

PULP AND PAPER

Business Area Managers:


Bernhard Rebernik, Graz, Austria
(until 31.3.2007)

Markku Hänninen, Helsinki, Finland
(until 31.12.2006)

Humbert Köfler, Vienna, Austria
(from 1.4.2007)

Karl Hornhofer, Graz, Austria
(from 1.1.2007)





The Andritz recovery boiler at SCA's Östrand pulp mill in Sweden operates at higher temperatures and pressures to maximize the production of high-pressure steam. The result of this High Energy Recovery Boiler (HERB) technology is that SCA produces more electricity from a "green" fuel and reduces the amount of carbon emissions into the atmosphere.

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, Medium Density Fiberboard (MDF), and nonwoven fabrics.

The Business Area's technology is employed for the production of chemical, mechanical, and recycled pulp. The successful acquisition of complementary product areas over the last decade enables the Business Area to supply complete processing lines from log handling to fiber production to the drying, sheeting, and baling of chemical pulp, including the power boiler, chemical recovery systems, and sludge handling.

The Business Area also supplies complete processing lines for the mechanical pulp production including flash drying and bale presses, for recycled fiber systems, for stock preparation and paper machine approach systems; for tissue and board machines; machine ventilation/drying systems; and press-dewatering, calendering, and coating systems for paper, tissue, paperboard, and for nonwoven applications.

Service activities within the Business Area are focused on helping customers 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, cleaners, disc filter sectors, chipper knives, etc.), as well as complementary technical services.

The Pulp and Paper Business Area provides 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.

Divisional Managers of the Pulp and Paper Business Area:

Jarmo Viiala
Wood Processing Division

Markku Kosonen
Chemical Systems Division

Erich Weitgasser
Pulp Drying Systems Division

Pekka Rahkila
Fiberline Division

Harry Rickman
Recovery Division

Michael Pichler
Paper Machine Division



Pulp and Paper Divisions:

As of January 1, 2007, the Business Area was reorganized in order to adapt it to the requirements of the markets and to even better fulfill the demand and needs of Andritz's customers. It is now divided into two segments: **Capital Equipment** and **Service**.

The Capital Equipment segment comprises the Wood Processing, Fiberline, Recovery Systems, Chemical Systems, Pulp Drying Systems, Paper Machine, and the Paper Finishing Divisions.

The Service segment comprises the Pulp and Paper Engineered Service (Engineered Wear Products, Engineered Services Pulp, Engineered Services Paper), Mechanical Pulping Systems, and Fiber Preparation Systems Divisions. →

Erich Bröker
Paper Finishing Division

Thomas Bachhofner
Engineered Services Paper Division

Christian Pedratscher
Fiber Preparation Systems Division

Dietmar Heinisser
Engineered Wear Products Division

Jarmo Häkkinen
Engineered Services Pulp Division

Wolfgang Lashofer
Mechanical Pulping Systems Division



Market development

In 2006, project activity for greenfield plants, as well as modernizations and rebuilds of existing plants, was at a satisfactory level. Projects for new pulp mills and capacity additions continued to be focused in the southern hemisphere (South America, South Africa, Australia, and Southeast Asia) and China. Investments for the modernization and refurbishment of existing mills developed favorably in Europe, and to some extent in North America.

The development of pulp prices in 2006 was characterized by continued strong demand from international paper producers and reduced pulp supply from North American pulp producers. As a consequence, the price for Northern Bleached Softwood Kraft (NBSK) pulp increased from approximately 600 US dollars per ton at the beginning of 2006 to approximately 750 US dollars per ton at the end of 2006.

The price for hardwood pulps (e.g. birch and eucalyptus) also increased during 2006, although much more moderately than for NBSK. This was due to the availability of sufficient production capacities and market expectations that further capacities will come on-stream in South America in the near future.

Demand for paper continues to grow in Asia (especially in China and India) based on the very positive economic development in these regions. This triggers increasing demand for virgin fibers and recycled fibers as most of the paper production is based on recycled fibers. In these countries, demand for higher paper quality is also on the rise, thus boosting equipment modernizations and investments in paper finishing equipment.

