill in Hallstavik, Sweden.

TEXT Jukka Holopainen

Better perform

Step by s

FAMILIAR STEPS
During an 18-month development project, Valmet's paper technology specialist Jukka Vuorio has become very familiar with the characteristics and details of Holmen Hallsta's PM 11.

Holmen Paper's Hallsta paper mill, in Hallstavik near Stockholm, produces machine finished (MF) magazine paper and book paper. The focus at the mill is on 100% virgin fiber.

The Hallsta mill is leading Holmen Paper's shift towards becoming a specialty paper company. To support and speed up this development, Holmen Paper has signed a performance agreement with Valmet with the goal of improving the performance of Hallsta's PM 11 paper machine, which produces highly calendered magazine paper.

"PM 11 has a production volume of about 300,000 tonnes a year. This year we have set up a tough budget

ance, step

Hallsta Paper Mill facts

- Raw material: Spruce pulpwood
- Pulp: TMP
- Products: MF-Magazine and book paper
- Brand names: Holmen VIEW, Holmen TRND, Holmen XLNT, Holmen BOOK, Holmen PLUS,
- Total production capacity: 525,000 tonnes/year
- Production capacity of PM 11: 330,000 tonnes/year
- Employees: 400

which is not easy to reach, but this performance agreement is helping us move in the right direction," says **Per-Arne Andersson**, the Production Manager of PM 11.

Training is vital

The performance agreement began in March 2013 and lasted until September 2014. Hallsta and Valmet have now signed a new two-year agreement for improving the performance of both PM 11 and PM 12 production lines. The package includes a large number of different activities and steps.

"First, we performed speed tests to locate bottlenecks and identify focus issues. Experts in several sections have tried to improve everything in the machine and get an idea of what we should do to perform better. We have been working on everything. However, the most important thing is the commitment of the operators and the improvements we make together to run the machine in the best possible way," Andersson emphasizes.

The project also includes a lot of training. Because of big changes at the mill, half of the personnel working on PM 11 are new.

"The skills of the personnel have been one big step towards improvement. It has been vital to develop new

MILL SITE
Holmen Paper's Hallsta mill is situated in Hallstavik, near Stockholm.

practices for running the machine in the best possible way and in a similar way during all shifts. This includes runnability, cleaning, making felt changes, and improving just about everything. It's a lot of small steps, really. We try to run faster and make things a bit better every time."

Maintenance is also an essential part of the development project. Many maintenance issues and discussions have emerged during the one and a half years of the agreement.

"The machine needs to be up and running all the time, so it's important to have certain standard routines and a long-term commitment to improvement. We haven't made any huge investments in new technology in the course of this project. We are trying to improve our expertise and performance with the equipment we already have, and we are on the right track now," Andersson believes.

Two companies, one team

Why did Holmen choose Valmet as its partner in the performance agreement?

"We needed someone who could combine all the challenges we have to improve our production. Valmet is a big company with many different skills. We wanted to bring the best parts of that to PM 11 and to develop the optimal way of using the machine," states Andersson.

In an 18-month project, continuity is of the highest importance, so Hallsta chose to have an expert from Valmet present at PM 11 throughout the agreement period. That person turned out to be paper technology specialist **Jukka Vuorio**.

"We needed a person who can see the big picture, not just his own products. Jukka's skills, experience and personality combined with our day shift and the motivated operators our first line manager **Jenny Söderström** is managing has proved to be a very good combination," Andersson explains.

Jenny Söderström agrees: "Although we are developing the performance of a machine, this also involves working with people. One of the benefits of having Jukka here is his ability to see what we should focus on, and then suggest the best way to make that change happen. Jukka has built a lot of trust around him as a person. We don't consider him to be a part of some other organization – he is part of our team."

Jukka Vuorio is quick to give credit to the whole Holmen Hallsta team for their strong commitment to improving the performance of PM 11.

"All the improvements we have made have been done together. The people at Holmen Hallsta have been working very hard on the many aspects of the PM 11 development process. The operators are committed to developing the machine – they come up with good ideas, and we try to put them into practice by utilizing Valmet's and Hallsta's expertise in the most effective way we can. This really is a team effort, no matter which company is paying your wages," Vuorio points out.

> "We are trying to improve our expertise and performance with the equipment we already have, and we are on the right track now."

Aiming for a win-win situation

Per-Arne Andersson is satisfied with the work Valmet has been doing at the PM 11 project.

"We have already improved the performance of PM 11. The operators are getting more skilled at running the machine in a more productive way, and there hasn't been any major damage to the machine in a year," Andersson notes.

"Our goal is to increase the production of PM 11. It is a shared target for both Holmen and Valmet. If we get there, both sides win." ■

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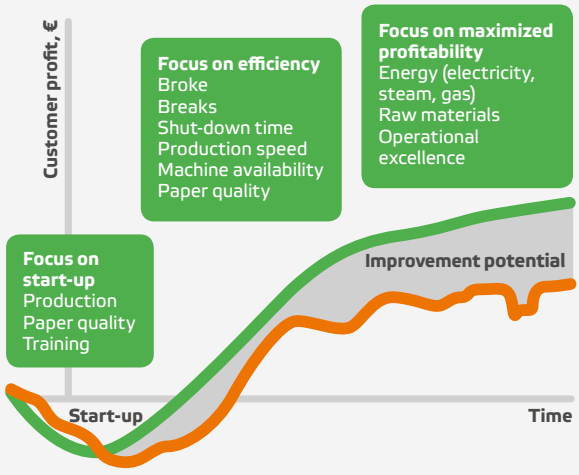
TRAINING AND TEAMWORK Per-Arne Andersson (left), Jukka Vuorio and Jenny Söderström emphasize the importance of training and teamwork in improving the performance of a production line.



Performance agreement in brief

Valmet's performance agreement is a mill-wide development program aimed at perfecting the customer's entire production line. It is a tool for achieving better production, improving efficiency and end product quality, developing maintenance, and reducing costs.

The performance agreement is based on Valmet's ability to serve as a full-scope supplier, offering tailor-made solutions for any kind of need. However, it is also a cooperation process in which both Valmet and the customer are committed to achieving common goals. Every agreement is tailored to match the customer's targets and situation.

Boosting production capacity in Estonia

Estonian Cell, the only European pulp mill sourcing products solely from aspen, wanted to boost the capacity of its single baling line and improve availability in continuous shift production.

TEXT
Bryan Ralph

PHOTO
Sergei Hramtsov

Estonian Cell has become Europe's largest producer of aspen BCTMP (bleached chemi-thermomechanical pulp) since it opened in 2006. However, rapidly rising electricity costs and production bottlenecks adversely affected financial results. The company responded with a bold strategic investment plan. This included the slab press investment and a new, innovative anaerobic effluent treatment phase that will reduce the mill's electricity consumption by providing biogas for use in production.

"One of the most important investments to improve the financial results was the contract with Valmet to expand the baling line in order to significantly increase production volumes and reduce costs," says **Lauri Raid**, Mill Manager, CTO and board member of Estonian Cell.

Increasing capacity and gaining savings

The pulp mill, located in Kunda, 110 kilometres east of Estonia's capital, Tallinn, was originally designed to produce 140,000 tonnes of aspen BCTMP annually in an eco-friendly, sulphur-free process with chlorine-free bleaching.

"The investment in a new slab press became even more critical considering the losses the company was making," continued Lauri Raid. "So, increasing capacity and gaining the related cost savings was the top priority. We

wanted to tackle availability issues and equipment-related breakdowns and reduce maintenance costs. We also had three other objectives: improve the appearance of our bale wrappers, go from double to single wiring on bales and offer customers a big bale option."

Multiple benefits from the new slab press

In 2012 Valmet got the go ahead to design, supply and erect a slab press and partial baling line to produce over 500 air dried tonnes of aspen BCTMP per day.

At the heart of the reconfigured line is Valmet's slab press, type PFE, the latest version of the automatic bale-forming machine for flash dried pulp that has been supplied to over 70 pulp mills worldwide.

Lauri Raid explains that the new solution has solved previous precompaction issues: "Uneven delivery of pulp to the slab press had been a major problem. If you start to compact the bale too early, all the other problems start from there. Valmet's double screw solution provides better, more even delivery of pulp to the press and was the best design for achieving higher capacity."

New and old side by side

However, the challenge was not simply to replace the slab press. "We wanted to retain some of the machinery from the old line and incorporate new machines," comments Lauri Raid. "We also wanted the option to use both the old and new press to feed the same baling line – so the new press was to be installed alongside the old one."

One of the more unusual new line elements was a massive, upper pulp distribution screw for splitting pulp flow from the flash drier to the two presses.

"Originally, we thought we would have to build a new cooling tower for the new press," explains Lauri Raid. "Valmet was the only supplier with experience of distribution screws and this solution has substantially reduced project costs."

The new slab press has been operating since July 2013. Although the old press currently stands idle, reincorporating it in production remains an option for the future.

From the new slab press, bales are fed via an L-shaped conveyor system to link up with the existing bale press. New and original machinery is interspersed throughout the line. Additions include Valmet's RoboApplier and RoboFolder machines to provide efficient bale wrapper application and folding. Valmet's RoboHightyer increases bale options by producing "big bales" consisting of two non-wrapped standard bales for use in large industrial pulping applications.

Targets achieved

"All our targets are being achieved," says a satisfied Lauri Raid. "Our bale wrappers look smarter, using single bales wires has cut wire costs and means less dewiring for customers, and we can now offer the big bale option. It's too early to assess maintenance costs, but it looks promising. Production stability is good and we have met our internal availability targets."

"Most importantly, our top priority has been achieved. Our target capacity has been easily reached. In fact, we recently beat our one-day capacity record by producing 557 tonnes and are well on course to meet our target of 165,000 tonnes for 2014," concludes Lauri Raid. ■

ESTONIAN CELL IN A NUTSHELL

Estonia is one of only a handful of countries that has over 50% forest cover. Around 8% of those forest resources are aspen. Estonian Cell produces high-quality grades of aspen BCTMP, which are used as additives to optimize aspects such as brightness, opacity and bulk, primarily in printing and writing papers. In 2011 Estonian Cell came under the sole ownership of the Austrian Heinzel Group.

