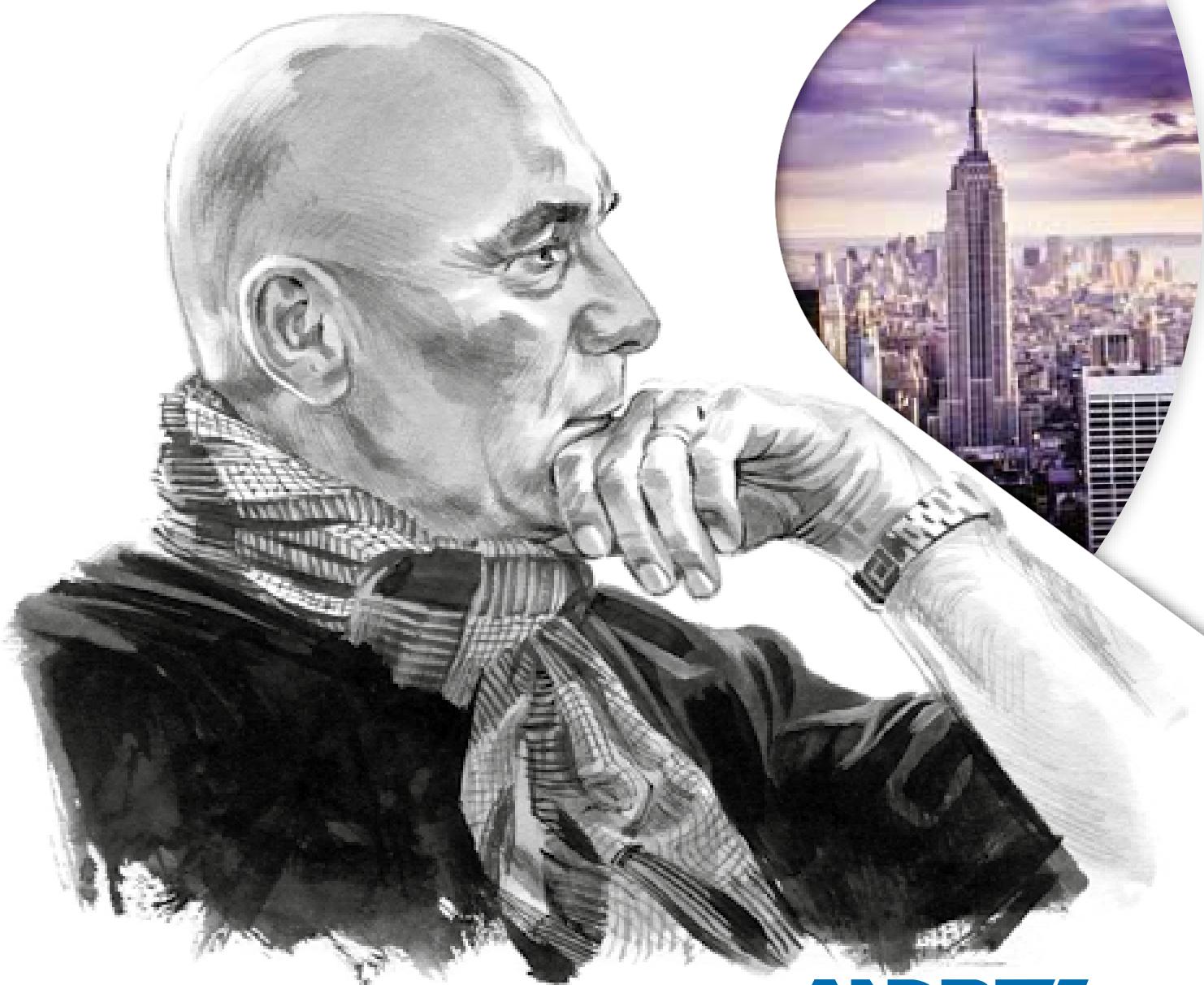


GLOBAL VIEWS

ANNUAL REPORT 2012



ANDRITZ

GLOBAL VIEWS

In their annual reports, companies generally write about themselves. However, this time we decided to ask external authors to write about ANDRITZ. An outsider's point of view can often provide new and perhaps also slightly different perspectives compared with a view from within the company. With this change of perspective, we hope that you will learn plenty of interesting facts about our customers, our markets, and the development of the ANDRITZ GROUP in the 2012 business year.