Business development

In 2006, Sales of the Business Area surged to 1,304.2 MEUR, an increase of 26.3% over 2005 (1,032.9 MEUR). In line with Sales, EBITA also increased, to 75.9 MEUR (2005: 63.6 MEUR). Profitability (EBITA margin) was 5.8%, slightly lower than in 2005 (6.2%). This was mainly due to the execution of some larger orders, typically having lower margins.

The Business Area's Order Intake showed very good development in 2006. It increased to 1,432.4 MEUR, which is 40.8% higher than in 2005 (1,017.0 MEUR). All Divisions of the Business Area contributed to this very high growth, thus confirming the excellent market position of Andritz for pulp and paper equipment.

New Managing Board members

At the beginning of October 2006, the Supervisory Board of Andritz AG approved changes in the Managing Board of Andritz AG. After 15 years on the Board, Bernhard Rebernik will, upon reaching the age of 65, leave the Managing Board at the end of March 2007 and retire. Markku Hänninen, on the Board since 2002, also resigned as a member of the Managing Board at the end of December 2006 and will join the Supervisory Board of the Finnish subsidiary Andritz Oy. Karl Hornhofer and Humbert Köfler, who have served as Andritz Divisional Managers for many years, have been appointed new members of the Andritz Managing Board as of January and April 2007, respectively.

New market-oriented organization structure

In order to better fulfill the expectations of Andritz's customers, the Pulp and Paper Business Area was divided into two segments (Capital Equipment and Service) as of January 1, 2007. Karl Hornhofer is responsible for the Capital Equipment segment and Humbert Köfler for Service. The goal is to further improve coordination between different product groups and benefit from opportunities in local service markets.

Acquisitions and product developments further strengthen market position

In June 2006, Andritz purchased the remaining 40% stake in the Paper and Nonwoven Business Areas of Eduard Küsters Maschinenfabrik GmbH & Co. KG from Jagenberg AG. Andritz Küsters, now 100% owned by Andritz, offers state-of-the-art calendering, press-dewatering, and finishing technologies for the paper and fast-growing nonwoven markets.

In May 2006, Andritz acquired Pilão S.A., São Paulo, Brazil, a special manufacturer of welded refiner fillings and stock preparation equipment, including conical refiners. Andritz Pilão further enhances Andritz's product portfolio in low-consistency refiners and increases the business volume of Paper Mill Services products and stock preparation equipment, particularly in South America.

With the acquisition of the rights for the worldwide chip thickness screening business of the Finnish company BMH Wood Technology Oy, Andritz strengthened its position as a leading supplier of wood processing equipment and services.

Major orders

Andritz also purchased the Coater Division of Bachofen + Meier AG (BMB), based in Bülach, Switzerland. BMB is a globally active specialist for technologies and systems for paper coating. It complements the existing Andritz product portfolio in the area of paper and board production equipment, enabling Andritz to offer complete systems including hard and soft nip calenders, coating, and drying equipment.

In the spring of 2006, Andritz launched a new tissue machine concept, the PrimeLineCOMPACT. It combines proven Andritz technologies for stock preparation, tissue production, and automation into a cost-effective system. Andritz created a design based upon standardized 1,600, 1,800, and 2,000 m/min tissue machines, with widths of 2.7–2.85 m. Virgin or recycled fibers can be used.

Hunan Tiger Forest & Paper Group Co., Ltd. of China selected Andritz to supply the main equipment for a greenfield pulp mill in Huaihua, Hunan Province. The new mill will produce 400,000 t/a of bleached kraft pulp. Andritz's scope of supply includes wood handling, cooking, washing, screening, bleaching, pulp drying, bale handling, and chemical recovery (evaporation, recovery boiler, re-causticizing, and lime reburning).

Sappi Saiccor (Pty.) Ltd. of South Africa, the world's largest manufacturer of viscose pulp, selected Andritz to supply the systems for screening, oxygen delignification, bleaching, evaporation, and pulp drying for the Umkomaas mill near Durban. Capacity of the mill will be increased from 600,000 to approximately 800,000 t/a. Andritz will provide the basic and detail engineering, equipment, mechanical erection, supervision, start-up, and training.