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←← IN OPERATION
Valmet's new slab press in operation.

← SATISFIED WITH THE PRESS
Lauri Raid, Mill Manager of Estonian Cell, is satisfied with the results of the slab press and partial baling line upgrade at the mill.

CalLeopard

– double the run time with Valmet's new calender roll cover

The high-end calender roll cover CalLeopard has achieved promising results, with mills reporting extended running times and trouble-free maintenance. **TEXT** Rob Stapels, Minea Hara

After the long journey that the pulp makes through all the papermaking phases, calendering represents the final chance to improve the quality of paper before it is rolled up and shipped. Great demands are therefore placed on calender roll covers, which are often required to perform under challenging conditions. A long, uninterrupted run that produces consistent paper quality requires excellent wear and barring resistance, as well as high nip load durability even at high speeds.

Save costs with long, reliable runs

Valmet has developed CalLeopard, a new composite cover for calender rolls uniquely designed to meet these tough calendering requirements. It is the first calender roll cover to utilize both a new polymer and fiber reinforcement, with a special focus on combining durability with a homogeneous micro-structure, resulting in a very smooth surface.

These factors combine to give CalLeopard extremely high wear and barring resistance, allowing extended running times. This nanotechnology newcomer is another step towards trouble-free papermaking and significant cost savings.

Excellent roll cover durability

Wear resistance is important for all rotating rolls in the paper machine, but perhaps nowhere as much as in the calender. The dry, abrasive paper is in direct contact with the elastic composite cover under high loads and often at very high speeds. Doctoring for paper grades such as SC or DIP-based paper also means special requirements for the wear resistance of covers.

Cover wear is often non-uniform, which affects the cover profile – primarily in the cross direction, but also in the roundness of the cover. When cover profiles deviate enough from the specified values, paper quality and runnability suffer. Excessive local wear may even put the cover itself at risk. With CalLeopard, the wear on the cover is minimal, reducing maintenance costs through longer grinding intervals and fewer cover changes.

130 days and still running

CalLeopard's extended running times are clear, including in a multi-nip calender at a North American SC paper mill, where CalLeopard has achieved a running time of 130 days at speeds of 1,170 m/min and a loading of 328 kN/m, and is still running. This has been the longest run in this position without profile problems, according to the mill.

Longer running times under vibration

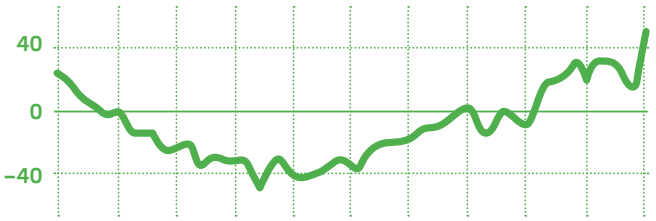
The design of CalLeopard also pays special attention to barring resistance. This is partly achieved by the high wear resistance, but another key factor is the resistance of the cover surface to deformation while absorbing the flexing in the nip. The advanced cover materials and cover structure of CalLeopard resist the barring deformation of its circumference into the infamous star shape, permitting longer running times under vibration. ■

From left to right: Håkan Kinnunen, Maintenance Manager at Stora Enso Kvarnsveden, and John Fridebring, Product Sales Manager at Valmet. "Good relationships come from good products that perform well, such as CalLeopard," notes John Fridebring.

DOUBLED RUNNING TIMES AT STORA ENSO KVARNSVEDEN

At Stora Enso Kvarnsveden's PM 12 in Sweden, high quality SC paper is produced with a modern 5 + 5 TwinLine multi-nip calender. After already achieving running times of about 800 hours with CalJaguar H, the new CalLeopard has nearly doubled that time, at almost 1,600 hours. The surface has remained very smooth throughout, even up to a Ra of 0.17 µm. CalLeopard has managed this level of performance under harsh conditions: pressures of more than 400 kN/m and speeds of 1,130 m/min, while being doctored.

Anita Nordenström, Technician of the PM 12 TwinLine states: "With CalLeopard, we can run much longer without vibration." Longer running times have also given Maintenance Manager **Håkan Kinnunen** more flexibility in planning roll changes.



As the cover profile after PM 12 TwinLine's running shows, uneven wear in the cross direction is minimal, despite aggravating factors such as high load, doctoring and abrasive SC paper. The diameter deviation of the scale is less than 100 µm.

"We are now well prepared for the Industrial Emissions Directive," points out Matti Virta, Production Engineer from Rovaniemen Energia.

Flue gas heat recovery

cuts heating costs in Rovaniemi

Valuable energy is no longer escaping into the air at the Suosiola CHP plant in Rovaniemi, the capital of Finnish Lapland and the official home of Santa Claus. The plant, owned by Rovaniemen Energia, recently started up a flue gas cleaning system with heat recovery supplied by Valmet. **TEXT** Marjaana Lehtinen

"In the first few months, we have had positive experiences with flue gas heat recovery: up to 22 MW more district heat production capacity in trial runs, a 95% reduction in sulfur emissions and dust down 75%," says **Jukka Partanen**, Production Director at Rovaniemen Energia. "The capacity of the scrubber naturally depends on the flue gas flow and moisture level in the boiler, as well as the moisture content of the fuel. At best, the scrubber has contributed as much as 20% to our total district heat production."

"Up to 22 MW more district heat production capacity in the trial runs, a 95% reduction in sulfur emissions and dust down 75%."

Partanen says that the company chose Valmet based on its reputation as a well-known and reliable technology supplier. "Valmet's solution offered the best alternative, both technically and economically. We have calculated that we will save about 1.5 million euros a year in fuel costs with the scrubber, depending on weather conditions and boiler load."

During its two-year development program, the plant increased its district heat production capacity from 62 MW to 110 MW. Of this, 22 MW originates in heat energy recovered from the 140 °C water vapor in the flue gases using Valmet's flue gas condensing technology.

The plant produces district heat for the city of Rovaniemi and electricity for the national grid. Wood chips and peat fuel the boiler, along with light fuel oil during start-ups. Heavy fuel oil is used in separate peak load boilers when there is high demand. One of the goals of the development program was to reduce the plant's dependence on heavy fuel oil. The total investment in the flue gas scrubber and heat recovery equipment amounted to about EUR 5.9 million.

Ready for the Industrial Emissions Directive

In addition to improving the plant's energy economics, the new equipment has a major impact on emissions, which were previously captured by an electrostatic precipitator.

"The new system means we are well prepared for the EU's Industrial Emissions Directive and will stay within the permit limits set for us for sulfur and dust emissions," points out **Matti Virta**, a Production Engineer at Rovaniemen Energia. "Now was a good time to carry out this project, since I expect there will be a big rush when other plants start to invest in this equipment."

Turnkey delivery – on time and on budget

Valmet's comprehensive delivery included the flue gas scrubber, the condensate treatment system, a condensate cooler, plant automation and a building to house them all.

"A turnkey delivery was a good, risk-free alternative for us. The project was on budget and on time, and the quality matched our expectations," Partanen points out. "We are especially excited about Valmet's innovative condensate cooler, which lets us utilize the heat from the cleaned condensate coming from the scrubber to warm and moisten secondary air in the power boiler. This heat is ultimately used to increase district heat production."

Matti Virta wants to thank all the Valmet people involved in the project: "Although there were challenges, we trusted that we had a strong supplier by our side. The project left us with a good feeling – and the desire to work with the same people again on other projects in the future."

Product Manager **Laura Kuukkanen** from Valmet's Environmental Systems unit is also satisfied with the outcome: "We are happy to see power plants investing in better energy efficiency and emissions control. In fact, we would like to see a flue gas condensing system used for every boiler that runs on moist fuel to utilize the fuel as efficiently as possible. Today, almost all new plants in the Nordic countries are equipped with flue gas condensing." ■

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At a glance

Delivery	Flue gas scrubber, condensate treatment system, condensate cooler (patent bending), plant automation and a building to house them all.
Start-up	2014
Results	up to 22 MW more district heat production, 95% reduction in SO_2 emissions and 75% reduction in dust

← Two cranes hoist a new evaporator heating surface.

← **A SPECIAL JOB** Crane personnel taking out the damaged hydraulic cylinder. It is extremely unusual that the cylinder collapses like this.

TUBEL for highest availability

In kraft pulp mills, black liquor is evaporated before it is burned in the recovery boiler. The evaporation takes place in large evaporators that are heated with steam. **Anders Wernqvist** from evaporator sales at Valmet, describes Valmet's experience with evaporator installations:

"To date, we have completed more than 400 big evaporation and condensate treatment projects around the world, gaining lots of experience. We have several different technologies for evaporating black liquor. In the concentrator part of the evaporation train, we usually recommend our TUBEL evaporators. They feature a design where the black liquor is evaporated on the outside of hot tubes. The tubes are robust and stable mechanical components, and this gives our evaporators a very long life time. Another big advantage is that the heating surface can be easily washed clean during operation. This ensures a high evaporation capacity and avoids the costs of hydroblasting.

The installation at Smurfit Kappa Kraftliner also made it possible for our customer to lower their steam consumption when their leaking heating surfaces were exchanged for our tube-based technology. I'm really happy about the very good experiences our customers have had with the TUBEL technology, both from upgrades of existing plants and in new plants."

Fast but challenging installation

Smurfit Kappa Kraftliner switched to Valmet technology.

TEXT Andreas Liedberg

The Smurfit Kappa Kraftliner paper mill in Sweden was having problems with its evaporation plant. The heating surfaces had begun to crack, resulting in unplanned outages, higher costs and sometimes lower evaporation capacity. After analysis and discussions with several suppliers, Smurfit Kappa Kraftliner chose to replace the damaged heating surfaces with Valmet's TUBEL heating surfaces. But the installation of the new heating surfaces became dramatic: A 350-tonne crane collapsed, and suddenly the standard replacement job became a race against time.