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IMPORTANT KEY FINANCIAL FIGURES & COMPANY PROFILE

The ANDRITZ GROUP is a globally leading supplier of plants, equipment, and services for hydropower stations, the pulp and paper industry, solid/liquid separation in the municipal and industrial sectors, the steel industry, and the production of animal feed and biomass pellets. The publicly listed, international technology Group is headquartered in Graz, Austria, and had a staff of around 17,900 employees as of end of 2012. ANDRITZ operates over 180 production sites as well as service and sales companies all around the world.

The ANDRITZ GROUP ranks among the global market leaders in all five of its business areas. One of the Group's overall strategic goals is to strengthen and extend this position. At the same time, the company aims to secure the continuation of profitable growth in the long term.

	Unit	2012	2011	2010	2009	2008
Order intake	MEUR	4,924.4	5,706.9	4,131.9	3,349.3	3,705.3
Order backlog (as of end of period)	MEUR	6,614.8	6,683.1	5,290.9	4,434.5	4,277.4
Sales	MEUR	5,176.9	4,596.0	3,553.8	3,197.5	3,609.8
EBITDA ¹⁾	MEUR	418.6	386.2	307.3	218.2	278.2
EBITDA margin	%	8.1	8.4	8.6	6.8	7.7
EBITA ²⁾	MEUR	357.8	331.5	257.6	164.1	233.2
EBITA margin	%	6.9	7.2	7.2	5.1	6.5
Earnings Before Interest and Taxes (EBIT)	MEUR	334.5	312.7	245.5	147.1	218.5
EBIT margin	%	6.5	6.8	6.9	4.6	6.1
Earnings Before Taxes (EBT)	MEUR	331.6	321.7	247.9	149.6	210.5
Net income (including non-controlling interests)	MEUR	242.2	231.5	177.0	102.9	147.0
Fixed assets	MEUR	1,390.5	1,151.8	858.9	731.4	732.1
Current assets	MEUR	3,770.5	3,414.8	3,176.9	2,577.9	2,354.2
Total shareholders' equity ³⁾	MEUR	1,033.8	938.9	794.4	663.5	577.4
Provisions	MEUR	725.4	667.3	582.8	529.9	477.3
Liabilities	MEUR	3,401.8	2,960.4	2,658.6	2,115.9	2,031.6
Total assets	MEUR	5,161.0	4,566.6	4,035.8	3,309.3	3,086.3
Equity ratio ⁴⁾	%	20.0	20.6	19.7	20.0	18.7
Liquid funds ⁵⁾	MEUR	2,047.8	1,814.5	1,594.7	1,082.1	821.8
Net liquidity ⁶⁾	MEUR	1,285.7	1,400.6	1,177.0	677.9	408.9
Cash flow from operating activities	MEUR	346.5	433.8	704.5	345.7	255.0
Capital expenditure ⁷⁾	MEUR	109.1	77.0	68.8	70.5	69.7
Employees (as of end of period; without apprentices)	-	17,865	16,750	14,655	13,049	13,707

1) Earnings Before Interest, Taxes, Depreciation, and Amortization 2) Earnings Before Interest, Taxes, Amortization of identifiable assets acquired in a business combination and recognized separately from goodwill at the amount of 22,942 TEUR (2011: 17,839 TEUR), and impairment of goodwill at the amount of 397 TEUR (2011: 1,000 TEUR) 3) Total shareholders' equity including non-controlling interests 4) Shareholders' equity/total assets 5) Cash and cash equivalents plus marketable securities plus loans against borrowers' notes 6) Liquid funds plus fair value of interest rate swaps minus financial liabilities 7) Additions to intangible assets and property, plant, and equipment. All figures according to IFRS. Due to the utilization of automatic calculation programs, differences can arise in the addition of rounded totals and percentages. MEUR = million euros. TEUR = thousand euros.