Brazilian Klabin, one of the largest manufacturers of paper, board, and paper products in South America, awarded Andritz an order for the EPC supply of a complete CTMP (Chemi-Thermo Mechanical Pulping) plant for the new board production line at the Monte Alegre mill. The plant will also include an effluent evaporator to reuse the process water. Start-up of the plant, which is designed to produce 140,000 tons per year of unbleached eucalyptus pulp for the production of various board grades, is scheduled for September 2007. This new CTMP plant will be among the first in the world to use eucalyptus as the raw material. This order underlines Andritz's dominant position in hardwood chemi-thermo mechanical production technology.

Andritz received an order from Aracruz Celulose S.A. of Brazil, for its expansion project 2330, which will increase the capacity of Fiberline C from 700,000 to 950,000 t/a. Fiberline C was delivered by Andritz in 2002. The expansion includes a new chipping line; the upgrade of washing, screening, and bleaching equipment, including three new Drum Displacer® (DD) washers; the rebuild of the drying machine; and a new StiroX™ system for white liquor oxidation. Andritz will also increase the capacity of an existing Andritz recovery boiler, which started up in 1997, by upgrading the combustion air system, superheater, and dissolving tank scrubber system. Aracruz also ordered a new bleaching stage from Andritz for Fiberline B at the same mill.

Andritz received an order to supply another PrimeLine tissue machine, including the complete stock preparation and approach system, to the Hengan Group, a leading manufacturer of high-quality tissue products in China. The start-up of the machine is planned for 2008. The new PM 7 will have an annual production capacity of 60,000 tons. With a speed of 2,000 m/min and a width of 5.55 m, the machine produces high-quality tissue products serving the increasing demand of the Chinese market. This order, once again, reflects the long-lasting and successful partnership of Hengan and Andritz. Including this latest order, Andritz will have nine tissue machines in operation in China, thus confirming its position as the leading supplier of high-tech tissue machines to the Chinese tissue paper industry. →

Key figures Pulp and Paper

MEUR	2006	2005	2004	2003	2002	2001
Sales	1,304.2	1,032.9	884.6	810.3	672.2	883.0
Order Intake	1,432.4	1,017.0	1,218.9	857.3	843.3	642.8
Order Backlog as of 31.12.	1,124.4	950.4	951.1	622.7	582.0	431.5
EBITDA	89.6	76.1	77.9	63.9	53.5	69.8
EBITDA margin	6.9%	7.4%	8.8%	7.9%	8.0%	7.9%
EBITA	75.9	63.6	64.8	49.1	39.2	53.9
EBITA margin	5.8%	6.2%	7.3%	6.1%	5.8%	6.1%
Capital investments	21.7	13.6	14.3	9.3	11.5	10.8
Employees as of 31.12.	3,863	3,018	2,805	2,959	2,634	2,626

In addition to these orders, the individual Divisions received orders as follows:

The **Wood Processing Division** received an order from Stora Enso to supply new equipment for a dual-line woodyard in Varkaus, Finland. This new woodyard represents the most modern and efficient wood processing technology available to minimize wood losses and produce quality chips. The same technology in a single-line configuration was selected by Price Maryvale Pty Ltd., Australia, and by Mondi Packaging Frantschach GmbH, Austria. The Division will deliver a complete woodroom to Grupo Empresarial ENCE S.A., Spain. This woodroom will be the first installation of the new RotaBarker™ technology for eucalyptus debarking. The RotaBarker™ technology was also chosen by Tolko Industries Limited for the debarking process at its new greenfield Oriented Strand Board plant in Slave Lake, Alberta, Canada.

The **Recovery Division** received an order for a new high dry solids evaporation plant from UPM for the Kymi mill in Finland. SCA Packaging, Sweden ordered a MeOH liquefaction plant for its Obbola mill. In North America, Weyerhaeuser selected the Division to supply a new high pressure and high temperature recovery boiler for its Campti, LA mill. Abitibi Consolidated, Canada ordered a new TMP heat recovery system for its Kenogami mill. Upgrades of note include evaporation modernizations for Nanning Pulp Mill, China; Papelera Guipuzcoana de Zicuñaga, Spain; Smurfit Kappa's Nettingsdorfer Papierfabrik, Austria; Svilocell, Bulgaria; and Mufindi Paper, Tanzania. The orders from Svilocell and Mufindi also include upgrades of the recovery boilers.