The Smurfit Kappa Kraftliner mill has an annual capacity of 700,000 tonnes of kraftliner. Kraftliner is made from virgin fiber and is used to manufacture containerboard. The mill started up in 1962 and has been continually upgraded and expanded ever since. Now the time had come for the evaporation plant. **Stefan Lundqvist**, Manager of the Chemical Recovery Plant at Smurfit Kappa Kraftliner relates the thinking at the mill:

"Our evaporation plant had been working well, but we had started having serious problems with cracks in the concentrator heating surfaces. We finally got to the point that it was no longer possible to repair the heating surface, we had to replace it instead. One option was to switch to a new heating surface of the same design, but made from a material that was more suitable for our conditions. After analysis and evaluation of our options, we chose to switch to a heating surface from Valmet."

Change of plans

Once the choice of technology was made, the effort focused on getting the new heating surface installed as quickly as possible. First, the work at the site went according to plan, but the situation suddenly changed when a crane collapsed. Valmet's Project Manager **Charlotta Cederström** describes what happened:

"The heating surfaces are very heavy, so for this installation we were completely dependent on a big 350-tonne crane, both to get the old heating surfaces out and to install the new ones. Things got more complicated than we had planned for. We began hoisting the old heating surface, but the main hydraulic cylinder on the crane suddenly bent. Nobody was hurt, but we had to stop the work and change our plans."

"In order to minimize the time lost due to the collapsed crane we, together with the crane company, immediately started scrambling to find new parts, dismantle the crane and repair it. We also began a range of other activities intended to save time and minimize delays. It was a hectic time, but we had a very open, direct and positive dialogue with the people at Smurfit Kappa Kraftliner, and their positive attitude was a great help. Cranes do not normally collapse, so this site work became very challenging. In the end, we managed to minimize the time lost and the installation was one of our fastest, compared to others with this kind of scope. I think that the support we got through the positive dialogue we had with our customer was one of the main reasons why the people on site could perform as well as they did in this project."

Good cooperation leads to results

Stefan Lundqvist at Smurfit Kappa Kraftliner continues the story:

"Our job is to make things work well, and when we run into problems, we focus on finding ways forward. A big challenge in a case like this is to make sure things remain safe, even when the plans for the work change as much as they did here. The cooperation with Valmet worked well, and many other people acted very professionally and made outstanding contributions. All in all, the end result was very good. Despite the setbacks, we ended up with only a small delay. I should also add that our concentrator has been working very well since it was started in autumn 2013." ■

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In its continuing quest for better productivity and cost savings, Hamburger Hungaria chose Valmet's new HiRun P blow boxes. TEXT Paavo Sairanen

BOOSTED EFFICIENCY with new blow box

The Hamburger Hungaria mill, located in Dunaújváros, Hungary, 70 km south of Budapest, has always aimed to achieve better results and has been able to improve the productivity and efficiency of its PM 7 year after year. First started up in 2009, the machine produces 100% recycled brown liner and corrugated medium. It has an annual capacity of approximately 470,000 tonnes, a width of 7.8 m and an original maximum production speed of 1,400 m a minute.

> Any action that reduces costs and improves efficiency is important.

In 2013, pre-dryer section runnability became a bottleneck for PM 7. The mill decided to investigate the possibility of improving runnability in the first dryer group, which would consequently reduce draw from the press to the dryer. This would be the next step in improving production line efficiency.

An additional aim was to save on costs in the spare part sealings of the blow boxes. The existing concept had a feature that wore out the sealing material rather quickly, resulting in high annual operating costs.

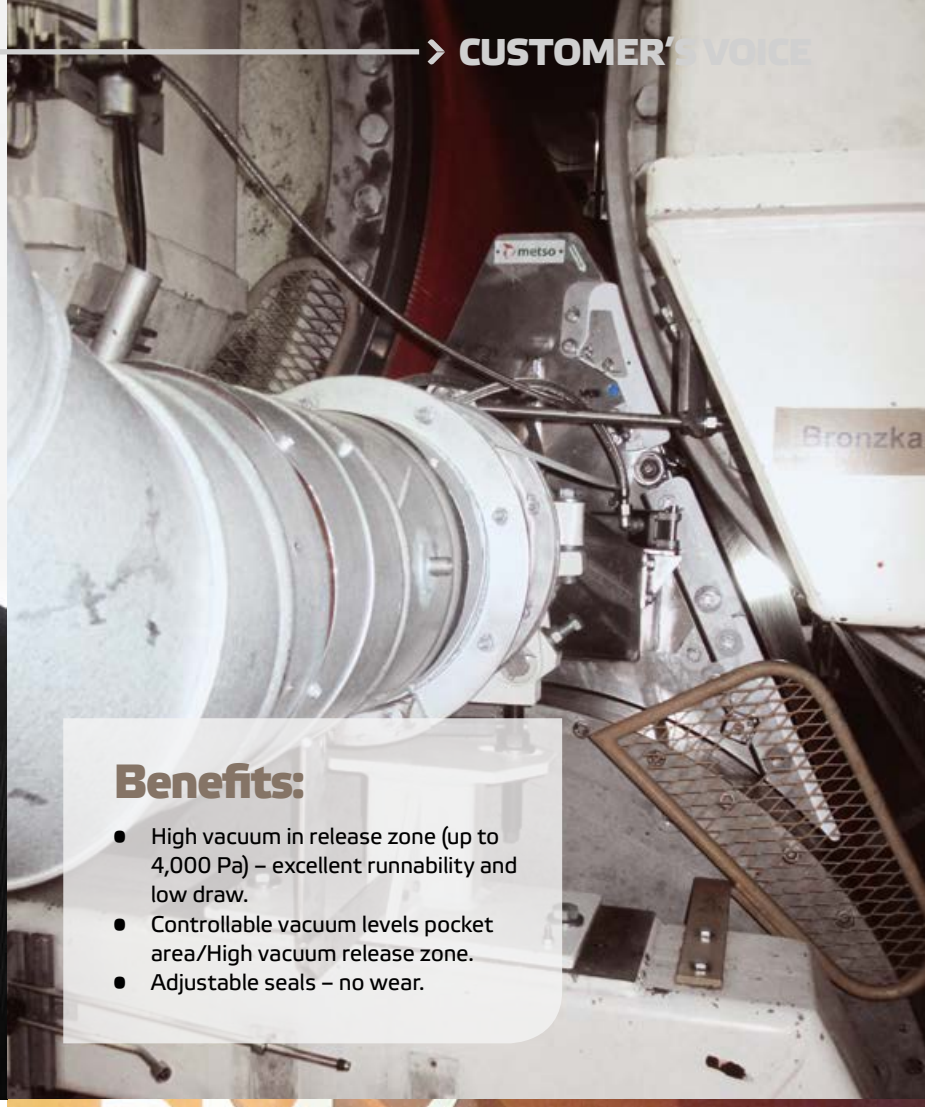
Excellent runnability and low draw

Hamburger Hungaria became interested in Valmet's HiRun blow box technology, which addresses both their targets and has also proven its capabilities in numerous reference cases in recent years. HiRun P is a new solution with passive drilled bottom rolls for improved runnability.

The mill set strict requirements for the delivery. They included a stable web run at 1,400 m/min (with the possibility of a future speed increase up to 1,500 m/min), lower press-to-dryer draw, higher time efficiency and a longer lifetime for the blow box sealings.

The HiRun P system was successfully started up at the beginning of January 2014. The test run met all the requirements for a stable web run, fewer breaks in the first group and lower draw. The guarantee for the sealing lifetime was also fulfilled.

"It was an easy decision for us to select HiRun, since it is known as



Benefits:

- High vacuum in release zone (up to 4,000 Pa) – excellent runnability and low draw.
- Controllable vacuum levels pocket area/High vacuum release zone.
- Adjustable seals – no wear.

the industry standard technology in terms of dryer runnability," says **György Szilas**, Production Manager at Hamburger Hungaria. "I am very pleased with Valmet's competent approach and attitude; Valmet people helped and worked with us to improve machine line competitiveness and productivity."

According to **Attila Bencs**, Mill Manager at Hamburger Hungaria, "Any action that reduces costs and improves efficiency is important. The HiRun P blow boxes were one step forward in our development process. Valmet made this a pleasant and smooth project." ■

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ONE STEP FORWARD
"The HiRun P blow boxes were one step forward in our development process," puts in Attila Bencs, Mill Manager at Hamburger Hungaria.

THE INDUSTRY STANDARD
"HiRun is known as the industry standard technology in terms of dryer runnability," points out György Szilas, Production Manager at Hamburger Hungaria.

Dryer Cylin

improves product qualit

Daily maintenance of dryer cylinders is crucial for any paper manufacturer striving for excellence. Valmet's mill improvement expert team reduced IP Sun's dryer cleaning time, furthering their ambition to become one of China's leading producers of liquid packaging board. Following the on-site maintenance, the adaptability and stability of their end products was better than ever. TEXT Martin Yang

der Service

y at IP Sun

Dryer cylinder surface before and after coating.

Board machine dryers are vital to enhancing the strength and smoothness of sheets and to improving paper moisture. It is no surprise that dryers are considered one of the most important parts of the dehydration process, after the press section. Nevertheless, dryer cylinders create a variety of operational challenges due to their large size and considerable weight, coupled with their price and the time required for installation and unloading.

High demands on end product quality

IP Sun places a great deal of emphasis on continuously improving their paper quality and fully satisfying the needs of their customers, while simultaneously expanding their market share, especially in the growing liquid package market. Securing end product quality demands a strict focus on strengthening the maintenance of dryers, preventing corrosion, and extending their service life.

The mill therefore needed rapid

assistance when some sticking and corrosion problems emerged on the surface of the dryer cylinder of their PM 22 in May of 2013. Due to poor surface release properties, fluff and break times had increased alarmingly and the sheet moisture had abruptly deviated. Eventually, this resulted in quality problems in the end product.

