

PULP AND PAPER

Business Area Managers



**LEADING TECHNOLOGIES FOR
THE PULP AND PAPER INDUSTRY.**

Humbert Köfler | Vienna | Austria

Karl Hornhofer | Graz | Austria



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[1] Andritz delivered four major EPC packages for CMPC's Santa Fe Line 2 in Chile, which produces 800,000 t/a of bleached kraft pulp. Shown here is the 2,405 t/d continuous digester with Downflow Lo-Solids® cooking technology.

[2] Andritz high-consistency refiner at Estonian Cell in Kunda, Estonia, the first P-RC™ APMP mill in Europe. Andritz supplied the complete fiberline. It produces 140,000 t/a of mechanical market pulp, which is sold to paper mills all over Europe.

[3] An essential part of Andritz's services concerns improvements to plant availability by customized maintenance activities. Preventive measures are as important as regular checks, optimizations, and repair work. The local Andritz service teams specialize in the performance of efficient, fast, and cost-effective services at customers' mills. Photo: Andritz engineer inspecting a chip metering screw



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THE DIVISIONS OF THE PULP AND PAPER BUSINESS AREA

The Pulp and Paper Business Area of the Andritz Group is organized into two major segments, **Capital Systems** as well as **Service and Units**.

Within the Capital Systems segment are the Wood Processing, Fiberline Systems, Recovery Systems, Chemical Systems, Pulp Drying Systems, Paper Machines, and Paper Finishing Divisions.

The Service and Units segment comprises the Pulp Engineered Services, Paper Engineered Services, Engineered Wear Products, Mechanical Pulping Systems, Fiber Preparation Systems, and Andritz Automation Solutions Divisions.

Divisional Managers



Milind Karkare | Andritz Automation Solutions Division



from left to right:

Wolfgang Lashofer | Mechanical Pulping Systems Division

Thomas Bachhofner | Paper Engineered Services Division

Dietmar Heinisser | Engineered Wear Products Division



from left to right:
Jari Älgars | Wood Processing Division
Harry Rickman | Recovery Systems Division
Jarmo Häkkinen | Pulp Engineered Services Division
Mikael Forslund | Fiberline Systems Division
Markku Kosonen | Chemical Systems Division



from left to right:
Michael Pichler | Paper Machines Division
Erich Weitgasser | Pulp Drying Systems Division



from left to right:
Christian Pedratscher | Fiber Preparation Systems Division
Harald Suttor | Paper Finishing Division

PROFILE

The Pulp and Paper Business Area is a leading global supplier of systems, equipment, and services for the production of all types of pulp, paper, tissue, board, Medium Density Fiberboard (MDF), and nonwovens.

The successful acquisition of complementary technologies over the last decade has enabled the Business Area to supply complete processing lines and comprehensive services.

The Business Area's technology is employed for the processing of wood; the production of chemical, mechanical, and recycled fiber pulps; the preparation of paper machine furnish; the production of tissue and board products; the calendering of paper, board, tissue, and nonwovens; the coating of paper and board; and the handling of reject materials and sludges. In addition, the Business Area provides complete chemical recovery plants and biomass boilers for power generation.

Service activities within the Business Area are focused on assisting customers to increase their operational efficiency while reducing operating costs. Service products include maintenance and development agreements; equipment upgrades and rebuilds; engineered wear products for all brands of equipment (refiner plates, screen baskets, rotors, cleaner cones, disc filter sectors, chipper knives, etc.); and complementary technical services.

Depending upon a customer's needs, the Pulp and Paper Business Area can provide basic and detailed engineering, procurement, manufacturing, equipment erection, construction supervision, commissioning and maintenance services, as well as the supply and start-up of complete installations on an EPC basis.

KEY FIGURES PULP AND PAPER

MEUR	2007	2006	2005	2004	2003
Sales	1,462.2	1,304.2	1,032.9	884.6	810.3
Order Intake	1,406.4	1,432.4	1,017.0	1,218.9	857.3
Order Backlog as of 31.12.	1,060.4	1,124.4	950.4	951.1	622.7
EBITDA	101.1	89.6	76.1	77.9	63.9
EBITDA margin	6.9%	6.9%	7.4%	8.8%	7.9%
EBITA	83.5	75.9	63.6	64.8	49.1
EBITA margin	5.7%	5.8%	6.2%	7.3%	6.1%
Capital investments	21.8	21.7	13.6	14.3	9.3
Employees as of 31.12.	4,843	3,863	3,018	2,805	2,959

MARKET DEVELOPMENT

During 2007, international pulp markets developed very positively. Due to a continued strong demand from international paper producers and wood supply disruptions caused by bad weather conditions and strikes, pulp supply has been tight. As a result, the price for NBSK (Northern Bleached Softwood Kraft Pulp) has continuously increased during the reporting year, from USD 750 at the beginning of the year to USD 860 per ton in December 2007.

In step with NBSK, the price for short-fiber pulp (birch and eucalyptus) also increased during 2007. Strong demand, and new capacity in South America coming onstream somewhat later than expected, led to a price increase for eucalyptus pulp from USD 670 in January to over USD 750 per ton in December 2007. Since pulp is usually traded in U.S. dollars, and the dollar has depreciated against most currencies, the effect of the price increase was somewhat dampened for Euro-based customers.

Project activity for pulping equipment during the reporting period remained at a satisfactory level, with the focus for greenfield pulp mills again concentrating on the Southern hemisphere (South America, Australia, and Asia) and China. Investments for the modernization and refurbishment of existing pulp mills remained focused on Europe, and, to some extent, North America.

BUSINESS DEVELOPMENT

Sales of the Business Area increased to 1,462.2 MEUR, increasing 12.1% compared to 2006 (1,304.2 MEUR). All Divisions of the Business Area showed a satisfactory development of Sales. In line with Sales, EBITA also increased, to 83.5 MEUR (2006: 75.9 MEUR).

The Business Area's Order Intake amounted to 1,406.4 MEUR in 2007, thus slightly lower compared to 2006 (1,432.4 MEUR).

Global forestry company UPM, the Andritz Group, and Andritz's associated company Carbona started a joint development project for biomass gasification and synthetic gas purification. Gasification technology is essential to the production of synthetic gas that will feed a Fischer-Tropsch based second-generation biodiesel production facility. Testing is being conducted at the Gas Technology Institute's pilot laboratory in Chicago in the United States. Pilot testing is expected to be completed by the end of 2008. Andritz has a comprehensive product portfolio for biomass starting from wood handling equipment, dryers, and pellet machines to fluid bed boilers and gasifiers for lime kilns. The recent addition of Carbona's gasification technology enables the development of future applications to complement the product family.

In June 2007, Andritz acquired a 50% stake in Brazilian Sindus Human Technology, the leading provider of outsourced automation, instrumentation, and electricity maintenance services for the pulp and paper industry in Brazil. Sindus, which has annual Sales of approximately 20 MEUR, specializes in sophisticated analysis systems for the process industry, including outsourcing of human resources to the leading pulp and paper mills in Brazil. (See also special report on page 064.)

Metsä-Botnia S.A., Uruguay successfully started up a 1,000,000 t/a bleached kraft pulp mill near Fray Bentos in November. This site is the first to have all major production systems provided by one supplier – Andritz. Andritz supplied proven and best available technology for the woodyard, fiberline, pulp drying/baling plant, and chemical recovery/energy island. In addition, Andritz is providing maintenance services for the mill's production area through a multi-year contract. (See also special report on page 066.) →

SINDUS HUMAN TECHNOLOGY COMPLEMENTS ANDRITZ'S PROCESS TECHNOLOGIES

In June 2007, Andritz acquired a 50% stake in Sindus Human Technology, a company specializing in maintenance services for pulp, paper, and other industries in Brazil. With Andritz's global scope, Sindus Andritz will be able to expand its business into other South American countries and beyond. With Sindus' expertise, Andritz has a closer connection to the Brazilian pulp and paper market.