The **Chemical Systems Division** will supply a complete white liquor plant featuring the most advanced technology for UPM's Kymi Paper mill in Finland. Also in Finland, the Division was awarded orders from UPM for a StiroX™ system at the Tervasaari mill and from Metsä-Botnia for a green liquor clarifier as part of a modernization project at the Äänekoski mill. A major order was awarded by Bahia Pulp S.A. for a complete white liquor plant to be built in the state of Camacari, Brazil. The Division was also chosen to upgrade the white liquor plant for Australian Paper's Maryvale pulp mill. An Indonesian customer selected the Division to supply a new LMD lime kiln. With a capacity of 1,000 t/d and a length of 140 m, the lime kiln will be the largest Andritz has ever delivered. This customer also placed a further order for a new white liquor plant with two lime kilns.

The **Fiberline Division** will supply a DD washer for brownstock washing and a digester upgrade for Mitsubishi Paper's Hachinohe mill in Japan. In Finland, Metsä-Botnia ordered modifications to the washing, screening and bleaching systems at the Rauma mill and UPM ordered systems for screening, brownstock washing, oxygen delignification, and bleaching for the Tervasaari mill. UPM ordered the Diamondback® chip bin and TurboFeed® chip feeding system for its softwood digester at the Kuusanniemi mill. Earlier, Andritz delivered a complete new hardwood digester for the same mill. In the USA, the Division was selected by International Paper to supply a knotting system for the Courtland, AL mill. Also, Simpson Tacoma Kraft ordered a Lo-Solids® cooking upgrade for its Tacoma, WA mill. SFK Pulp ordered a blowline pressure diffuser system for its St-Félicien, Quebec mill. In China, Nanning Phoenix Pulp & Paper Co. Ltd. selected the Division to provide a cooking and fiberline capacity increase for the mill. Sichuan Yong Feng Paper, Inc. ordered screening and MC components for its new Bamboo fiberline in Muchuan, China.

The **Pulp Mill Services Division** was very active in providing upgrades, rebuilds, and maintenance contracts to all the industry's major producers. New maintenance agreements were signed and existing agreements were extended. UPM's Wisaforest mill, Metsä-Botnia's Kaskinen and Joutseno mills, Stora Enso's Tainiokoski mill and ENCE of Spain ordered HQ-Plus™ chipper service programs. Upgrade activities in Europe included a project to modernize the recovery boiler and evaporation plants for UPM's Kaukas mill, and Natron-Hayat Maglaj of Bosnia-Herzegovina's project to upgrade the cooking, evaporation, and white liquor plants at its mill. Natron-Hayat Maglaj also selected Andritz to provide start-up services for their recovery boiler. In South Africa, Mondi Paper ordered a rebuild of the digester at its Piet Retief mill. Upgrade activity in North America was considerable. Georgia-Pacific ordered upgrades including a lime mud filter, a kiln shell replacement, and a recovery boiler modernization. Smurfit-Stone Container selected Andritz to upgrade a boiler scrubber system. Fiberline and cooking upgrades were performed for International Paper Co.

The **Pulp and Paper Machines Division** received an order from Fripa Papierfabrik KG of Miltenberg, Germany for the first new PrimeLineCOMPACT tissue machine soon after the concept was introduced to the market. The machine will produce 30,000 t/a of supersoft tissue. The Division also booked orders for two tissue machines for Shandong Hengan Paper Co. Ltd., China. ICT of Poland, Swedish Tissue, and SCA Tissue in the USA ordered one tissue machine each. A confidential customer placed an order for a wide TAD machine. The Division was also selected to rebuild a pulp drying line for ENCE, Pontevedra in Spain. An Indonesian customer ordered a complete 6.7 m wide pulp drying plant. The Division received orders from Natron-Hayat Maglaj, Bosnia-Herzegovina for a sack kraft machine rebuild.