An economic yet efficient solution

Valmet's mill improvement team recommended the DryOnyx H anti-sticking coating service, designed for efficient on-site application. DryOnyx H's excellent suitability for on-site work meant that time-consuming heating with gas-based equipment was not needed. This allowed the mill to save time and avoid any negative effects of heating, such as possible changes to dryer dimensions.

Moreover, due to its innovative nanopolymer release material, DryOnyx H has unparalleled surface performance. The coating maintains its hardness even at the high temperatures found in the dry section. This leads to reduced wear, improved release properties and a longer service life. Due to the special chemical additive in the polymer, the coefficient of friction is 80% lower than in previous materials, which means better doctorability and reduced drive power consumption.

Professional service in the shortest possible time

After receiving the call from Sun Paper, Valmet's mill improvement experts quickly arrived at the mill site. First, the team identified the location and size of all the corroded areas, and then proposed the optimal solution based on the customer's preferred break time. Valmet swiftly assigned two recoating teams and two sets of equipment to work simultaneously on the dryer cylinders of PM 22. Both teams applied the DryOnyx H anti-stick coating and completed the repair on-site in the shortest possible time.

A profitable partnership

The success of the project was highly regarded by the management teams of IP Sun and Sun Paper. Between June and November 2013, Valmet's expert service team successively applied the DryOnyx H anti-stick coating to no less than 25 dryer cylinders on four different machines. In addition to dryer cylinder DryOnyx H coatings, three suction roll shells were also serviced by the Valmet team. The expectations of brief downtime and minimal customer losses were met through successful cooperation.

"Valmet's service personnel were very professional and I was greatly satisfied with the coating results. Since minimizing downtime is very precious to us, it was crucial that the break times were reduced and the release properties significantly improved. Valmet saved lots of valuable time for us with their efficient and professional service," says Mr. **Li**, Mill Manager of PM 17 at IP Sun.

"We can now see a significant decrease in fluff and the surface of the dryer cylinder is very clean. Before the service was carried out, the dryer cylinder needed to be cleaned three or four times every shift. Now we only need to clean it once in every shift. Valmet helped us save lots of cleaning time," says Mr. **Ma**, Vice Mill Manager of PM 22 at IP Sun. ■

> It was crucial that break times were reduced and the release properties significantly improved.

About the Mill

International Paper & Sun Cartonboard Co., Ltd., located in Yanzhou in China's Shangdong province, is boldly taking up the challenge of answering to the country's increased demand for liquid packaging board production. A joint venture between the American firm International Paper and China's Sun Paper, the mill's annual output is more than 1.4 million tonnes of liquid packaging board, folding boxboard and solid bleached board. With its newest cooperation, IP Sun plans to deliver 300,000 tonnes of sterile liquid package board in the near future.

PLEASED WITH THE RESULT
The head offices were very satisfied with the results. Valmet Mill Improvement Service Engineer Qu Bo and IP Sun Mill Manager Han Guobin stand in the front of the Dryer Cylinder.

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Service Engineer Jake Li from Valmet (left) and Production Manager Yichang Zhong inspecting the CD segment holder.

ShiveClean segment pattern leads to excellent refiner performance

When Asia Pulp & Paper (APP) decided to install a new BCTMP (bleached chemi-thermo-mechanical pulp) line at its Guangxi Jingui pulp and paper mill, it turned to Valmet. Since its start-up in mid-2013, the capacity of the line's refiners and the lifetimes of their segments have reached remarkably high levels, and their energy consumption has been low. **TEXT** Ville Ruola

The new line consists of two Valmet RGP 82 CD high-consistency refiners in the chip refining stage. Subsequent refining is carried out in three Valmet RF-5 conical low-consistency refiners.

Refiners running at almost double design capacity

The design capacity of the pulp line is 750 TPD (tonnes per day). As the line consists of two parallel chip refiner units, this means that each refiner is guaranteed to run at a production rate of 375 TPD. APP Guangxi Jingui is determined to take full advantage of the pulp line, though, so they have pushed the equipment to the limit and run over 700 TPD through just one machine – almost double the design capacity – with no deviations in final pulp freeness.

Long segment lifetime

The performance of the refiner segments has been very good. APP Guangxi Jingui has been running turbine segments with the ShiveClean feature – Valmet's latest segment patterns – right from the very beginning. These segments are specifically designed for hardwood BCTMP processes; they target pulp quality as much as they focus on minimizing energy consumption.

These segment patterns are helping APP Guangxi Jingui achieve the longest segment lifetime in China: more than 3,000 hours on several occasions, with a record of 3,200 hours. The mill's Production Manager, **Yichang Zhong**, is happy with the input of the Valmet segment team, and he believes that continuing cooperation will mean they can achieve even better performance.

"The best BCTMP mill in China"

Yichang Zhong was also happy to say that APP has the best BCTMP mill in China. Two important factors have contributed to the high level of customer satisfaction at APP Guangxi Jingui: the stable operation and the excellent availability of the line, which are the natural outcome of choosing turbine segments featuring ShiveClean.

The revolutionary new way that the new segment pattern handles steam also ensures that refiner power and disc gap variation is minimized. This is very important when the goal is long segment lifetime, as it is at APP Guangxi Jingui. ■

About the mill

APP Guangxi Jingui Pulp & Paper Co., Ltd., one of the largest mechanical pulp producers in the world, is located in the province of Guangxi in southern China, close to the Vietnamese border.

The mill employs more than 3,000 people. In 2013, pulp production reached 550,000 tonnes. Currently, it produces 600,000 tonnes of top-grade board annually. APP's ShiveClean investment supports its ambitious long-term sustainability roadmap, Vision 2020.

The operating principle of ShiveClean is to let the flow of steam move forward in grooves while the fiber flow is forced up to the bars for further development.

WavStar

has the "Wow!" factor in Hallsta

CAPACITY UP
"Since the installation of the filter bags we have been able to increase the capacity by 20%," says Patrik Jansson.

"The poor capacity of our disc filters was causing us major problems. They were a truly troublesome bottleneck and the entire process was negatively affected – finding the right solution was a must," says Patrik Jansson, Operations Engineer at Holmen's mill in Hallsta, Sweden. TEXT Annica Börstell

"We were initially skeptical that a corrugated filter bag could be the solution, but because the idea of investing in new, costly disc filters was not all that attractive, we decided to give Valmet's WavStar filter bags a try. The alternative, with sectors in corrugated steel instead of filter bags, was not an alternative for us either. The references we looked at showed that it was difficult to achieve the promised capacity, and even if the service life of plates is longer than for filter bags, the cost of investment is high.

"Using corrugated filter bags was a new thing for us, and we wondered how long the filter bags would last. But because Valmet promised a service life of at least three years, we felt secure in moving forward with our decision, despite a few misgivings."

Stable capacity increase

"Now that we've evaluated the results after the filters have been running for more than two years, we can see the benefits and we know that the major benefit is in the increased capacity, which means we don't have to invest in more filters," says Patrik Jansson. "The corrugated fabric significantly increases the sector's surface area, which explains why dewatering is now so much more effective.

"The numbers send a clear message. Since the installation, we've been able to increase capacity from 1,000 to 1,200 tonnes per day – a 20 percent rise – that has been stable throughout the time we've been using the filter bags. Part of the increase is due to us changing the cleaning and cake discharge shower system and getting a bit better at caring for our disc filters. However, the main reason is the new filter bags."

Speed fundamental

"Another positive effect is that the nozzles do not get clogged," Patrik Jansson continues. "At the high speeds we were running at before, this was a big problem. High speeds also produce poor, thin pulp cakes. Contrary to what one might believe, it's an advantage to be able to run at a lower speed, because it is difficult to get the pulp to form a good cake at higher speeds. We've been able to reduce the speed from 1.8 to 1 rpm, which is ideal – the filtering is good and the fibers have time to build up into a cake with the right moisture content and thickness. Since the cake is thicker than before, the filters are also cleaner.

The first of Hallsta's filters that is fully equipped with WavStar.

"Valmet installed the first filter as part of the comprehensive service, but since then we've replaced them ourselves. One difference from before is that we now change all sectors and fabrics at the same time. Before, we constantly had bad fabrics that had to be frequently replaced. Determining which sectors had to be replaced was time-consuming when you consider that we had 360 sectors to monitor."

Analysis – an aid in service

"General disc filter maintenance is performed during the autumn," says Patrik Jansson. "One sector is taken down and samples are sent to Valmet for analysis. This tells us how much strength remains in the weave and can even indicate the expected service life, which is handy. The analysis also includes technical operation discussions. We really appreciate the technical support we receive from **Antti Mäkinen** at Valmet. Both maintenance and service have become much easier."

Bottleneck eliminated

"With WavStar filter bags, the bottleneck was eliminated," Patrik Jansson concludes. "Dewatering for the disc filters is now properly dimensioned, the process is optimized and the filter bags work really well – we're extremely pleased with the results!" ■

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COSTS REDUCED AT BOHUI

Valmet TwinRoll press and Exchange Service Agreement enhance efficiency and quality at Bohui.

TEXT Martin Yang and Zhang Bichun

Shandong Bohui installed its first TwinRoll press in its BCTMP (bleached chemi-thermo-mechanical pulp) line 1 in 2004. It was chosen for its small footprint, easy operation and maintenance, low fiber loss and stable, reliable operation. Now all of the pulp lines at Bohui are benefiting from the production and dewatering efficiency provided by TwinRoll presses.

Efficient operation

Chen Xinli, who manages pulp line 1 at Shandong Bohui, puts it this way: "The TwinRoll press is very stable and maintenance is minimal. We've had no need to repair presses during normal use and operation. Valmet trained our employees during the start-up phase after each press was installed. So for them, completing the daily maintenance work is no problem at all."

Chen Xinli specifically stated that "due to its high dewatering efficiency, the TwinRoll press has a strong advantage over its competitors when it comes to improving washing efficiency and reducing chemical residuals."

TwinRoll Exchange Service Agreement reduces maintenance costs

After running for a long time, the two rolls in a TwinRoll press require attention to maintain runnability. Changing rolls can mean long periods of downtime – a factor that no mill is particularly happy with. A TwinRoll Exchange Service Agreement targets this problem by reducing the downtime required for changing rolls.