A humble beginning

It was 1987 when Luis Binotto, his brother-in-law, and four other engineers formed Sindus Human Technology in an empty laundry room in the Binotto family house. Their initial business was maintaining complex laboratory equipment. As the business grew, the company moved from the family house and the engineers began to develop a gas analyzer for environmental monitoring – the TRS analyzer. Today, Sindus is the only manufacturer of Total Reduced Sulfur (TRS) analyzers in Brazil.

Outsourced maintenance

In addition to maintaining laboratory equipment, customers began to ask Sindus to maintain their analyzers. Sindus saw this as an opportunity to expand into outsourced maintenance contracts, where Sindus manages all the maintenance activities – recruiting and training specialists, scheduling and performing the work, analyzing the failures, and reporting on the progress.

In the 1990s, a pioneer in maintenance outsourcing for the pulp and paper industry was the Araucruz Guaíba mill (called Riocell at that time) near Porto Alegre. In 1994, Riocell asked Sindus to maintain all the instrumentation and electrical systems in the mill. As part of the process, Riocell employees became employees of Sindus. This was the company's first large contract.

What is a non-core activity for many manufacturing plants (maintenance) is the core business for Sindus Andritz. Customers rely on Sindus Andritz to perform the maintenance of instruments, controls, motors, and valves more efficiently than they could by themselves.

Close association with Brazilian industry

Today, Sindus Andritz has major contracts in force and works with all the leading pulp and paper producers in Brazil. With Sindus Andritz employees in the mills every day, they know the customers' needs and priorities very well.

Sindus Andritz today

Sindus Andritz has 680 employees. About 70 are located at the company's headquarters in Porto Alegre. The average age of an employee is 32 years. About 130 employees have university degrees or are in the process of obtaining their degrees. Of this number, about 50% are engineers. Field technicians typically have high school degrees plus some specific technical training. The average Sindus Andritz employee has been with the company over three years, though many have worked for 10 years or more. The average is distorted since the company hires from 50 to 100 employees each year to meet the growing demand for its services. Three employees who started in apprentice positions have now risen to managerial positions within the company. In general, pulp and paper accounts for about 80% of Sindus Andritz's annual revenue. The rest comes from other process industries such as steel, chemicals, and mining.

Distributed communications and training

With employees spread out across Brazil (up to 5,000 km apart), Sindus Andritz relies heavily on technology to support its remote communications and training. The company uses video-conferencing, tele-conferencing, and web-conferencing regularly to link all the site managers together.

For employees, web-based training technology is being used. Every specialist has to have basic skills in math and physics, with a thorough knowledge of the complex electronic and control equipment installed in a modern pulp and papermaking facility. Employee training needs are prioritized based upon their impact on customer results.

New browser-based training modules are made available to employees in their job sites around the country. There are online 'chat sessions' where specialists can share their knowledge and compare notes. The training can be delivered online for individuals or small groups through the tele-conferencing and web-conferencing systems.

New tools

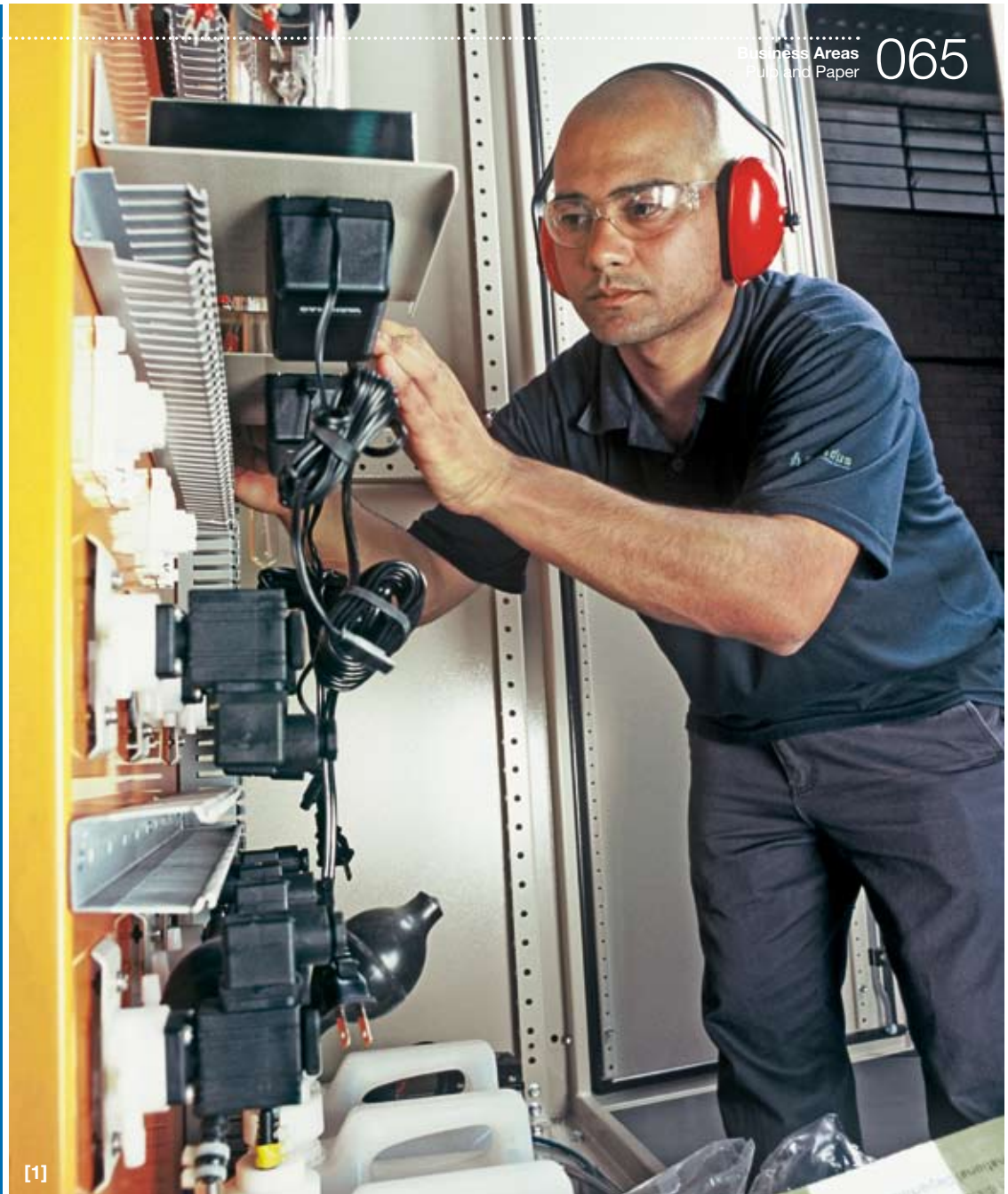
OPP (Optimization of Process Performance) is a software package developed by Sindus Andritz that collects information from distributed control systems and programmable logic controllers to help specialists identify instruments that need attention and to better tune their control systems. This results in improved equipment efficiencies and higher production. Five mills in Brazil currently have the OPP system installed.