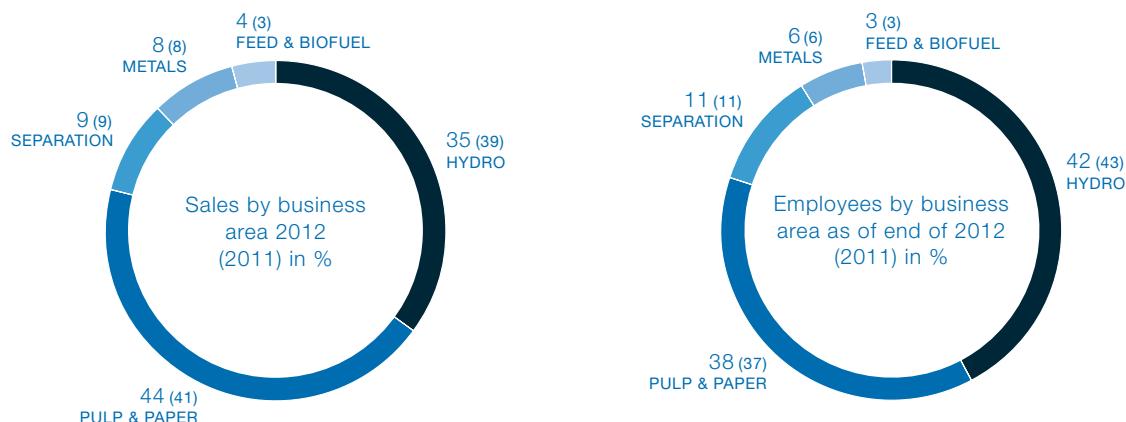
ANDRITZ BUSINESS AREAS

ANDRITZ HYDRO supplies electromechanical equipment for hydropower stations. With over 170 years of accumulated experience and more than 30,000 turbines installed totaling approximately 400,000 megawatts output, the business area is one of the world's leading suppliers for hydraulic power generation, offering the complete product portfolio, including turbines, generators, and additional equipment of all types and sizes: "from water to wire" for small-scale hydropower stations up to outputs of more than 800 megawatts. ANDRITZ HYDRO also holds a top position in the growing hydropower plant service, refurbishment, and upgrade market. Pumps (for water transport, irrigation, and applications for various industries) and turbogenerators for thermal power stations are also allocated to the business area.

	Unit	2012	2011	2010	2009	2008
Order intake	MEUR	2,008.4	2,096.2	1,870.1	1,693.9	1,543.4
Order backlog (as of end of period)	MEUR	3,842.3	3,671.4	3,376.0	2,894.5	2,590.1
Sales	MEUR	1,836.8	1,772.9	1,579.2	1,378.0	1,205.9
EBITDA	MEUR	182.4	174.3	139.9	120.9	105.7
EBITDA margin	%	9.9	9.8	8.9	8.8	8.8
EBITA	MEUR	153.2	147.7	118.0	100.5	87.9
EBITA margin	%	8.3	8.3	7.5	7.3	7.3
Capital expenditure	MEUR	56.7	44.3	41.5	44.5	35.0
Employees (as of end of period; without apprentices)	-	7,469	7,285	6,530	5,993	5,606

ANDRITZ PULP & PAPER is a leading global supplier of equipment, systems, and services for the production and processing of all types of pulps, paper, tissue, and board. The technologies cover processing of logs, annual fibers, and waste paper, production of chemical pulp, mechanical pulp, and recycled fibers, recovery and reuse of chemicals, preparation of paper machine furnish, production of paper, tissue, and board, calendering and coating of paper, as well as treatment of reject materials and sludge. The service range includes modernization, rebuilds, spare and wear parts, service and maintenance, as well as machine transfer and second-hand equipment. Biomass, steam, and recovery boilers, gasification plants for energy production, flue gas cleaning plants, biomass torrefaction, and plants for the production of nonwovens, dissolving pulp, plastic films, and panelboards (MDF) are also allocated to the business area.

	Unit	2012	2011*	2010*	2009*	2008*
Order intake	MEUR	1,962.4	2,694.1	1,415.5	940.0	1,065.4
Order backlog (as of end of period)	MEUR	2,018.1	2,230.0	1,107.3	782.6	762.0
Sales	MEUR	2,282.2	1,884.9	1,129.8	925.5	1,355.2
EBITDA	MEUR	156.2	138.1	99.9	41.7	84.6
EBITDA margin	%	6.8	7.3	8.8	4.5	6.2
EBITA	MEUR	134.6	120.4	82.2	17.2	66.4
EBITA margin	%	5.9	6.4	7.3	1.9	4.9
Capital expenditure	MEUR	36.4	22.5	18.4	17.8	22.1
Employees (as of end of period; without apprentices)	-	6,774	6,208	5,046	4,418	5,354



ANDRITZ SEPARATION is one of the leading suppliers of technologies and services in the solid/liquid separation and thermal treatment areas for the environmental sector (particularly treatment of municipal and industrial wastewater), for mining and mineral processing, the chemical industry, and for the food and beverages industries. The extensive portfolio covers centrifuges, filters, thermal systems, screens, thickeners, separators, conveying equipment, as well as torrefaction of biomass. Based on 150 years of experience, ANDRITZ SEPARATION is a long-term service partner for the entire life cycle of customer plants, including delivery of wear and spare parts, modernization, and process optimization.