Chen Xinli again: "Since the TwinRoll Exchange Service Agreement was introduced some time ago, we have benefited from not having to invest in or maintain spare rolls. That has saved us a lot of capital expenditure. Importantly, the agreement guarantees continuous reliability and availability. Valmet also provides professional supervised installation on site during the exchange process. At the end of the day, we decided to purchase the exchange agreement due to the vast experience of the global Valmet team."

FAST SERVICING
The Exchange Service Agreement shortens the roll changing downtime.

How the agreement works

Valmet keeps spare rolls and key repair parts in stock at a Valmet service center for an annual fee to ensure rolls can be quickly replaced. The agreement also includes on-site guidance from Valmet experts during disassembly and installation. Valmet technicians also provide professional advice to mills if they encounter any problems there.

Reduced downtime is not the only benefit of the Twin-Roll Exchange Service Agreement;. It also allows mills to reduce the capital costs of owning spare rolls. What's more, Valmet provides a full mechanical guarantee for rolls from the time of installation.

The rolls covered by the agreement can be shared between several mills. This means that more than one mill in the same region can have access to a centrally warehoused roll if they have the same type of press. Each mill pays an annual fee that is considerably lower than the cost of owning spare rolls. Having key parts always in stock also ensures rapid repairs of replaced rolls. Each mill participating in the agreement pays for any repairs involved in the exchange process separately.

TwinRoll Exchange Service Agreement guarantees quality

Guided by the principle of establishing service components close to its customers, the agreement with Valmet saves them money on logistics, overseas transportation time, and duties and tolls. All parts involved in the exchange agreement are of the original design. ■

Shandong Bohui Paper Co., Ltd.

Shandong Bohui Paper Co., Ltd. is a leading producer and marketer of folding boxboard, printing and writing paper, testliner, gypsum board, kraftliner and market pulp in China.

The Shandong Bohui mill's first roll, TRPW-1532, was reconditioned in September 2013 at the Valmet Zibo service center in Zibo, China.

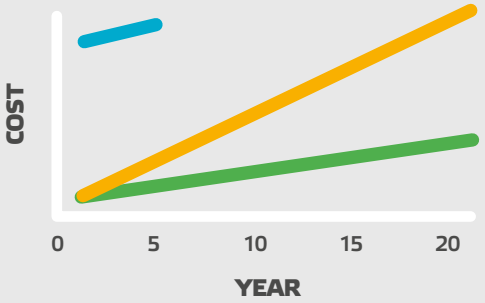
Valmet's TwinRoll press technology

Valmet's TwinRoll press technology has been serving the pulp and paper industry for some sixty years. The TwinRoll press is particularly popular in China, with an installed base of around 110 units in some 20 mills.

There are currently more than 1,100 TwinRoll presses installed across the globe. Continuous tracking and mill visits give Valmet valuable feedback and suggestions from its users throughout the world. Valmet employs an experienced team of experts to serve customers worldwide in mills and Valmet service centers.

AT THE MILL
Service staff during a visit to the Shandong Bohui mill. From the left, Jack Dou (Valmet Mill Sales Manager), Chen Xinli (Manager of pulp line 1), Zhang Bichun (Valmet Senior Manager), Fiber workshop service.

The blue curve indicates the total cost for a mill of owning its own spare roll. The orange curve shows a single mill with an exchange agreement. The green curve shows three mills sharing one spare roll under a joint exchange agreement.



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Well-planned maintenance maximizes availability

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In a major mill or plant investment project, the cost of maintenance planning is just a drop in the ocean. However, it pays for itself many times over through high availability and better results.

TEXT Marjaana Lehtinen

Proactive maintenance shows low maintenance costs and reduced unplanned downtime in the long run," notes **Markku K. Salo**, Manager of Sales and Operation Development at Valmet. "Unfortunately, we still see too much of the traditional method where a mill or plant relies on warranties from equipment suppliers for the first few years and doesn't pay attention to preventive maintenance. When the warranty period ends, availability often falls and problems start to emerge, which result in extra costs."

Salo compares it to cars. "If you buy a new car, you certainly will not neglect its scheduled maintenance, because you want the car to keep you on the road. Strangely enough, with industrial investments that are worth billions, people tend to do just the opposite: wait until the equipment fails."

A criticality analysis reveals maintenance needs

Valmet helps its customers establish and improve their maintenance operations through its expertise in both maintenance and computerized maintenance management systems (CMMS). The work includes creating a maintenance plan, uploading it to the customer's CMMS, as well as collecting and linking the maintenance plan, spare part information, drawings, bills of materials, documents and machine cards. The maintenance plan is always based on a criticality analysis of the probability and consequences of failure.

"Using our combination of machinery, automation, process and maintenance know-how, we rank the equipment-based production loss, maintenance costs, safety and environmental effects, and mean time between failures," Salo explains. "The most critical equipment needs continuous condition monitoring, whereas the least critical equipment can be run to failure without any effect on productivity."

In most cases, about 20% of components are considered critical and 20% are not so critical. Maintenance actions on the remaining 60% are carried out case by case.

Systematic maintenance plans for all equipment

Valmet creates a maintenance plan based on the criticality analysis that itemizes and schedules all preventive maintenance action, such as inspection, lubrication, maintenance and overhauls, and vibration monitoring. For each piece of equipment, this maintenance plan describes what needs to be done, when it should be done, and who does it on a daily, weekly, monthly or annual basis. A life cycle plan for all equipment is also included.

"If key process indicators show that some equipment needs maintenance earlier than scheduled, the necessary actions will be carried out immediately," Salo explains. "As process conditions change, the maintenance plan has to be updated every two to three years."

A CMMS in top-notch condition means that once a problem is identified, maintenance technicians can easily locate the failure and find the documentation they need. This facilitates troubleshooting and locating necessary spare parts, resulting in the shortest possible downtime.

"Traditionally, all this information is found in various supplier manuals lying around somewhere. In the worst case, the information is purely empirical and can be found only in the head of somebody who is not present at that moment," adds **Mikko J. Lehtola**, a Project Manager from Valmet's Mill Maintenance Services. In a CMMS, access to all vital information is immediate.

Early planning brings the best benefits

Valmet provides maintenance planning services either on a support or outsourcing basis for both greenfield and brownfield mills and plants. According to Lehtola, the best results are achieved on new production lines where the customer has outsourced all their maintenance to Valmet.

The earlier maintenance planning is involved in the investment project and process engineering, the better. As the main equipment supplier, Valmet is able to take maintenance needs into account in preparing the process layout, writing the maintenance instructions and compiling equipment documentation.

"A modern mill or plant often has high-tech equipment whose maintenance requires expertise. Reading a maintenance manual is simply not enough to solve problems. If critical components are left without maintenance after start-up, it can lead to a catastrophe," Lehtola says. "This is what maintenance planning in CMMS definitely prevents – which saves money in the long run." ■

> Proactive maintenance shows low maintenance costs and reduced unplanned downtime in the long run.

READY TO SERVE
Valmet provides maintenance planning services either on a support or outsourcing basis.

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BioTrac
– the path to a fossil-free future

HYDROLYSIS FOR BIOMASS REFINING
The flexible BioTrac system at Valmet's research and development center in Sundsvall, Sweden.

About hydrolysis

Hydrolysis is a chemical process that, under elevated temperature and pressure, makes cellulose and hemicellulose available to be split into different sugars and lignin in subsequent processes. The lignin is obtained as a solid residue. Both sugars and lignin can then be further refined.

Many companies that use fossil fuels in their production are today seeking bio-based alternatives. Their goal is to become carbon-neutral and reduce carbon dioxide emissions. Valmet has the right equipment and extensive experience in handling biomass produced from non-wood fiber. In other words, Valmet is a reliable partner on the path towards achieving this goal. TEXT Kerstin Eriksson

Valmet has installed a new pilot plant at its R&D center in Sundsvall, Sweden that focuses on process optimization and testing raw materials based on biomaterials. Many of Valmet's customers visit the plant to test Valmet's technology for their own ideas and processes.

The BioTrac system for hydrolysis of biomass is flexible in terms of both raw material and process. It can easily be adapted to downstream process steps. Further refining can range from producing bioethanol to bio-based chemicals and biomaterials, such as bioplastics. Or it may be biocoal to replace fossil coal as an energy source in heat and power generation.

Some kind of hydrolysis is often the first step in a biorefinery, and one that has to be carried out regardless of the subsequent process. The layout of the system varies by application area, but often consists of either one or two reactors, although more may be used if required. It can also be supplemented by solid-liquid separation to extract hydrolyzates from solid biomass.

High availability and security

When dealing with high temperatures and high pressure, it is extremely important to reduce risks to improve security. BioTrac is designed for safe operation. Continuously feeding biomass into a pressurized reactor requires well-thought-out solutions – one of the strengths of this system. In the BioTrac system, the biomass is pre-compressed to accomplish a steady feed into the reactor while improving the safety and providing high availability.

We are pleased with the performance of Valmet's pretreatment system", says Dr. Markus Rarbach of Clariant.

Continuous development

"The BioTrac system can easily handle a variety of biomass types, and we can closely control and follow what is happening in the process. This pilot plant gives us the opportunity to continue developing our technology," says **Olof Melander**, Manager of Valmet's Fiber Technology Center.

Valmet has invested in developing equipment and technology for the expanding biorefinery market. The number of patents in the field has increased, and solutions are plentiful.

Several good examples

Valmet today has a number of references, having sold ten hydrolysis systems since the 1990s. One of the most recent sales was to the Bioprocess Pilot Facility in the Netherlands.

Another example is the Swiss specialty chemicals company Clariant, which inaugurated Germany's largest second-generation bioethanol plant in July 2012. The cellulosic ethanol produced by Clariant reduces CO_2 emissions by 95% compared to fossil fuels, and it does not interfere with food or feed production. The raw material is agricultural residue such as wheat straw or corn stover.