The **Fiber Preparation Systems Division** received an order from Georgia-Pacific in the USA for a new Fibre-Flow™ drum pulper. In China, Zhejiang Jingxing Paper ordered the main equipment for an approach system for their board machine, and Stora Enso Huatai ordered a complete deinking line and paper machine approach system. Also included in the order are the systems for sludge dewatering, chemical preparation, and water treatment. Anhui Shanying Paper ordered a complete 600 t/d deinking line, including sludge dewatering, for standard newsprint. JTI Yelets of Russia ordered stock refining equipment and Durango of Mexico selected Andritz to upgrade its existing deinking lines. Natron-Hayat Maglaj, Bosnia-Herzegovina ordered an approach system for a rebuild of a board machine. Thai Union Paper, Thailand ordered equipment for its recycled fiberline for packaging grades. ICT Poland gave Andritz a repeat order for a complete stock preparation and approach system.

The **Mechanical Pulping Systems Division** was awarded large orders from a renowned Asian customer to supply two complete chemi-mechanical pulping lines based on P-RC™ APMP technology to China. The integrated systems will use various hardwood raw materials (eucalyptus, poplar, etc.) and are designed to produce chemi-mechanical pulp for printing and writing paper, as well as board grades. Both lines include chip washing and impregnation, mainline refining, heat recovery, reject refining, screening, cleaning, thickening, pulp washing, and a final storage tower. They will be connected to zero-effluent systems where all pulp mill effluents are recovered, cleaned, and re-used in the process. The decision in Andritz's favor was made due to its leading process technologies which provide the highest pulp quality at the lowest possible energy and operational costs. The start-up for both lines is scheduled for late 2007. In addition, two P-RC™ APMP lines will be delivered to China – one to Nanning Jinlang Pulp Co. Ltd. and the other one to Yanzhou Heli Paper Industry (Sun Paper). The start-up of these hardwood-based integrated systems is scheduled for 2008. Further, Holmen Paper, Hallstavik, Sweden, placed an order for three TwinFlo™ low-consistency refiners and a pressure screen to upgrade the existing Andritz RTS™-TMP system to further reduce specific energy consumption.

In the **Panelboard segment**, Fiberboard GmbH, a member of the German CLASSEN Group, ordered a chip washing and pressurized refining system for a new MDF mill in Baruth. Yangdong Luyuan Wood Based Panelboard, Ltd., China selected Andritz to supply a complete front end system (woodyard, chip washing, and pressurized refining) for a new MDF investment. This is the fifth Andritz system ordered by Yangdong Luyuan within five years.

The Division also received an order from Unopan Tableros de Fibras, S.A. of Spain to supply a woodyard (debarking, chipping, chip handling, storage, and screening), a chip cleaning system, and a pressurized refining system for its new MDF factory in Burgos. Bajaj Eco-tec Products, Ltd., a wholly owned subsidiary of India's largest processor of sugar and ethanol, ordered two pressurized refining systems for new MDF plants. These are the first orders Andritz has received from India for processing bagasse as the raw material. Andritz will also supply MDF pressurized refining systems to Sichuan Shengda Forestry Industry Co., Ltd. and Shenyang Heavy Machinery Group, Co. Ltd. of China.

In the **Press and Calendering Division**, German packaging specialist DELKESKAMP ordered a Prime-Press X shoe press from Andritz Küsters to produce kraftliner substitute from 100% recycled paper. The X-Nip technology delivers product and efficiency gains while allowing higher production speeds. The Italian Marchi-Burgo Group ordered two new calenders to improve paper quality. Marchi-Burgo is the first customer to use the new Andritz Küsters sheet transfer system. In Japan, Nippon Paper ordered 11 Multi-HV axles with a working width of 8,850 mm for the multi-nip calender of its new paper machine at the Ishinomaki mill.