	Unit	2012	2011*	2010*	2009*	2008*
Order intake	MEUR	468.2	438.8	397.2	288.4	329.6
Order backlog (as of end of period)	MEUR	258.0	250.8	234.6	135.7	142.6
Sales	MEUR	468.0	419.9	350.9	300.4	338.0
EBITDA	MEUR	39.3	42.7	33.3	29.6	32.0
EBITDA margin	%	8.4	10.2	9.5	9.9	9.5
EBITA	MEUR	34.7	36.7	28.0	24.9	27.2
EBITA margin	%	7.4	8.7	8.0	8.3	8.0
Capital expenditure	MEUR	3.7	4.0	3.7	2.8	5.5
Employees (as of end of period; without apprentices)	-	1,915	1,752	1,621	1,150	1,185

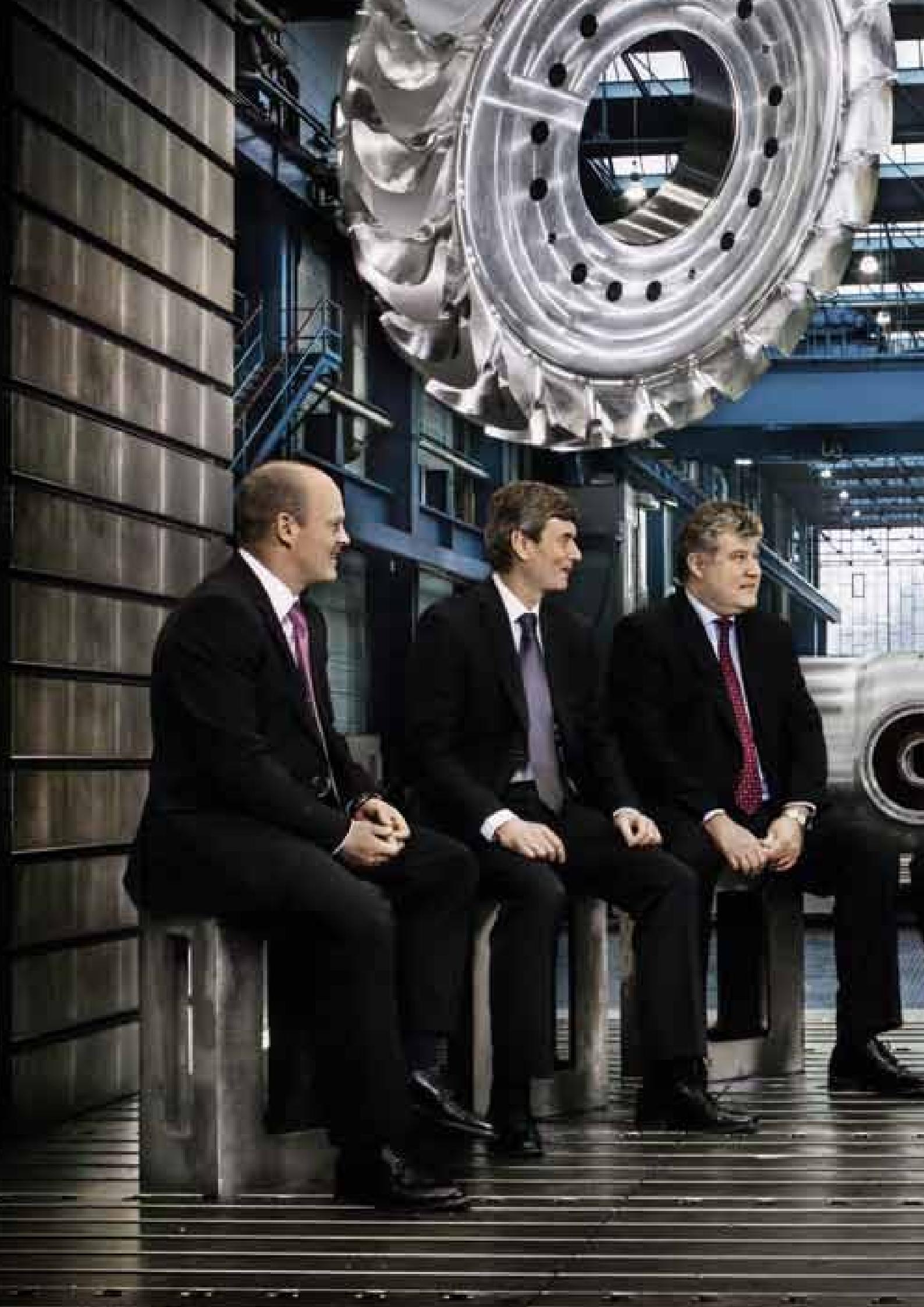
ANDRITZ METALS is one of the leading global suppliers of complete lines for the production and processing of stainless steel. These lines consist of equipment for cold rolling, heat treatment, surface finishing, strip coating and finishing, punching and deep drawing, and for regeneration of pickling acids. In addition, the business area supplies lines for the production and processing of carbon steel and non-ferrous metal strip, resistance welding equipment for the metalworking industry, as well as turnkey furnace systems for the steel, copper, and aluminum industries.