Another new development is to perform maintenance tasks on automation systems through an Internet link. In a pilot project, Sindus Andritz found it could do 90% of the automation maintenance tasks for one mill remotely. Technically, there are few limits. Customers gain access through a remote link to a group of experts with extensive experience who can improve the technical support of existing maintenance contracts. ○

[1] The Analyzer Division of Sindus Andritz has expanded over the years from the initial manufacturing of TRS analyzers to include all kinds of devices for gas analysis. Here, a technician assembles a total system, including sensor, sample handling, and system electronics.

[2] Based upon input from the OPP (Optimization of Process Performance) system, a Sindus Andritz engineer isolates a control loop problem to a faulty valve positioner in the pulp mill. By replacing the positioner, effective control is restored to the process.

[3] With nearly 700 people spread out up to 5,000 km apart, Sindus Andritz relies heavily on technology to support its remote communications. Here, business directors discuss a project's status during a weekly video-conference. For employees, web-based training technology is utilized to a large extent.



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METSÄ-BOTNIA AND ANDRITZ: PROVEN PARTNERS TAKE ON A NEW CHALLENGE

When Metsä-Botnia was formed in the 1970s, Andritz was a key supplier of production systems for the first greenfield mill (Kaskinen). This relationship has strengthened over the years. The most recent collaboration has Andritz providing all the major production technology for the one million ton-per-year greenfield pulp mill in Fray Bentos, Uruguay – plus maintenance for all areas of the mill. This extent of involvement has never been accomplished on such a large scale by a single supplier before.

Andritz and Botnia have grown to work closely together in an atmosphere of mutual respect and trust. So, it was logical for Botnia to consult with Andritz about the possibility of the next grand collaboration – a very large greenfield kraft pulp mill in Uruguay.

Botnia's Fray Bentos mill in Western Uruguay is its first large investment outside Finland. The Fray Bentos mill represents another first: the first time a single supplier (Andritz) provided all the major production systems and comprehensive maintenance for a greenfield market pulp mill.

While this project was indeed a significant challenge for Andritz, it was not illogical. Every Andritz process and every system in the Fray Bentos mill is successfully proven somewhere in the world, many in South America. Andritz has delivered very large systems whose start-up and production curves have set world records.

With regard to maintenance, Botnia outsourced maintenance activities for all its mills in Finland and was very interested in establishing the outsourcing concept in Uruguay. It looked to a company with global experience and a base of expertise in South America. During the time that Andritz's project team was preparing quotations for the technology, the Andritz service team put together a 10-year maintenance plan and maintenance cost estimates. In September 2005, Botnia signed the contract with Andritz for long-term mill maintenance services.

Long-term local presence

A considerable amount of work is involved in planning the maintenance of a new pulp mill, such as Fray Bentos. Pre-engineering was largely done in Finland – working side-by-side with Botnia's project team for the year before the core maintenance team came to Uruguay in October 2006 to recruit Uruguayan managers and technicians and to begin the site implementation of maintenance activities.

Pre-engineering planning included criticality analyses performed on the major production systems in the mill – determining how important the equipment is to the process, the time required to repair, the cost to repair, etc. From this, a preventive and predictive maintenance plan was prepared and the plan was entered into Botnia's computerized maintenance system. This approach ensured that maintenance was adequately considered through all stages of the project.

The maintenance target for Fray Bentos is to have better productivity (in terms of maintenance cost per ton of pulp produced) than in Finland. As part of the training, Andritz brought eight key maintenance managers from Uruguay to Finland for a three-month period in 2006 – for intense training in pulp mill processes and pulp mill maintenance. They also gained work experience at Botnia's Joutseno mill.

Training continued during the construction period, equipment commissioning, and mill start-up. The maintenance team now has a network of local companies with experience at the mill to support its various tasks. The work during the construction of the mill gave these companies a good understanding of the installed equipment. This will become extremely relevant during annual shutdowns – periods when hundreds of people can be on-site at one time to perform inspections, maintenance, and repairs to the production equipment.

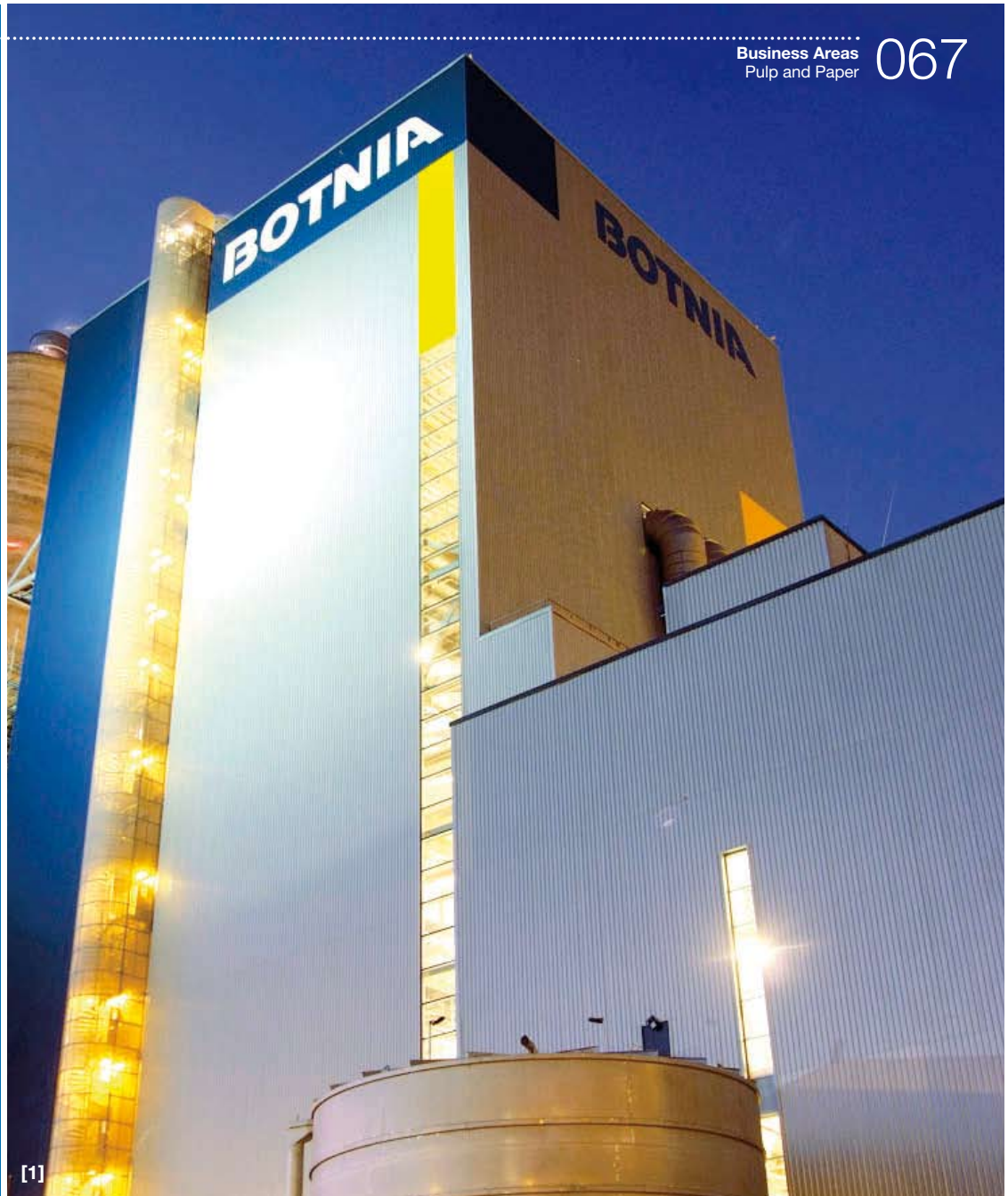
A commitment to the government is that at least 75% of the approximately 100-person maintenance staff will be Uruguayan. Since Uruguay does not have a tradition of pulp production, this required Andritz to recruit locally and train extensively. Today, 95% of the staff is from Uruguay and Andritz's goal is to increase that to 100%. In addition, local companies have been hired as subcontractors for auxiliary maintenance services (HVAC, cleaning, etc.). Thus, Andritz and Metsä-Botnia are contributing substantially to not only creating highly qualified jobs, but also to training local personnel to take advantage of these jobs. →

[1] Andritz supplied the entire chemical recovery island for the Fray Bentos mill. The evaporation plant has a capacity to remove 1,100 t/h of water. The recovery boiler (pictured), capable of burning 4,450 tons of dry solids per day, is among the world's largest.