"We are very pleased with the performance of Valmet's pretreatment system. The integration into our sunliquid process set-up works very well, and the pretreated material demonstrates good properties in downstream process steps," says **Dr. Markus Rarbach**, the head of Clariant's Start-up Business Project Biofuels & Derivatives.

Collaboration is key

Valmet sells both pilot and commercial-scale plants. Some buyers will use the equipment to carry out their own further research, while others will produce bio-based fuels or chemicals.

"The technology Valmet is marketing today is based on technology originally developed for the pulp and paper industry – an area where we have extensive experience. This experience combined with the excellent cooperation we have with our customers have been very valuable in developing the equipment we have today," says **Rickard Andersson**, Vice President of Biotech and Environment Systems at Valmet.

The range of applications is wide for BioTrac, but the goal is the same: carbon dioxide emissions must be reduced while retaining profitability. This goal can only be achieved through collaboration; together we will find the best road to a fossil-free future. ■

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OptiConcept M – One concept, many production environments

Defining suitable production capacity is the key to ensuring the highest possible return on investment. Valmet's focus is on supplying the right papermaking lines with sustainable solutions to serve both local and global markets. **TEXT** Marika Mattila

OptiConcept M is a modular paper and board making concept which answers these challenges. Production can be flexibly focused on products where demand and prices are most profitable. The OptiConcept M family, launched in 2011, now suits both containerboard grades and fine paper production – simple, well-functioning solutions that meet our customers' needs.

Smart paper machine approach based on papermakers' needs

OptiConcept M's operating profitability is based on the concept's overall efficiency – energy- and resource-efficient processes and high-speed production from 1,100 m/min up to 1,300 m/min. For customers, considering the long-term future is important. The focus should shift from the moment of investment to the lifetime operating costs.

This smart concept combines the advantages of standardization with modular tailoring. The modular processes and solutions, set within optimally fixed machine widths, allow the designing of individual lines for customers' varying needs and targets.

OptiConcept M's energy efficiency is achieved by taking into account all the surrounding processes and systems, such as the machine controls. Valmet has many references globally proving its energy-efficient production. This experience is available with the new OptiConcept M as well. One highlight of the innovative and energy-efficient process is Valmet's VacuMaster. This suction box with a curved cover can replace a suction roll and forming section, allowing total energy consumption to be cut by around 10%.

Design is the difference

The OptiConcept M papermaking concept sports fresh design and engineering innovations which add safety and usability. One standout example is the new walkway approach. The drive side now has spacious walkways which greatly improve accessibility and safety at the assembly stage due to a new installation order. All the tending-side walkways are on one level, eliminating the need to walk up and down stairs and providing a pleasant working environment for operators. Another great differentiation element in the design is the machine's simplified frame construction. No cantilever beams are needed and foundation loads between drive side and tending side are even.

Several customers have already chosen the new concept

Valmet has already sold five OptiConcept M production lines for efficient containerboard production as of August 2014. The first delivered line, Liansheng Paper PM 6, started up in China in December 2012. "The most beneficial part of this new concept is the low consumption of water, electricity and steam," says **Xue Rong Jun**, Project Manager at Liansheng Paper. He continues: "The installation required 30–40% fewer working hours than a conventional project." Customers have clearly gone for reliability and resource efficiency in a compact package. ■

THE RIGHT SOLUTION FOR IMPROVED PERFORMANCE
Designed to maximize the dryness and minimize the drive power consumption, VacuMaster vacuum suction box with a curved cover is the right solution for improved former drainage performance. Under optimal operating conditions the forming fabric is just kissing the VacuMaster blades while there is a continuous water layer transfer into the box.

OPTICONCEPT M
One concept, many production environments for containerboard and fine paper making.

FLUTING
Speed 1,400 m/min
Reel width 6,660 mm

LINER & FLUTING
Speed 1,400 m/min
Reel width 6,660 mm

FINE PAPER
Speed 1,600 m/min
Reel width 6,660 mm

FENNIAprize 14

HONORARY MENTION

LINER & FLUTING
Speed 600-1,000 m/min
Reel width 5,650 mm

OptiConcept M receives honorary mention in Fennia Prize 2014

In January, 2014, Valmet's OptiConcept M received an honorary mention in Fennia Prize 2014, one of the biggest design competitions for companies in Finland. The competition aroused much attention since 80 companies registered for it.

The Fennia Prizes are awarded to companies in recognition of the comprehensive and innovative use of design in creating and realizing products, services and business concepts, and in product development, manufacturing and corporate image matters.

Jussi Salojärvi, a member of the OptiConcept M design team, is happy about the honorable mention the concept received: "This is a great achievement in our long development work. We have clearly managed to choose the right product properties for OptiConcept M. Getting this honorable mention is an indication of this success. This is a good place to continue from. A large team has been involved in developing OptiConcept M, and certainly this prize is for everyone who has positively affected the concept. Thank you, everybody!" says Salojärvi.

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Huge improvements on packaging grade through right forming fabrics

The right forming fabric can bring about huge improvements in boardmaking. The OptiProof forming fabrics improve machine efficiency and paper quality as well as provide major cost savings – all benefits warmly welcomed by packaging grade producers. TEXT Pekka Kortelainen

The production efficiency and cost-saving requirements of packaging grades – liner and fluting – are continuously growing. One such need is to make packaging paper and board grades as light as possible, yet with the same strength properties as heavier grades. "To achieve this in both the cross- and machine directions throughout the web, formation has to be good and fines must be bound on the web. It is also important to have even basis weight profiles as well as good printability properties on liner," says **Pekka Kortelainen**, Product Technology Manager for Forming Fabrics at Valmet.

Another requirement is to save energy since energy plays a significant role in production costs. The forming section is responsible for approximately 19% of the energy consumption of a packaging paper machine. The sectional drives make up the largest single user of energy in the forming section at 42%. (Fig. 1)

A third requirement is to increase machine speeds in order to produce packaging paper more quickly and without web breaks. The fastest gap former machines today run at over 1,600 m/min, and the 24-hour world speed record is currently 1,704 m/min.

FIG 1: FORMING SECTION OF ENERGY CONSUMPTION

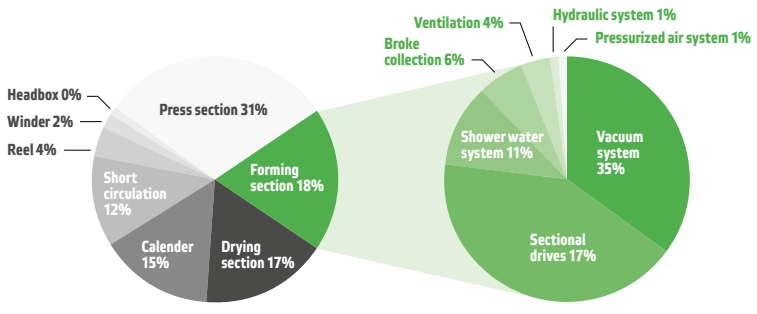
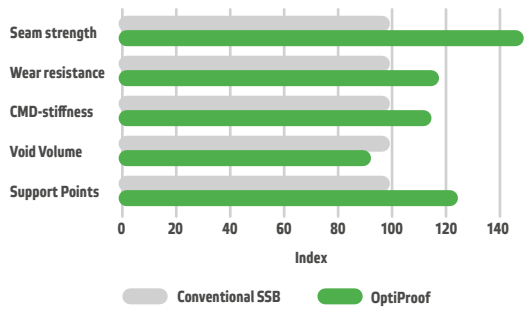


FIG 2: COMPARISON OF OPTIPROOF AND CONVENTIONAL SSB-DESIGN



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More demands on forming fabrics, too

All these requirements place more demands on forming fabrics, too. "In addition to featuring a long lifetime and effective dewatering, the fabrics must have a good retention capability, minimal fiber and water carry, high dimensional and diagonal stability, as well as good fiber support," Kortelainen points out.

The OptiProof fabric provides 25% better fiber support and 15% higher CMD stiffness than traditional SSB fabrics. Although the fabric is thinner and has a void volume almost 10% lower, its wear resistance is almost 20% better than that of a traditional SSB fabric. The seam is also 50% stronger (Fig. 2), mainly due to the lock binding.

Valmet developed its OptiProof forming fabric based on the fine-surface fabrics originally made for printing paper machines. The fine warps, 10-shed structure and lock binding (Fig. 3) of these fabrics are known to contribute to a fine paper side and a wear-resistant roll side.

According to Kortelainen, experience gained on production machines has demonstrated that OptiProof fabrics are suitable for both slow Fourdrinier machines and for the world's fastest gap former packaging board machines. ■

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Best ever profiles and EUR 200,000 annual savings on a gap former machine

A gap former machine producing testliner and fluting at over 1,600 m/min in a basis range of 70–120 g/m² was having an issue with uneven basis weight profiles. Despite numerous trials with many PMC suppliers' products, it was only possible to achieve sufficiently good profiles with one supplier's fabrics.

In the spring of 2013, a pair of OptiProof fabrics was installed in the machine, resulting in its best ever profiles. Sheet formation was more homogeneous, and the strength properties (CMT, SCT and burst) improved compared with the standard fabric. There was also a significant reduction in the use of polymer/retention aid, a high dry content after the forming section and a record-long fabric lifetime.

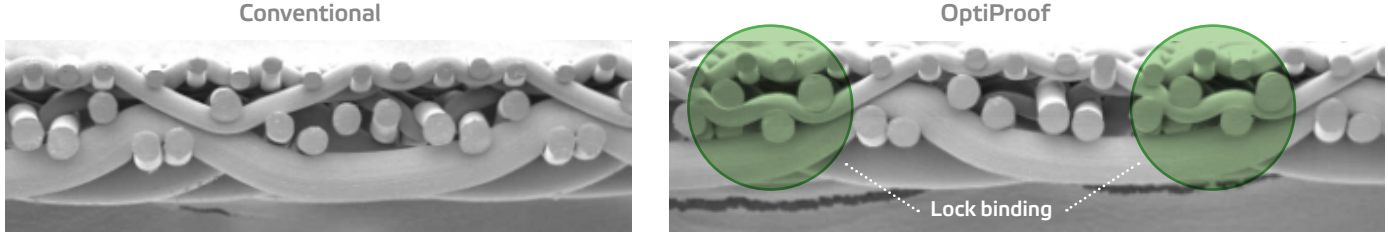
A huge financial benefit came from significantly lower power consumption, resulting in annual savings worth approximately EUR 200,000.