	Unit	2012	2011	2010	2009	2008
Order intake	MEUR	324.2	318.6	302.7	296.2	611.5
Order backlog (as of end of period)	MEUR	451.4	465.1	521.0	564.1	736.2
Sales	MEUR	404.7	372.7	340.2	473.4	566.2
EBITDA	MEUR	28.0	21.5	21.2	23.2	42.6
EBITDA margin	%	6.9	5.8	6.2	4.9	7.5
EBITA	MEUR	25.1	19.4	18.4	20.5	40.1
EBITA margin	%	6.2	5.2	5.4	4.3	7.1
Capital expenditure	MEUR	2.6	1.8	1.9	2.0	4.3
Employees (as of end of period; without apprentices)	-	1,129	945	937	971	996

ANDRITZ FEED & BIOFUEL supplies systems, equipment, and services for the industrial production of animal feed pellets (pet food, fish, and shrimp feed) and for biomass pellets (wood pelleting plants and pelleting of agricultural and industrial by-products, such as straw). The business area is one of the world market leaders in both fields.

	Unit	2012	2011	2010	2009	2008
Order intake	MEUR	161.2	159.2	146.4	130.8	155.4
Order backlog (as of end of period)	MEUR	45.0	65.8	52.0	57.6	46.5
Sales	MEUR	185.2	145.6	153.7	120.2	144.5
EBITDA	MEUR	12.7	9.6	13.0	2.8	13.3
EBITDA margin	%	6.9	6.6	8.5	2.3	9.2
EBITA	MEUR	10.2	7.3	11.0	1.0	11.6
EBITA margin	%	5.5	5.0	7.2	0.8	8.0
Capital expenditure	MEUR	9.7	4.4	1.8	3.4	2.9
Employees (as of end of period; without apprentices)	-	578	560	522	517	566

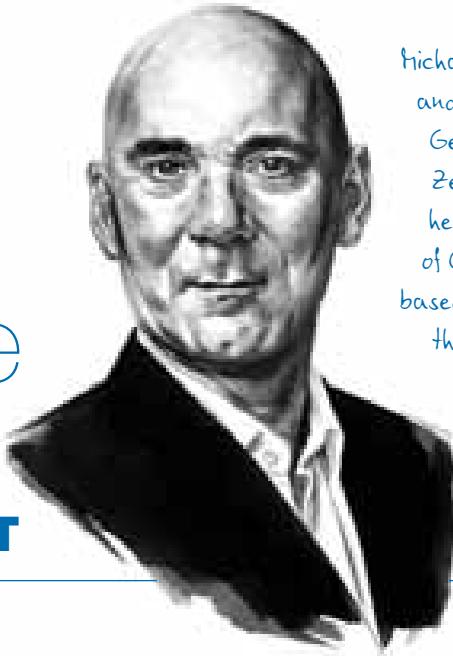
* In 2012, there was a minor shift of some products from the SEPARATION business area to the PULP & PAPER business area. Comparison figures for the previous years have been adjusted.





Factory workshop M2, ANDRITZ headquarters in Graz, Austria: Michael Kneissler (third from the right) during the interview with the ANDRITZ Executive Board members Karl Hornhofer, Wolfgang Semper, Humbert Köfler, Wolfgang Leitner, and Friedrich Papst (from the left).