[2] For added flexibility, Botnia selected two identical Andritz dewatering and drying lines designed to handle 3,600 t/d production.

[3] The Andritz white liquor plant represents the most modern technology for recausticizing and lime reburning. The lime kiln (foreground) is 135 m in length and 4.75 m in diameter.

[4] Andritz provides all the maintenance services for Fray Bentos under a long-term contract. The target is to have better productivity (in terms of maintenance cost per ton of pulp produced) than in Finland. Since Uruguay does not have a tradition of pulp production, Andritz had to recruit locally and train the new maintenance employees extensively. Today, 95% of the maintenance staff is from Uruguay. The longer term goal is to increase this to 100%.



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**FRAY BENTOS IS THE FIRST PROJECT
WHERE A SINGLE SUPPLIER (ANDRITZ)
PROVIDED ALL THE MAJOR SYSTEMS
AND COMPREHENSIVE MAINTENANCE
FOR A GREENFIELD MARKET PULP MILL.**



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[1] A two-vessel continuous digester (background) produces 3,200 t/d of prime quality pulp. A total of nine large DD Washers (foreground) wash the pulp as it flows through the oxygen delignification, screening, and bleaching stages.

[2] Two chipping lines produce high quality chips. Chip storage utilizes the latest blending technology with a rotating stacker-reclaimer. Two species of eucalyptus are blended to achieve the optimum fiber for pulp production.



[2]

Andritz Technology at Fray Bentos

The Fray Bentos mill is based in all aspects on the best available technologies, e.g. for forestry, wood harvesting and transport, pulp production, pollution control, and environmental management. The Best Available Technologies (BAT) from Andritz are impressive in terms of scale and efficiency.

Woodyard

Two-line chipping system, chip storage, chip screening, and conveying system provide high-quality eucalyptus chips to the fiberline. Chipping capacity is 330 m³/h per line.

Pulp Production

Two-vessel Downflow Lo-Solids[®] continuous digester (capacity: 3,200 t/d) with patented TurboFeed[®] chip feeding system produces high-yield, high-quality pulp. DD Washers clean the pulp before and after two-stage oxygen delignification. Combined knot separation and screening system cleans the pulp prior to bleaching.

Pulp Bleaching

Four-stage light ECF bleaching with patented A-Stage[™] to reduce the amount of bleaching chemicals required. Four efficient DD Washers wash the pulp to final cleanliness and further reduce effluent volume due to filtrate recycling capabilities.

Dewatering/Drying/Baling

The drying plant consists of two five-stage screening systems to ensure pulp cleanliness, followed by parallel Twin Wire Former pulp machines (each 5.3 m width), Andritz Fläkt dryers, and Cutter/Layboys. There are four automated baling lines to weigh, press, wrap, stencil, and tie the dried pulp bales.

Chemical Recovery and Energy Production

The evaporation plant (1,100 t/h evaporation rate) consists of seven effects with internal stripping of volatile gases and the ability to segregate condensate streams. The recovery boiler has a capacity of 4,450 tds/d. The white liquor plant (10,000 m³/d) consists of advanced technology for the filtration of green and white liquors, and a 830 t/d lime reburning kiln. A complete system for the collection of odorous gases and incineration in the recovery boiler (with backup alternatives in the auxiliary boilers) ensures low odor emissions from the mill. The steam from the recovery boiler is sufficient for the turbo generator to generate enough electricity to power the entire mill.

Dynamic Simulation

Dynamic process simulator from IDEAS to model all the mill's processes for training operators prior to start-up.

The Fray Bentos project

A global team of project managers, technical experts, site managers, erection specialists, and commissioning technicians were a key part of the team in Fray Bentos. The overall construction manpower at the mill peaked at about 4,500 people during the first months of 2007. One Andritz site manager likened the scene to a 'miniature United Nations' with people from 25 countries working together to build this massive mill. Even with this, the majority of workers came from Uruguay – between 70–80% during the construction peak period were Uruguayans.

Environmental care

Compared to the amount of pulp produced, the emissions from the Fray Bentos mill are among the least intrusive in the world. Due to improved management of the combustion processes and cleaning of fuel gases, what comes out of the smokestacks is mostly water vapor. Air emissions of nitrous oxide and sulfur dioxide have been virtually eliminated with the advanced chemical recovery technologies.

Modified cooking and efficient pulp washing lower the effluent load from the fiberline. Oxygen delignification and A-Stage[™] bleaching decrease the amount of chemicals required. The level of organic chlorine compounds in treated effluents is so low that it is no longer considered environmentally significant.

As a result of using raw materials this efficiently, there is very little solid residue left to discard to the landfill. In fact, less than 1% of the initial raw material is discarded.

Since the collection and treatment of odorous gases are a major factor in forming the local community's opinion about having a pulp mill as a neighbor, the mill has added auxiliary boilers into the plant design if there is a process disturbance. Electricity is generated in an environmentally friendly way at the Fray Bentos mill. The black liquor from the pulping process which is burned in the recovery boiler is a renewable biomass material derived from eucalyptus. Botnia's electricity generation adheres to the Clean Development Mechanism (CDM) which is determined in the Kyoto Protocol to the United Nations Framework Convention on Climate Change. ○

BUSINESS DEVELOPMENT (CONTINUED)

CMPC Celulosa S.A., Chile reached the top of its start-up curve for a new 780,000 t/a bleached eucalyptus chemical pulp line, supplied by Andritz to the Santa Fe mill. Full production – on a 30 days rolling average – was reached in just 171 days, beating the previous world record of 174 days. Andritz supplied the main equipment for the fiberline – from digester to dried pulp bales – as well as the recovery boiler and white liquor plant on an EPC basis.

In 2007, Veracel Celulose S.A., Brazil, set two new world records with its 9.34 m pulp dryer supplied by Andritz in 2005. The machine delivered 3,796 t/d of prime quality bleached eucalyptus pulp; a speed record of 247 m/min was achieved at the cutter/layboy.

The Wood Processing Division and Fiberline Systems Division successfully started up systems for the new eucalyptus fiberline at Suzano Bahia Sul Papel e Celulose S.A.'s Mucuri mill in Brazil. The woodyard systems include three chipping lines and circular stacker reclaimer-type chip storage. The fiberline systems include washing, oxygen delignification, knot separation/screening, and bleaching. The bleaching line includes four of the largest DD washers ever delivered.

In April, the Wood Processing Division started up a debarking and chipping line for Natron-Hayat Maglaj in Bosnia and Herzegovina. In September, the Division started up a two-line debarking and chip screening system with JetScreen™ for Stora Enso Fine Paper in Varkaus, Finland.