The **Paper Mill Services Division** received several major orders for screen baskets including a contract from Nine Dragons in China to supply 80 baskets, and Aspex Paper of Indonesia to rebuild the coarse and fine screening lines. Contracts were signed with Mondi Swiecie, Poland for complete service and inventory management for baskets and refiner plates; with M-Real, Finland for maintenance planning and execution at the Joutseno and Kaskinen mills; and with Estonian Cell, Estonia for the establishment of a preventive maintenance system including quarterly inspections. Significant orders for dewatering and drying service products were received from Mondi Merebank, South Africa; Norske Skog, France; and Stora Enso, Sweden. Mechanical pulping services were focused on extending the lives of refiners that are no longer being actively developed. These products, which enable longer service intervals and higher refining precision, include guide systems, seals, and bearings. Orders for mechanical pulping services and automation systems came from Holmen Paper, Sweden; and Weyerhaeuser, Catalyst Paper, and Boise Cascade, all in North America. →

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 use of media to a minimum (higher efficiencies and yields with less raw materials, 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's response to the sustainability requirement is evident in the new systems which have been adapted to the efficient processing of plantation fibers and technologies which consume much less energy than their 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.

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

Developing technology jointly with key customers is an essential step when implementing new products and applications. During 2006, new wood processing applications were under intensive development to contribute to the sustainability of the forest products industry.

Continued development of the RotaBarker™, a dry debarking technology which minimizes wood losses, now makes the technology suitable for processing softwood logs after it has proven the eucalyptus application. New types of debarking teeth are being tested to see if debarking efficiency can be improved even further.

Another new technology has been created for separating stones, sand, and other potentially damaging materials early in the process before damage is done to downstream equipment. The first new stone separator was recently installed in the debarking line of a mill in southern Europe.

Fiberline

Technology development in the Fiberline Division continues to focus on lowering the investment cost per ton of pulp produced. This is being accomplished through process simplification, increased specific capacity, standardization, and modularization. In addition, the work is continuing to make the pulping process more sustainable.

Recently, the development work in cooking and brown-stock processing has resulted in higher yield and better fiber recovery from uncooked chips. For hardwoods, these yield improvements can result in up to 5% less wood usage for the same pulp output.

Less chemicals are now required for cooking and bleaching while benchmark pulp quality features such as strength, cleanliness and brightness are being improved. Quality improvements in the pulping stage typically have a positive carry-over to paper production in terms of less raw material and chemical additives being required, in addition to there being fewer variations and process disturbances on the paper machine itself.

The milder conditions in reactors and simplified process designs are also consuming less energy. Reduced fresh water consumption and correspondingly lower effluent volumes have been achieved by introducing new fractional washing concepts and by pressurizing/closing process steps to prevent emissions to the atmosphere.

Many of these developments are now in practical application in the latest Andritz installations, for example at the Veracel mill in Brazil.

Recovery

Due to continuously rising energy costs for pulp and paper producers, a development program was launched to introduce advanced biomass-fired power boilers to the industry.

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. Technologists in the Recovery Division are reviving biomass gasification technology, which was developed for this purpose during the 1980s.

The next generation of High Energy Recovery Boilers (HERB) is taking shape through successful installations recently started up. Work continues on refinements such as new materials and new sub-processes.

Improved accuracy of CFD modeling (simulation of heat transfer and fluid streams within the recovery furnace) is being addressed in a large, partially publicly-funded project. The modeling helps designers better understand the internal behavior of the boiler in order to improve energy efficiency, minimize emissions, and minimize scaling. Andritz is also developing next generation automation to optimize the operation of a recovery boiler.

Chloride removal is becoming more important as mills close their chemical circulation loops to reduce emissions to the environment. A new, leaching-based chloride removal process is being developed to offer a lower cost alternative to the proven ash re-crystallization process (ARC).

Another contribution to sustainable development is the technology to reuse process fluids in other areas of the mill to minimize the consumption of fresh water. Key to this is the technology to split condensate streams inside the evaporation process and re-direct them to optimized areas of the mill.

Chemical Systems

The Chemical Systems Division is further developing its technologies to promote the environmental sustainability of a pulp mill. For example, a recently launched product for lime mud dewatering – the LMD-Filter™ – has been further enhanced to significantly reduce soda levels in the lime kiln feed. The new soda levels are well below previous achievements and serve to decrease emissions from the kiln even further. A two-stage LMD-Filter™ installed at a pulp mill in Austria has been operating with excellent results.

To address the customer requirement to manufacture more products at lower overall costs, the Division developed a larger kiln which can process 1,000 t/d of lime. The largest model is being delivered to a mill in Indonesia.