Excellent fabric performance on a Fourdrinier machine

A customer running a Fourdrinier machine that produces corrugated medium (fluting) in a basis weight range of 90–170 g/m² at speeds of 600–800 m/min wanted to extend the lifetime of their forming fabric.

A trial with OptiProof resulted in a longer lifetime than standard fabric. Many other major advantages over other designs were also realized, such as improved dewatering, reduced waste, excellent runnability and higher production.

FIG. 3: COMPARISON OF OPTIPROOF AND A CONVENTIONAL SSB DESIGN



Metal belt technology improves quality and efficiency

Metal belt technology has made a major breakthrough as a revolutionary new calendering concept for papermaking. Now, the benefits of a metal belt can also be utilized in pressing.

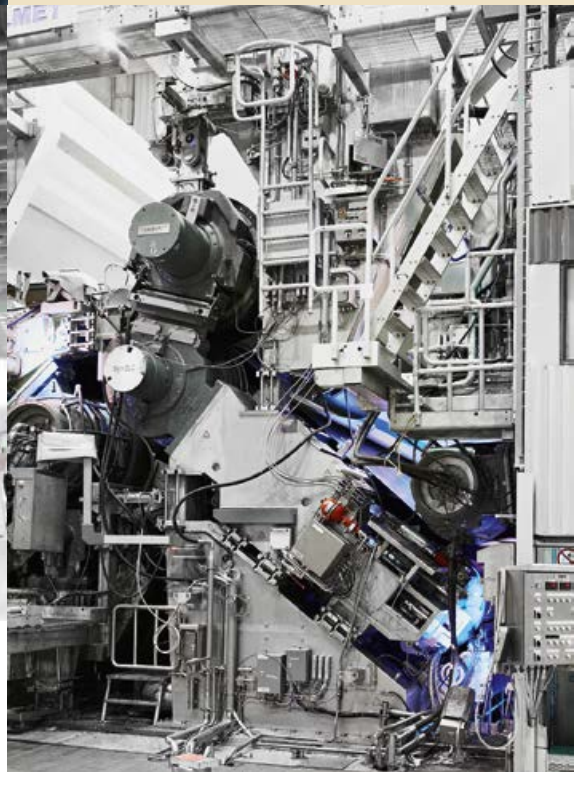
The newest OptiPress Center concept has a smooth, heated metal belt that goes around the center roll and guide stretcher roll. The steam-heated metal belt improves press section performance, as the temperature of the paper web increases on both sides of the press nip.

Up to 20% more effective water removal

The OptiPress with metal belt technology boosts production capacity by eliminating unsupported open draws. It also increases the dry content after press by up to six percentage points due to more effective water removal at the press nip and evaporation over the hot metal belt. Furthermore, it improves several end product qualities, such as strength and porosity.

The new concept is compact and increases dry content significantly, making it ideal for rebuilds to increase capacity by removing bottlenecks such as limited drying capacity or runnability.

↑ The investment is UPM's way of meeting the increasing customer demand for label papers. The new technology enables producing even thinner high quality papers.



→ Valmet's new metal belt technology closes the draw between the press and dryer section, increases dryness and improves end product qualities such as strength and porosity.

Even thinner

high-quality label papers thanks to new metal belt

A papermaker once said "It's hard to make a machine longer but we really need to increase capacity." A dilemma indeed. However, it did not take long for a group of Valmet's innovative engineers to come up with a solution: Why not close the draw between press and dryer section with a heated metal belt that boosts both dryness and runnability? Several blueprints and long test drives later, the first OptiPress with metal belt technology started up in UPM's Tervasaari mill in 2012. The concept worked.

New level of papermaking competence

PM 8 at the Tervasaari mill, which produces label release base papers, went through a renovation that included a press section rebuild along with modifications throughout the paper machine line. The targets were to increase speed and further improve paper quality, as well as increasing the capacity of the paper machine by 30,000 tonnes annually.

The heart of the investment in PM 8 was the rebuild of the existing center roll-based press section with Valmet's latest innovation: a new steam-heated metal belt application. The new metal belt technology closes the draw between the press and dryer sections, increases dryness, and improves end product qualities, such as strength. The increased dryness and the higher web temperature after the press section also allow higher temperatures for the first dryer cylinders, so the drying of the paper web starts more quickly.

The new press section with metal belt technology has delivered what was promised: The draw between press and drying section has decreased significantly. Water removal is more effective as the dryness after the press has increased significantly. The concept also has positive effect on paper quality. Runnability has also improved and thanks to the rebuild the maximum speed of the paper machine has considerably increased.

Gaining competitiveness

The investment was UPM's way of meeting its customers' increasing demand for label papers. The new technology enables the production of even thinner high-quality papers. The better efficiency of the paper production and material usage improves the competitiveness of label papers. It also strengthens the competitive position of paper-based labelstock compared to other available materials and alternative product decoration techniques.

This was not the first time that UPM had sought a competitive advantage with Valmet's novel technology; UPM and Valmet have a long history of co-operation. The Tervasaari mill has adopted five totally new papermaking technologies over the past eight years. One example is the first OptiDry vertical impingement dryer adopted in 2006, which improved drying capacity enough to achieve increases of over 20% in production. ■

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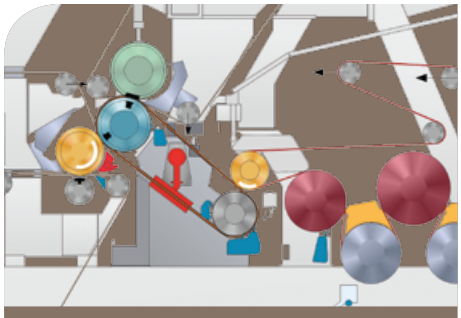


NEW INNOVATION
The OptiPress Center concept has a smooth, heated metal belt that goes around the center roll and guide stretcher roll. The steam-heated belt improves press section performance.

OptiPress Center with metal belt technology is part of Valmet's renewed OptiPress press section family.

Opti for papermakers

Read more about our press section expertise at **www.valmet.com/optipress**

EXPERT'S VOICE

Food for thought

TEXT Mark Rushton PHOTOS Shutterstock, Tobias Webb

Navigating through the sustainability megatrends

We are now living in a world where the consumer is undoubtedly king. At the push of a button or a click of a mouse big brands, individual companies and even whole industries can find their reputations in tatters if they make the wrong supplier choice. The pulp, paper and bioenergy industries are right at the forefront of this new world, and there are plenty of both challenges and opportunities to embrace.

Tobias Webb runs the London based *Innovation Forum* which has sustainability and responsible business practice at the heart of its foundation. Webb is something of an expert on the subjects, as well as lecturing on Corporate Responsibility at the University of London he is also the mastermind behind Innovation Forum's thought-leading conferences such as its latest: *How Business Can Tackle Deforestation.* The conference held in London recently attracted high level speakers including politicians, procurement officers from companies such as Unilever, McDonald's and Marks & Spencer as well as NGOs including Greenpeace.

Forward asked Webb for some insight into some of the global

SUSTAINABILITY IN FOCUS
"There are ten sustainability issues that should be of importance to all major companies", says Tobias Webb.

megatrends that are affecting major corporations and their sustainability agendas, and for some ideas on how to manage goals going into the future. "Well there are a lot of megatrends" he says. "But KPMG has identified ten sustainability-related issues that corporate reputations could hinge on and that must be addressed as a matter of urgency. These are: climate change, energy and fuel, material resource scarcity, water scarcity, population growth, wealth (middle class predicted to grow 172% up to 2030), urbanization, food security, ecosystem decline and deforestation. All of these should be of massive importance to all major companies".

Consumer expectations are changing

The consumer, through the Internet and social media, is now much better educated and informed as to what is going on in the world and even a single voice can now go viral and make a huge difference, but Webb believes that this consumer behaviour change is a really difficult area to manage for B2B companies going forward. He says: "There are more than 400 eco labels worldwide and they confuse customers and a lot of these have a negligible impact on the environment anyhow. But it is really consumer expectations that are changing how both B2C and B2B companies are thinking. Research from all over the world, particularly northern Europe and emerging markets shows that whilst consumers want sustainable products, they don't want to be drowned in detail. They simply expect brands to get on with it.

"In the B2B space there's lots of really interesting innovation going

> Whilst consumers want sustainable products, they don't want to be drowned in detail.

"In the B2B space there's lots of really interesting innovation going on."

on," continues Webb. "This has much less to do with consumers than with redesigning products and services for efficiency and environmental savings, for instance on carbon, water and chemicals. So companies such as Interface have redesigned how modular flooring works, DSM have reworked their business around recycling, and suppliers to companies like Coca-Cola have begun innovating with plant based PET type plastics to reduce environmental impacts. Siemens now has a whole business unit, a major one, focusing on the opportunities for sustainable and technologically enabled urbanization, and firms such as Skanska do 'deep green' retrofits in old buildings such as the Empire State in New York, which hugely reduce costs and impacts. We're at the early stages of a slow revolution – or perhaps even a fast evolution is better way of putting it – and many B2B companies, and businesses which invest in sustainable R&D today, such as Nike or Adidas are doing, will reap the rewards in the medium term and long term".

Serious issues to be tackled in biomass based industries

A lot of innovations and good development in sustainability issues have taken place in the pulp, paper and bioenergy industries during the recent years. However, active discussion on the topic continues. Whilst not professing to be an expert in the pulp and paper sector, Webb has had some experience, most recently with the industry in Asia especially. So what is his take on the industry's position in relation to challenges of a corporate sustainability nature? Webb comments, "It's obvious to me that the pulp and paper sector has some very serious issues to manage with regard to sustainability. The big issue has been poor planning, with little consideration for biodiversity and natural forest. But this is changing fast, all over the world, and technology and transparency, alongside NGO and investor pressure, is driving progress faster than ever before towards greater sustainability. A major trend is information mapping, the Global Forest Watch as an example, led in part by the World Resources Institute. This is part of the bigger trend towards much greater, almost real time, information flow about how companies are managing natural assets.