Several Divisions of the Pulp and Paper Business Area contributed to the successful start-up of a major new production line for Marusumi Paper in Ohe, Japan. Marusumi is one of Japan's major newsprint producers. The new line increases the mill's pulping capacity from 100,000 to 252,000 t/a. The Andritz scope of supply encompassed the fiberline (including a continuous digester with the first TurboFeed® chip delivery system in Japan), a six-effect evaporation plant (the first complete evaporation plant delivered by Andritz to Japan), and a white liquor plant (including a StiroX™ white liquor oxidation system). Andritz delivered the project on an EPC basis. Start-up of the fiberline occurred in mid-May 2007, two weeks ahead of schedule.

In the area of mechanical pulp grades, Estonian Cell AS signed all acceptance certificates and took over the entire BCTMP mill in Kunda, Estonia.

In March 2007, Andritz successfully handed over a 100,000 t/a market pulp mill to Shandong Zhongmao Shenyuan Co. Ltd, China. The fast and successful project execution, installation, and start-up provided the best approach for Shandong Zhongmao Shenyuan Co. Ltd. to use this project in order to produce market pulp, thus entering a new business segment. Andritz supplied its proven P-RC™ APMP technology, which is the best available technology for hardwood mechanical pulping systems, allowing the most economical production of all kinds of hardwood mechanical pulp grades.

Klabin, one of the largest manufacturers of paper, board, and paper products in South America, successfully started up the Andritz CTMP line based on Andritz's proprietary P-RC™ APMP technology at its Monte Alegre mill. The line is among the first in the world to use eucalyptus as raw material. This order once again underlines Andritz's dominant position in hardwood CTMP production technology.

Stora Enso Kvarnsveden, Sweden made a very fast start-up of its new bleaching plant supplied by Andritz in 2007.

The Paper Machines Division reports a new world speed record for CrescentFormer machines set by PT. Lontar Papyrus, Jambi, Indonesia. The Andritz tissue machine broke the 2004 record set by the same mill. In July 2007, the machine ran at 2,125 m/min for over 54 hours producing 13.5 g/m² of facial tissue. Procter & Gamble's new Andritz machine was successfully started up in Green Bay, Wisconsin, USA.

MAJOR ORDERS

- The Business Area received an order from Votorantim Celulose e Papel (VCP), Brazil to deliver a complete fiberline, pulp drying/baling plant, and white liquor plant for the world's largest pulp mill. The design capacity of this greenfield bleached eucalyptus market pulp mill is 1,250,000 t/a. The mill is located at Três Lagoas in Brazil's Mato Grosso do Sul state. The Andritz fiberline includes a 4,180 t/d single-vessel continuous digester, washing, oxygen delignification, screening, and low-impact bleaching based upon the proven Andritz DD washer technology. The drying plant includes a 9,334 m pulp drying machine and three automated baling lines. The white liquor plant is designed to produce 12,100 m³/d of white liquor and features green liquor filtration based on X-Filter™ technology, a CD-Filter™ for white liquor filtration, an LMD-Filter™ for lime mud washing, and the largest lime kiln to be installed in South America. Andritz will also supply the basic and detailed engineering, electromechanical erection, erection supervision, start-up, and training.
- Australian Visy Industries, the world's largest privately owned packaging and recycling company, selected Andritz to supply technology and systems for the expansion of its Tumut mill in New South Wales, Australia. The order encompasses the upgrade of the existing fiberline and recausticizing plant, and the installation of a new recovery boiler, pre-evaporator, lime kiln, a 1,300 t/d OCC line, stock preparation, and approach flow systems. It is planned that the entire integrated mill will be operational during the first half of 2009.

In addition, the individual Divisions received orders as follows:

The **Wood Processing Division** will supply a complete chipping line to Sappi Saiccor Pty. Ltd., South Africa. Inland Paperboard & Packaging, Texas, USA placed an order for a turnkey tree-length debarking line, as well as a portal crane. The Division will also deliver a complete woodyard with chipper, chip screens, and chip handling for the new MDF plant of Duratex S.A., Brazil. In addition, there was a debarking line modernization order from Mondi Packaging Stambolijski EAD, Bulgaria and a PowerScrew™ reclaiming order from Tableros Talsa, S.L., Spain. Several clients in Australia, Japan, Indonesia, and Austria ordered key woodroom equipment.

The **Fiberline Systems Division** signed a contract with Stora Enso Fine Papers in Varkaus, Finland for modernization of the chip feeding system (Diamondback® chip bin, TurboFeed® system, and a vapor reboiler). The Division will also upgrade the softwood digester at Domtar Industries' mill in Ashdown, Arkansas, USA with a TurboFeed® chip feeding system, Diamondback® chip bin, and RETRO-fit™ flash tank. In Canada, St-Félicienne Kraft Pulp ordered a new blowline Pressure Diffuser system for its northern softwood fiberline.

The **Chemical Systems Division** booked a repeat order from an Indonesian customer for a new sector cooler for an LMD lime kiln. To Celulose Beira Industrial (Celbi), S.A. in Portugal, a complete lime kiln will be supplied on an EPC basis. The Division was also chosen to deliver a recausticizing plant for West Coast Paper Mills, India, including an X-Filter™ for green liquor handling and a CD-Filter for white liquor filtration. Munksjö Paper will upgrade the lime kiln at its Aspabruk mill, Sweden with LMD technology from Andritz. Several StiroX™ systems for white liquor oxidation were ordered by customers worldwide.

The **Recovery Systems Division** was awarded a contract to deliver a new recovery boiler, power boiler, and evaporation plant for the Ence Group's Navia Asturias mill, Spain as part of a program to increase pulp production at the mill. The new plants will also significantly increase the amount of energy generated from biomass. A new MVR evaporator for the Andritz mechanical pulping line was sold to Sun Paper's Yangzhou mill in Shandong, China. Mondi Packaging ordered an evaporation plant upgrade for their Stambolijski mill, Bulgaria. In the USA, the Division will rebuild a recovery boiler for Weyerhaeuser in Columbus, Mississippi. In addition, the Division will supply an ash leaching chloride removal system to Lwarcel Celulose e Papel, Brazil. This will be the first chloride removal system based on leaching the ash from the electrostatic precipitator. The Division will also upgrade the evaporation plant at Zellstoff Pöls, Austria to increase capacity and the volume of reusable condensate for other processes in the mill. The upgrade includes a new sixth effect, surface condenser, and a condensate stripper.

The **Pulp Drying Systems Division** was selected to deliver a machine rebuild (wet end) to Pitkyaranta Pulp Works OAO, Russia. The machine has a working width of 5.2 m and a production capacity of 255 t/d. The Division booked an order for a dryer upgrade from Jari Celulose S.A., Brazil. A market pulp drying line was ordered by Cellulose Beira Industrial (Celbi), S.A. in Portugal. The pulp drying system will be based on the successful Andritz Twin Wire Forming Technology and have a design capacity of 1,815 t/d at a working width of 4.8 m. →

The **Pulp Engineered Services Division** was awarded a contract to deliver evaporation replacement lamellas for UPM, Finland. A further project included supplies for three different Stora Enso mills in Finland (evaporation lamellas, recovery boiler economizer upgrade, debarking drum rebuild, and Downflow Lo-Solids® cooking upgrade). Also in Finland, the Division signed a multi-year maintenance contract (OPE™) for Botnia's Joutseno mill and existing contracts at several mills were extended. In Sweden, the Division will rebuild a lime kiln for Billerud and a feeder for MoDo's Husum mill. The Division also received a significant recovery boiler retrofit order from Sweden and an order to rebuild a wash press. The Division was selected to rebuild a drum for a competitor's woodyard in France. In Indonesia, the Division will rebuild a recovery boiler originally delivered by a competitor. From Russia, equipment for a digester upgrade at JSC Bratsk Pulp and Board Mill and the upgrade of a lime kiln at International Paper's Svetogorsk mill were ordered. In North America, upgrades of several recovery boilers will be performed for International Paper and Georgia-Pacific mills, as energy is a key focus. Also in the USA, the Division will rebuild two existing digesters for Red Shield Environmental and will supply equipment for the mill's cooking process to be used in the co-production of pulp and ethanol from wood cellulose. Smurfit Stone ordered a debarking drum replacement. In Brazil, Veracel S.A. chose Andritz to perform field services for part of the fiberline. Sindus Andritz in Brazil signed a multi-year contract with Klabin for complete electrical and instrumentation maintenance.