The Division's new concept for green liquor handling has become widely accepted by customers. In 2006, the Andritz X-Filter filtration technology conquered a new market area, China. In Europe, the Americas, Australia, and Indonesia it has served in recausticizing processes for quite some time. Also, the application of centrifuge technology for dregs dewatering and washing is now being accepted by customers. The centrifuge eliminates using lime mud as a separation aid. The dregs from the centrifuge process are less bulky and better washed, which minimizes their impact in landfills. Also, the amount of material to be landfilled is reduced. Lime mud can be purged separately in an uncontaminated form, which allows it to be used as a soil amendment.

A new lime kiln at UPM's Kuusaniemi mill in Finland will incorporate a burner which is a completely new technology. The LMD Burner has lower NO_x emissions and improved flame shaping, compared to existing technology.

Pulp Mill Services

The Division launched an aggressive program called LCP (Life Cycle Profits for customers) to support the sustainability targets of Andritz's customers. It includes cooperation with the major research organizations in Europe and several projects to improve the maintenance of systems for pulping processes. The LCP projects are focused on developing predictive tools (such as online condition monitoring and diagnostics), proactive practices (such as efficient spare parts systems), and more durable materials for the equipment.

The other leading force for service development is the OPE® (Overall Production Efficiency) agreement where the target is to increase production and quality at each customer's mill while reducing costs.

Many product innovations are taking place. A new type of sensor to measure acoustic emissions has been developed which gives more exact measurements. This sensor is being deployed to measure the wear in chipper knives and the condition of the sealing elements in DD washers. Special materials have been developed to lengthen the life of wear parts in wood handling and of rotors in screening applications. In the cooking process, two new style digester screen plates have been developed. For the lime kiln, a new advanced control system helps to reduce energy consumption, and an improved burner replaces oil with natural gas to reduce energy costs and emissions. New air port rodders in the recovery boiler improve efficiency and increase energy production of the boiler. →

Fiber Preparation Systems

The Fiber Preparation Systems Division has been focusing its R&D for stock preparation on increasing system efficiency and reducing the amount of energy consumed. The results of this effort in the last year are the introduction of new low-consistency and high-consistency pulpers for both virgin and recycled pulp slushing as well as the new family of low-consistency refiners. There are also new under-machine pulpers.

Excellent operating results are being achieved with newly developed products such as SelectaFlot™ flotation, CompaDis™ dispersion, and Papillon™ refiners. After the acquisition of Pilão, the Division now has a TriConic® conical refiner in the Graz pilot plant to test the optimum refining solution for every customer application.

In support of sustainable development with reduced environmental impact, development work continues to introduce more competitive systems for wastewater, sludge, and reject handling.

Mechanical Pulping Systems

Development work in the Mechanical Pulping Systems Division focuses on reducing energy consumption and simplifying the processes to lower the investment/operating costs for customers.

Reducing energy consumption not only lowers costs, but also lowers the emission of greenhouse gases in support of the goals of the Kyoto protocol. In the area of energy efficiency, the Division has introduced to the market a pre-treatment process for wood chips prior to the refining stage (RT pre-treatment). Additionally, work is proceeding on the application of a low-consistency refiner as last stage, which will further reduce energy consumption and can also simplify the process.

The trend in sustainable development is to utilize different or new wood species in the production of paper – especially in countries where wood is a rare resource. One part of the Division's R&D work is focused on the selection and testing of such species (eucalyptus, acacia, birch, maple, bagasse, reed, and kenaf). In combination with the use of new raw materials, emphasis is on reducing the total effluent dispatch from the mill. The Division is active in the development of zero-effluent technologies where all effluent streams from a mechanical pulp mill are collected, evaporated, and recovered. Fresh water consumption is significantly reduced and valuable chemicals can be recovered.

For the MDF industry, the Division is developing a new digester concept that reduces energy consumption and minimizes the moisture content of the fibers, resulting in lower energy costs for the overall process. Another project focuses on the development of an entirely new treatment process to turn mixed plastic waste into a raw material for new products, thus extending the value-added chain for this material.

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

Press and Calendering

Energy efficiency and cost savings continue to be major drivers for the paper industry. The R&D programs of the Press and Calendering Division are designed to accomplish both. Important to this is the continued development of extended nip calendering technology (X-Nip). In 2006, the Division not only installed a pilot machine in its technical center, but initiated detailed research to document which paper grades can be produced more efficiently and at higher quality with the X-Nip technology.