"But I think paper has the potential to be seen as an extremely environmentally friendly product," continues Webb. "However, this potential is very dependent on how it is produced, used and disposed of and recycled at end of life. Any natural product can be managed sustainably, over time."

And finally, what has been the impact of social media? Has its rapid take up really made the major corporations sit up and listen when it comes to issue of sustainability, deforestation, and social responsibility? Webb concludes: "Yes, definitely. Rightly or wrongly, the Greenpeace/Kitkat and Mattel/Barbie youtube campaigns were highly effective in driving change. Were they fair? Probably not, but campaigns like it, and more nuanced ones such as those by Canopy in North America, have made, and will continue to make a real difference". ■

Join the discussion on Valmet's sustainability performance!

Help Valmet define the direction of its sustainability work and fill in a short survey to point out the topics that you consider are the most important for Valmet and its stakeholders. The purpose of the online brainstorming session is to find out what are the social, environmental and economic issues that really matter to you. Valmet's sustainability agenda is reviewed against the results once a year and our development actions are revised accordingly.

www.valmet.com/stakeholdersurvey

Read more about sustainability at Valmet at **www.valmet.com/sustainability**

Around the world

Fifth tissue line order from Turkish Hayat Kimya

The long-term relationship between Valmet and Hayat Kimya was recently further strengthened when the Turkish tissue producer ordered its fifth Advantage DCT 200 tissue line from Valmet. The order is part of Hayat Kimya's expansion plan in the Middle East.

New cooking system to Irving Pulp and Paper

Valmet will supply Irving Pulp and Paper with a new CompactCooking G2 plant for its mill in Saint John, New Brunswick, in Canada. The new cooking plant will replace 14 batch digesters. The plant will be a first for this new technology in North America.

Propapier PM 2 sets once again a containerboard machine speed record

The containerboard base paper machine at Propapier PM2 GmbH in Eisenhüttenstadt, Germany, set a 24-hour world speed record of 1,704 m/min on April 24, 2014. During the record run, the 10.85 m-wide PM 2 produced corrugating medium at a basis weight of 70g/m2 with a total efficiency of 96%. This was already the fourth 24-hour world speed record set by the machine.

Repeat tissue line order from First Quality Tissue in USA

A complete Advantage ThruAir (TAD) tissue line will be supplied to First Quality Tissue in their existing Anderson, South Carolina USA site. The new production line is planned to be started-up in the second half of 2015 and will add 70,000 tonnes of ultra premium quality tissue to the company's annual production. Valmet has supplied around 50 ThruAir technology tissue making machines worldwide.

New sizing technology for Papierfabrik Niederauer Mühle

Papierfabrik Niederauer Mühle will install a new sizer and auxiliaries for its PM 3 containerboard machine in Kreuzau mill in Germany. The target of the project is to improve the strength properties of the white top liner grades.

Advantage DCT tissue line started up at Kimberly Clark in México

The new Advantage DCT 200TS tissue line, at the Bajío mill in San Juan del Rio, Mexico, adds 60,000 tpy of high quality tissue paper to the current production of facial, toilet, napkin and towel per year.

Suzano production in schedule

Suzano Papel e Celulose S.A., Brazil, announced that the start-up of the operations in Maranhão is proceeding as planned. The operational start-up of the new pulp production unit in Imperatriz, Maranhão, took place on December 31, 2013, with the production of the first bale of FSC certified pulp.

What is happening in the global pulp, paper and energy industries? *Around the world* demonstrates some of the events and projects where Valmet has worked together with its customers to move their performance forward.

Gasification technology developed further

Lahti Energia and Valmet will together continue to develop the gasification-based waste-to-energy plant solution, developed by Valmet. The commercial solution was first taken into use at Lahti Energia's Kymijärvi II power plant in Finland.

Grade conversion rebuild for Stora Enso's Varkaus mill in Finland

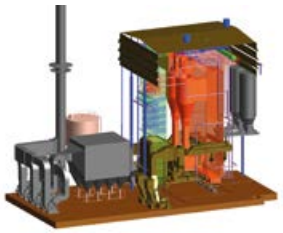
Stora Enso will carry out an extensive rebuild for converting the Varkaus mill's PM 3 fine paper machine to produce lightweight containerboard grades. Through the conversion, Stora Enso is taking advantage of the combination of two market forces: the decreasing global market for fine paper but increasing global market for renewable packaging board.

Valmet's roll cover manufacturing capacity enhances in Thailand

Valmet has invested in the roll cover manufacturing capacity at its service center in Laem Chabang, Thailand. The investment will double Valmet's composite roll cover production capacity in the Asia-Pacific region. Production of the newest polyurethane products has been in operation since June, 2014.

New wood chipping plant to Södra Cell Mörrum in Sweden

Södra Cell has ordered a new wood chipping plant to their Mörrum pulp mill in Sweden. The delivery is part of Södra Cell's project to increase the pulp production at Mörrum. Valmet's delivery will consist of a complete woodroom including two wood debarking and chipping lines, bark handling and chip conveying systems.



Cikarang power plant proceeding on schedule

The delivery of the PT Cikarang power plant in Babelan, Indonesia, is proceeding well. The delivery comprises two 135 MW CYMIX circulating fluidized bed boilers, using coal as fuel.

An Engineering Excellence Award to Valmet's customer

The Norske Skog Boyer Mill in Tasmania, Australia was the Overall Winner of the 2014 Tasmania Engineering Excellence Award and also won the Project Management and the Product and Manufacturing Facilities categories. Valmet's engineering and site teams were the customer's partners in the project.

Valmet's Customer Days in Berlin

Valmet's Customer Days will be held in Berlin, Germany, on October 22-24, 2014. The event will include presentations of the latest pulp, paper and energy technologies.

About Valmet

Valmet's sustainability agenda: five focus areas

1) Sustainable supply chain: We enhance our supply chain management and create a transparent value chain

2) Responsible operations: We provide a safe working environment and minimize the environmental impact of our own operations

3) People and performance: We develop an engaged and performance driven community

4) Cost-effective sustainable solutions: We provide solutions that support sustainable development

5) Corporate citizenship: We are a trusted partner to our stakeholders and a respected corporate citizen

Mutual benefits from the changing environment

The changing business environment is creating new demands for Valmet and the industries it serves. The scarcity of raw materials and the need to abate climate change are increasing demand for more environmentally effective industrial processes. At the same time, responsible operations from cradle to grave have become a factor that cannot be compromised.

How do you think these changes will affect businesses?

Laura Puustjärvi, Head of Sustainability at Valmet, emphasizes two key developments among the current trends.

LP: First**,** regulation is becoming stricter both locally and globally. Secondly, cultural change is affecting corporations around the world: responsible business practices already are a must and a license to operate for us and our customers.

Initiatives such as China's 12th 5-year plan, the US Climate Change Strategy, and the European Union Climate and Energy Policy, are guiding the development towards more environmentally benign industrial processes. As a global company we carefully monitor the changes in regulations, and provide solutions accordingly to enable our customers to comply with the respective regulations.

The demand for responsible business practices is reinforced by the requirements for more transparent reporting of performance from independent organizations, from governments and from the EU.

How does Valmet respond to the demands arising from the changing environment?

LP: We acknowledge that our customers require continuous improvement in profitability and efficiency – in a more sustainable way. In order to ensure competitiveness for us and for our customers now and in the future, we actively work together with our customers to continuously increase our understanding of their needs.

Furthermore, sustainability criteria is being increasingly used in partner selection. To maintain and enhance our position as responsible and value adding partner, we have defined a sustainability agenda that drives the continuous development of our sustainability performance. By fostering responsible practices, transparency and global alignment in all areas of our business, we want to help our stakeholders to assess our performance.

Valmet Corporation is a leading global developer and supplier of services and technologies for the pulp, paper and energy industries. Our 11,000 professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.

Valmet recognizes that the changing business environment creates opportunities for it and for its customers. What does this mean?

LP: As demand for more environmentally efficient processes and end-products increases, companies' ability to respond to these needs can turn them into a competitive advantage.

We ensure our competitiveness and that of our customers by delivering technologies that enable environmentally efficient processes. Valmet's solutions have excellent potential to reduce the use of energy, water and raw material, and produce less industrial waste. In addition, our technology enables increased utilization of renewable raw materials and fuel sources. Our services help to maximize the benefits that are enabled by the technology.

JOIN THE DISCUSSION OF VALMET'S SUSTAINABILITY PERFORMANCE AND FILL IN OUR STAKEHOLDER SURVEY:

WWW.VALMET.COM/STAKEHOLDERSURVEY

Valmet's sustainability key figures

Indicator	2013	2012
CO_2 emissions	**1,000t**	
Direct emissions (scope 1)	20.73	20.97
Indirect emissions (scope 2)	76.10	84.89
Sum	**96.83**	**105.86**
Energy	**TJ**	
Coal	91.10	87.43
Natural gas	201.47	195.65
Oil	18.53	22.99
District heat	267.95	314.93
Electricity	721.86	798.07
Steam	32.05	38.51
Sum	**1,332.96**	**1,457.58**

Valmet included in Dow Jones Sustainability Index

Valmet has been selected for the world's leading Dow Jones Sustainability Index (DJSI). The annual review of the DJSI is based on a thorough analysis of corporate economic, environmental, and social performance. The ranking follows a best-in-class approach, which means that the index includes companies across all industries that outperform their peers in sustainability performance.

MEMBER OF Dow Jones Sustainability Indices In Collaboration with RobecoSAM

Indicator	2013	2012
Water consumption	**1,000m³**	
Sum	**539.21**	**750.61**
Waste	**1,000t**	
Hazardous waste	2.25	4.44
Non-hazardous waste	29.48	36.83
Sum	**31.73**	**41.27**

Forward

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Valmet FORWARD