The **Paper Machines Division** will deliver a complete packaging paper machine to Hebei Yongxin Paper Co. Ltd., China including stock preparation plant, winder, and mill automation. The machine will have a wire width of 6.2 m, a design speed of 1,100 m/min and will produce over 400,000 tons of kraftliner and linerboard per year. Also in China, Zhangzhou Liansheng Paper Co. Ltd. selected Andritz to deliver headboxes. Swedish Tissue AB, Sweden ordered a new tissue machine, with a working width of 3,370 mm. The machine will incorporate the new PrimePress XT shoe press, enabling the customer to produce softer and bulkier tissue paper and reduce energy costs at the same time. Cartiere Miliani Fabriano, Italy awarded Andritz a contract to rebuild its PM3 horizontal reel with a reel spool magazine and unwinder. The rebuild will be suitable for a parent roll diameter of 3,200 mm. For SCA Tissue North America – one of the largest manufacturers of Away From Home tissue products in North America – a second CrescentFormer tissue machine will be installed at the Barton mill, Alabama, USA.

The **Fiber Preparation Systems Division** was selected to supply a 500 t/d deinking line, sludge handling, and stock preparation equipment to Shandong Chenming Paper Holdings Limited, China. Also in China, Lee & Man Paper ordered a line for processing 250 t/d of mixed office waste, OCC processing equipment, and paper machine approach system components for three paper machines. Shandong International Paper & Sun Coated Paperboard selected the Division for new stock preparation and paper machine approach systems for coated board. Hebei Yongxin Paper bought a 1,350 t/d OCC line for kraft paper; and Anhui Shanying Paper placed an order for a 900 t/d OCC line and a paper machine approach system. Stock preparation equipment was ordered by Henan Yinge Industrial Investment Holding, Luoho City. Also in Asia, Joint Creation Limited, Can Tho, Vietnam signed a contract with the Division to supply a new OCC line and paper machine approach components for PM15. Daehan Paper, South Korea ordered a sludge handling system. In South Africa, a FibreFlow® drum pulper, coarse screening, and reject press were ordered by Mondi Packaging South Africa Pty Ltd., Felixton mill. In Europe, the Division will deliver a stock preparation system for the new Andritz tissue machine at Swedish Tissue AB, Kisa, Sweden. Stock preparation equipment was also ordered by Weidmann, Rapperswil, Switzerland, and Papierfabrik Palm, Germany ordered a sludge handling system for its Eltmann mill. In the USA, Andritz received orders for two new FibreFlow® drum pulpers: one for Abitibi-Consolidated's Snowflake, Arizona mill and the other for Georgia-Pacific's Muskogee, Oklahoma mill. SCA Tissue awarded the Division a contract to provide the complete stock preparation system for a new Andritz tissue machine. The Division also received an order from Georgia-Pacific, Green Bay, Wisconsin for deinking line equipment including a FibreFlow® drum pulper, RotoWash, SpeedWasher, screens, and cleaners. In South America, Papelsa, a subsidiary of the Smurfit Kappa Group, selected Andritz to provide a complete 350 t/d OCC line for its Barbosa plant, Colombia.

The **Mechanical Pulping Systems Division** will modernize the TMP system at Holmen Paper's Braviken mill, Sweden. This rebuild will help the mill lower its energy costs. It includes systems for chip washing, RT Pre-treatment, and equipment for the rejects system. Also in Sweden, the Division has provided the detailed engineering, equipment, and erection work for the new peroxide high-consistency bleach plant for SC++ paper grades at Stora Enso's Kvarnsveden mill. Nanning Jinlang Pulp Co. Ltd., China awarded Andritz a contract for a new P-RC™ APMP system. The mill plans to produce 200 t/d of market pulp for lightweight printing and writing grades. Also in China, the Division received a follow-up order for a control system from Sun Paper Industry Joint Stock Co. Ltd. for its 260 t/d P-RC™ APMP system purchased from Andritz in late 2006. In South America, the delivery for the new TMP 3 line at Norske Skog's mill in Pisa, Brazil included main process equipment, basic engineering, erection, and start-up services. TMP 3, which is equipped with the latest Twin Refiner technology, will supply up to 665 t/d of high-quality pulp from fast growing pinus taeda for the second newsprint machine at this location. In Europe, the Division received its fourth order from PF Louisenthal, Germany to supply a bleach plant for cotton combers-based pulp. PF Louisenthal operates Andritz bleach plants in its own mills and procures them for other bank note paper producers.

The **Panelboard Department** received four orders from Brazil for pressurized refining systems. Two will be delivered to new MDF plants for Indústria de Compensados Guararapes Ltda. and Indústria de Compensados Sudati Ltda. Duratex S.A. selected Andritz to provide a complete fiber preparation system for their third new MDF plant in Agudos. With a capacity of over 1,500 t/d, this will be the world's largest single-stage pressurized refining system. In addition, Andritz will deliver another pressurized refining system to Satipel Industrial S.A. via Siempelkamp Ges. m.b.H. In China, Shangqiu Dingsheng Wood Industry Co. Ltd. and the Guandong Weihua Group

ordered new pressurized refining systems. The system for the Guandong Weihua Group is the fourth Andritz unit ordered by this customer. It will be delivered to Liaoning Taian Weiliban Woodworking Industry Co. Ltd. Vezirkopru Orman Urunleri Ve Kagit San. A.S., Turkey also ordered new pressurized refining systems. Siam Fiberboard Co. Ltd., Malaysia placed a repeat order for a pressurized refining system. This is the third Andritz installation at the site and the fifth to be delivered to the Group. In Europe, Andritz booked an order from Dieffenbacher, Germany for the supply of a pressurized refining system for HDF/MDF for the Homanit Group's project in Poland. The system is designed for a capacity of over 500 t/d. This will be the fourth system supplied to the Homanit Group by Andritz. In addition, Andritz received two orders from Pfeleiderer AG. Andritz will supply a refining system to the Nidda MDF plant, replacing a competitor's fiber preparation system. Pfeleiderer also selected Andritz to deliver a turnkey woodyard and fiber preparation system (capacity 1,200 t/d) for a new investment in Novgorod, Russia. Andritz will also deliver a pressurized refining system for Abinsk MDF in Russia. The order was received via IMAL of Italy. Andritz Panelboard has sold the first pressurized refining system to Nigeria. The system was sold via Salzgitter Mannesmann International and will be installed at OMO Wood in 2008.