In addition, the Division developed a sheet transfer feeding system and sold the system to a customer. The Paper and Nonwovens research staff is working on new methods to produce speciality papers for gasoline filter systems. In this, the paper industry is benefiting from the Division's extensive experience in the nonwoven area. Specifically finished nonwovens are laminated to specific paper grades, thus showing optimum product qualities. Similar research projects for development of new wet finishing technologies for nonwovens are on the research agenda.

Pulp and Paper Machines

Technology development for pulp drying lines continues to focus on lowering the investment cost per ton of pulp produced. The main research and development thrust is to increase the production capacity of a single drying line based upon Twin Wire Forming technology from approximately 3,500 t/d today to over 4,000 t/d or over 1,200,000 t/y of pulp. Energy consumption of the entire drying line has been 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. A similar simulation tool for flash drying lines was installed for the first time at the Estonian Cell mill. In addition, there are developments to improve machinery uptime through advanced process control using BrainWave® sensors. An ACE™ (Andritz Control Expert) tool ensures stable and uniform operation of the machine automatically to minimize operator requirements and also minimize the steam and energy consumed.

Technology development for tissue machines centers around the deployment of a tool which dynamically simulates all mass and energy flows in tissue or TAD plants. Operators can be trained “virtually” to run the production line – doing start-ups, grade changes, and shutdowns in a safe, virtual environment.

Also in the tissue industry, a new generation of shoe presses became available with the acquisition of Andritz Küsters in 2006. Andritz received the first order for the PrimePress XT from a mill in northern Europe. The new shoe press shows improvements in all areas: machine direction profiles can be adjusted online, the smaller diameter makes it easier to retrofit on existing machines, together with other features to simplify and improve the reliability of the system.

A stable sheet run in the area between the creping doctor and reel is critical to runnability at high speeds. To secure this high runnability, especially for high speed tissue machines, the new PrimeRun system with advanced run components – air or dust deflectors, suction headers, active headers with low sheet contact, and guiding/stabilizing foils – has been developed and introduced to the markets.

The move by Andritz into TAD tissue production, starting with the first machine in 2004 and followed by two additional orders, is now successfully established. The Division is making steady improvements to allow more economic TAD production. Now a commercial solution is available which will reduce energy costs significantly.

Over the past few years, there has been a continuous rise in energy costs. Andritz has responded to this development in good time and marketed EconoFit and ECOS, two new control concepts which provide for permanent process analysis in paper drying, thus ensuring optimum energy use and reducing costs.

Paper Mill Services

Much of the R&D focus for paper mill services is on improving the efficiency of equipment already installed in a customer's plant to lower the operating costs. To this end, the Division is developing engineered solutions to extend the operating life and add value to the production process. Examples of recent activities include programs to extend the maintenance cycles and refining precision of Twin 60 refiners, and developing new seals and bearings that can be retrofitted into the Bauer DD 485/495 refiner.

R&D programs for refiner plates focus on advancing the energy efficiency and continuously improving fiber quality. The acquisition of Andritz Pilão in Brazil further strengthens the company's capabilities to produce high-quality conical refiner plates. Programs are underway to extend the operating life of cast plates and enhance the manufacturing techniques for fabricated plates.

In the stock preparation area, new techniques are being deployed for upgrading pulpers in virgin fiber and broke applications. Development work to improve the efficiency and durability of cleaner plants – from Andritz and other OEMs – continues to expand the market possibilities.

In the dewatering area, a major goal of the R&D program is to develop upgrade products to improve equipment performance and extend the maintenance intervals of disc filters, Twin Wire presses, and screw presses offered by different manufacturers. A patented coating for wear shoes on screw presses was developed to increase production rates and reduce abrasion significantly. A new filtrate valve and optimized filtrate channels of disc filters improve capacity and filtrate quality. Condition monitoring of bearings on Twin Wire presses alerts operators to potential problems before production is impacted.

The Division will also continue to link automation and optimization systems with its fundamental process/product knowledge as this has proven to be fertile ground for innovation. ■