The **Paper Finishing Division** was awarded a contract to supply a soft-nip calender (PrimeCal Soft with MatOnLine technology) and a hard-nip calender (PrimeCal Hard) to two Chinese companies. Another hard-nip calender (PrimeCal Hard) will be delivered to Stora Enso's Fors mill, Sweden. The order will include the new PrimeFeeder feeding system and the rebuild of the drying section. Start-up is planned for January 2009. Finally, the Division received orders for three shoe press modules. Two of the shoe presses are PrimePress X Twin models to be installed on new machines built by the Paper Machines Division. The third shoe press will be installed on a pulp machine in Portugal.

The **Paper Engineered Services Division** received orders for dewatering equipment rebuilds from Steyrermühl, Austria; Ence Pontevedra, Spain; Norske Skog Halden, Norway; Steti, Czech Republic; Rottneros, Sweden; Klabin, Brazil; and M-real Stockstadt, Germany. Andritz obtained the first repair order for a Thune screw press from Stadacona, Canada. Jiangxi and Yueyang, China, Holmen Paper's Braviken mill, Sweden, Mondi Syktyvkar, Russia, and Stora Enso's Varkaus mill, Finland placed major orders for mechanical pulping services. Among further significant contracts for the pulper business were orders from Mepco, Saudi Arabia and Dunapack, Hungary. Dewatering equipment will be supplied to NSI Golbey, France; Rhein Papier, Germany; KC-Aranguren, Spain; Hainan, China; Marushi, Japan; and Sappi Umkomaas, South Africa. Service orders for mechanical pulping systems continued very well with orders from Yueyang, China and Klabin, Brazil. Automation orders were received from Mayr-Melnhof and Norske Skog, both Austria; Domtar and Georgia-Pacific, Leaf River, both USA; and Abitibi-Consolidated, Canada. Large spare parts orders for stock preparation equipment were received from China, India, and Turkey.

The **Engineered Wear Products Division** received significant orders for refiner plates from Solikamsk, Russia; UPM, Finland; and Stora Enso, Sweden. For the screening product line, major orders came from Cheng Loong, Taiwan; Nine Dragon, China; PT Lontar Papyrus, Indonesia; Paper Core, Korea; and UPM, Finland. In North America, orders for Cleaner products were entered by Weyerhaeuser and Buckeye, and a disc filter sector exchange program was ordered by Smurfit Stone. In the PerfTec product line, German producers Linde, Krones, and Bühler all placed major orders.

RESEARCH AND DEVELOPMENT

The Divisions within the Business Area have focused their R&D activities on the development of technologies helping customers to maximize specific production parameters while at the same time reducing the amount of input materials and energy to a minimum (higher efficiencies and yields with less raw material, use of natural resources, and lower energy consumption). R&D programs address the needs of capital equipment buyers as well as users to lower the total cost per ton produced.

Two major trends are driving customer investments today. First is the goal to reduce the investment cost per ton to its lowest possible level. This is leading to larger, single-line production units with no redundancy of systems. The second trend is to continue to make the production process more sustainable.

Andritz is not only reacting to these trends, but actively developing technologies that offer substantial improvements. Andritz's response to the sustainability requirement is evident in the new systems which have been adapted to the efficient processing of plantation fibers, and technology which consumes much less energy than its predecessors. As part of this, considerable R&D effort is being employed to more effectively utilize biomass as an energy source. Not only does this substantially reduce fossil fuel-based CO₂ emissions, but it also enables many more pulping operations to become virtually energy self-sufficient, or even produce surplus electricity which is supplied to the public grid.

Sophisticated simulation programs are being utilized to improve individual processes. Advanced control systems for all the fiberline process areas are being developed and tested.

The Divisions' R&D programs in detail are as follows:

Wood Processing

The trend in wood processing is towards simple, easy-to-operate, and reliable high-capacity lines. The amount of planted wood being debarked in the forest is growing. In order to serve this demand, the Division has developed bigger lines for both barked and debarked logs. A new chipper with 18 knives (the largest in the world) has been developed to serve bigger lines for barked and debarked wood.

For debarking, a new high-capacity (42 m long and 5.5 m diameter) drum has been developed. The Division also developed a new technology for separating sand and loose bark which can be utilized for processing logs that are debarked in the forest. More efficient washing and cleaning methods based upon a roller conveyor have been developed for conventional log cleaning.

Fiberline Systems

Technology development in the Fiberline Systems Division continues to focus on lowering the investment cost per ton of pulp produced. This is being accomplished through process simplification, increased unit capacities, standardization, and modularization. This development is not only targeted to large greenfield mills, but also to develop cost-competitive solutions for small- and medium-sized lines and also for the modernization of existing lines.

These new product developments are evident in the start-up curves and quality of pulp of recent deliveries. Digester feedline improvements, the larger scale of DD washers, next generation of MC-equipment, and advanced control systems are introduced in these deliveries.

The environmental impact of the chemical pulping process is another important driver in Fiberline technology development. Less chemicals are now required for cooking and bleaching while pulp quality (strength, cleanliness, and brightness) is being improved. Reduced fresh water consumption and correspondingly lower effluent volumes are achieved by new washing concepts and by pressurizing/closing process steps to prevent emissions to the atmosphere. Simplified process designs and improved equipment efficiencies are also consuming less energy.

Many of these developments are now in practical application in the latest Andritz installations, for example at the Suzano Mucuri mill in Brazil, the CMPC Santa Fe mill in Chile, and the Metsä-Botnia mill in Uruguay.

Chemical Systems

The Chemical Systems Division is further developing technologies for environmental sustainability and increased capacities of pulp mills. In terms of capacity, a new lime kiln was designed for an installation in Indonesia with a capacity exceeding 1,000 t/d. A new series of white liquor disc filters with a diameter of 4.4 m will be delivered to Brazil in 2008.

The Division's new concept for green liquor handling has become widely accepted. In 2007, X-Filter green liquor filtration technology was introduced to a new market – India. The application of centrifuge technology for dregs dewatering and washing is gaining acceptance. The centrifuge minimizes the impact of dregs in landfills. With the centrifuge, lime mud can be purged separately in an uncontaminated form, which allows it to be used as a soil amendment.

A system for the selective reduction of phosphorus in the lime circulation will be installed in a mill in Finland, which will enable further closing of the lime cycle and reduction in solid waste and dead-load. Modernizations offer interesting challenges. A new lime kiln technology is now in operation in Brazil which considerably boosts the throughput that can be achieved from an existing lime kiln shell.

Recovery Systems

Due to continuously rising energy costs for pulp and paper producers, a development program was launched in 2006 to introduce advanced biomass-fired power boilers to the industry and the first power boilers are already under construction.

High oil and gas prices have triggered growing interest in using biofuels in lime kilns, which are still significant consumers of fossil fuels in the pulp mill. As experience with the operation of the High Energy Recovery Boiler (HERB) is accumulated, plans for the next steps to increase the electricity generation from black liquor are in place.

Developments to increase the accuracy of CFD modelling (simulation of heat transfer and fluid streams within the recovery furnace) continue, as well as utilization of improved calculation methods for the Andritz automatic control system.

As mills continue to close their chemical circulation loops to reduce emissions, chloride removal is becoming more important. The first leaching-based chloride removal process by Andritz is being constructed in Brazil and this offers a lower cost alternative to the proven ash re-crystallization process.

Technology development in the evaporation process continues to focus on lowering the investment cost. This is being accomplished through process simplification, standardization, and modularization – resulting in fewer engineering hours and shorter delivery times. Significant development efforts have been made to reduce the operating costs of the evaporation. A new patented approach has been developed to address recent trends in thermal and electrical energy prices.

Studies have been conducted on materials to find a more corrosion-resistant material for liquors with high alkaline content. Due to the high price of certain commodities, the emphasis is on finding alternative materials for stainless steels with a high nickel content.

In the pulp mill automation area, the product development for ACE™ advanced control and optimization of a recovery boiler's sootblowing and combustion activities is proceeding at full speed. A pilot project has been agreed upon with a Finnish customer. A mill in China recently ordered the Recovery ACE™.

Since the development of Safety Related Systems (SRS) in 2003, over 20 system packages for processes such as recovery boilers, lime kilns, and power boilers have been sold. Andritz's engineers follow a predefined procedure that covers steps from risk evaluation, through safety controls planning, up to testing, start-up, and normal operation.

Pulp Drying Systems

The research and development focus of the Pulp Drying Systems Division is to increase the production capacity of a single drying line based upon Twin Wire forming technology from approximately 4,000 t/d today to over 4,500 t/d or over 1,300,000 t/y of pulp. Energy consumption of the entire drying line will be reduced by simplifying the process and optimizing the 'biggest energy consumers' in the line (e.g. thermal energy, vacuum sources).

Further development work for the process simulator on the sheet drying line has been carried out. In addition, the first advanced process control using BrainWave® controllers was successfully installed to improve machinery uptime. The next level – optimization – will be accomplished with the ACE™ (Andritz Control Expert) to ensure stable and uniform operation of the machine while minimizing the steam and energy consumed.

Pulp Engineered Services

The Division's leading development program is the OPE® (Overall Production Efficiency) concept, where the target is to enhance production efficiency and maintenance practices in order to secure the highest lifecycle profits for customers.

Supporting the OPE® concept is the Life Cycle Profits (LCP) program, which helps to secure and maximize a profitable operation for customers. Parts of the program are being developed in cooperation with European research organizations. LCP also supports a customer's sustainability targets. The program consists of several elements, where predictive tools for online diagnostics of pulping processes are developed. High importance is attached to developing proactive practices which support process improvements and maintenance routines. One example is the development of sophisticated mill-wide maintenance audit tools. Another is the development of a service for refurbishing chipper wear parts. →

Product innovations such as software tools for improving predictive maintenance are being introduced. An example is the software to determine the most cost-effective timing for changing chipper knives. Another is the software to predict the maintenance needs for hydraulic drives; still another is the smooth functioning of DD washers even under difficult, volatile circumstances. For cooking systems, the Division is continuing the development of screen plates for both continuous and batch digesters. In the recovery area, an advanced diagnostics system helps to improve the efficiency of the recovery boiler operations. A significant part of the development work includes advanced control systems that focus on improving energy efficiency and minimizing the environmental impact of existing mills.

Paper Machines

Technology development for the Paper Machines Division centers around three main items: reduction of investment cost, energy savings, and improved efficiency.

Developments in the tissue group included the introduction of the PrimeDry Steel, a Yankee dryer completely made of welded steel. The main advantages are higher performance and higher operational safety compared to a conventional cast iron Yankee.

In the air engineering department, the focus was on energy-saving equipment. A new step in heat recovery from the exhaust of Yankee hoods – ReEvaporation – has been developed. Condensate is re-evaporated in a heat exchanger by using exhaust air. Up to 25% savings in primary steam is possible.

Additionally, a new web guiding device after the creping doctor, the PrimeTakeOff, has been introduced. The benefits are fewer paper breaks at higher machine speeds.

The modular Yankee hood allows delivery of the huge hood body to the construction site in smaller parts, with final assembly on-site. Parts from different suppliers, some manufactured locally, can be used in this way to minimize cost.

Another focus is to develop advanced solutions for the modernization of board and packaging machines integrating Andritz Küsters and Andritz BMB products.

Fiber Preparation Systems

Increasing system efficiency and reducing energy consumption are the focal points of development in the Fiber Preparation Systems Division. The Division introduced an ash washing machine (SpeedWasher) for Mixed Office Waste (MOW) papers and a pressurized disperser for Old Corrugated Container (OCC) grades.

Mechanical Pulping Systems

The continuous increase of energy prices has led to increased demand from customers for technologies with lower energy consumption. Reducing energy consumption not only lowers production costs, but helps to save energy resources and supports the goal of lowering the emission of greenhouse gases. Another priority is to simplify processes and improve the reliability of equipment to lower investment/operating costs.

The Division modernized its pilot plant in Springfield, Ohio, USA to better meet future requirements, including the application of low-consistency refiners at various process stages, which offers the potential to further reduce energy consumption and simplify the process.

Further development work has been done on a novel pre-treatment process for wood chips prior to the refining stage (RT Fibration), which enhances energy savings and helps improve the pulp quality. The new technology allows/facilitates the use of alternative wood species (e.g. various pine species) which were formerly not desirable for papermaking. One part of the Division's R&D work is focused on the selection and testing of such species as eucalyptus, acacia, birch, maple, bagasse, reed, and kenaf. This supports sustainable development in countries with different wood species or where wood is a rare resource.

A new fiber centrifuge, which separates steam and fibers more effectively after the HC refiner, and a new series of compression devices and refiner plug screws are examples of new equipment introduced to the market.

To cope with more restrictive limits being placed on mills for effluent release, the Division is continuing its development of low-effluent technologies – particularly scenarios where all the effluent streams from a mechanical pulp mill can be collected, evaporated, and incinerated. Fresh water consumption is significantly reduced and valuable chemicals can be recovered. This project is carried out in cooperation with other Andritz Divisions and demonstrates the internal synergies for information exchange and sharing of resources.

Minimizing energy consumption throughout the whole process is also the main focus in the panelboard industry. In a basic research program, the design of the entire fiber processing plant is being evaluated with the target of optimizing fiber quality while reducing energy consumption.

Another priority program is to reduce the moisture content of the raw materials, which reduces the overall energy demand and lowers emissions.

A newly developed system directed to the mixed plastic recycling industry is gaining interest in the market.

With these developments, the Division supports environmental protection, material recycling, waste reduction, and sustainable management of limited resources.

Paper Finishing

Energy efficiency and cost savings continue to be important issues in the paper industry. For the tissue industry, the Division developed the smallest shoe roll ever built – with a diameter of only 710 mm. Patented features like additional lubrication and the edge relief system make it possible to obtain higher dryness without loss of bulk and with the fewest possible belt changes. Cost reduction is very often a question of reliability and availability. The Division's R&D team came up with a new design for the PrimeFeeder technology that makes the entire process significantly more stable and helps reduce the time it takes a paper machine to reach full production after a sheet break. This solution has a patent pending.

Paper Engineered Services

The R&D focus is on improving the efficiency of equipment already installed in a customer's plant to lower the operating costs. This involves optimizing the machine design to conserve energy and increase reliability, especially in the areas of sealing and wear technologies. An excellent example of such a value-added solution is the high-precision CONCEPT rebuilding program for Andritz Twin refiners. CONCEPT not only extends the time between major rebuilds, but also significantly increases the operational efficiency of the equipment.

For dewatering machines, the focus is on introducing wear-resistant technologies for disc filters, Twin Wire presses, and screw presses from different manufacturers. State-of-the-art sealing technologies have been developed and are being retrofitted on these machines.

For the pulping of stock, broke, and recycled fiber, a development program is in progress to enable up to 20% energy savings for the majority of pulpers installed in mills.

In the automation area, a new optical sensor for measuring fiber properties online was introduced. The sensor requires significantly less maintenance and eliminates the need for intense recalibration often required for competitive units. This is a major step toward fully automated pulp production lines.

The Division will continue to make modern technologies available for upgrades and retrofits of existing equipment, regardless of the original supplier, to increase the efficiency of each customer's installation. ○