What one has achieved **BELONGS TO THE PAST**



Michael Kneissler is a scientific author and has written for numerous renowned German publications, such as "Die Zeit" and "Der Spiegel". He currently heads the editorial departments of GruenertJahr's Corporate Editors based in Munich, which is responsible for the journalistic section of the present annual report. He moderated the conversation with the ANDRITZ Executive Board on the 2012 business year and the future perspectives for the company.

Factory workshop M2 is 206 meters long and 22 meters wide. It is one of the big workshops at the ANDRITZ headquarters in Graz, Austria, in which tailor-made machines and equipment, such as hydropower turbines or headboxes for pulp and paper plants, are manufactured. On the way to the interview, the ANDRITZ Executive Board members stop from time to time to talk to the workers. "How are you today? Everything OK?" one of the Executive Board members asks a man working on a filter press. "And the equipment, too?" Production in the workshop continues during the interview, cranes move plant components weighing many tons, and men in protective clothing operate computer-aided tools for machining oversized stainless steel parts. The working atmosphere is one of concentration – exactly the right environment for a meeting with the Executive Board.

You have chosen this factory workshop as the venue for our talk today. Why are we sitting here and not in a comfortable office or conference room?

Wolfgang Leitner: The five of us sit in our offices less than people perhaps imagine. We spend a lot of time traveling, visiting our customers and employees. Since manufacturing is one of our core activities, we have decided to come here to talk to you about the

past business year and to thank our staff for all their efforts.

2012 was yet another successful year, wasn't it?

Wolfgang Leitner: Our performance was satisfactory ...

... sorry for interrupting you: only satisfactory? No better than that?

Wolfgang Leitner: No – no better or worse. We did not lose our footing, and do not wish to do so in the future, either. The performance was satisfactory because we were able to grow organically together with the markets we serve and also broaden the products and services we offer through acquisitions. We thus consolidated our market position in all five business areas. The bottom line is that we were able to increase our sales and our profit. The order backlog is at a high level and provides a solid workload. And given the difficult economic environment, the order intake was good, even though it did not reach the record high of 2011, when we received, after all, three large orders with a total volume of about 1.4 billion euros.

How do you cope with these fluctuations in order intake? Mr Horhofer, the large capital business for the pulp industry, for which you are responsible, is very volatile. Of all the managers here, you must be the one who experiences the most sleepless nights ...

**Wolfgang Leitner**

Responsibility: President and CEO,
central Group functions

Joined ANDRITZ in: 1987,
President and CEO since 1994

Karl Hornhofer (*smiling*): No sleepless nights – at least only when we are negotiating large projects! Seriously though, like all suppliers of investment goods, we are in a volatile business that is affected to a certain extent by the economic environment. However, our customers plan in the very long term, and the decision to invest in a new pulp mill or hydropower station is not taken in just a few weeks on the basis of short-term price and demand trends. These are projects that are often planned over many years and reflect long-term trends relating to needs. It is crucial for us that we serve mar-

kets that are able to grow structurally in the long term. The pulp industry is one such market. What concerns us more than the volatility of large orders is how they are processed. Compared to service business, large projects do generally offer lower margins. Achieving a reasonable profitability in spite of such large orders is one of the main challenges in our business segment.

**Karl Hornhofer**

Responsibility:
PULP & PAPER
(Capital Systems),
Group-wide quality
and safety
management
Joined ANDRITZ in:
1996



The METALS business area is the one most affected by the poor economic climate. My question is probably naive, but how does the business area still manage to make a profit? What is its secret?

Friedrich Papst: There is no secret at all. It is the result of the alignment of our business model. In all segments, we are flexible in terms of costs and are able to adjust capacities relatively quickly to the order situation. Since we are active in projects, this is something we deal with every day. Specifically in the METALS area, we have a high degree of outsourcing, meaning that our own manufacturing shops concentrate on parts requiring advanced technology and that we procure other parts from approved and certified suppliers. However, for all of us there are still areas in which we can become even more flexible. We must make considerable efforts to achieve this in the future, too.

Humbert Köfler: In addition to our flexibility on costs, service business does help us to grow profitably, independently of a few large orders. There is still further potential in this area. Since servicing, maintenance, and the sale of spare and wear parts for our machinery and equipment is more profitable and more stable than investment business, our aim is to continually expand service business further.

Is service business not just a sideline?

Humbert Köfler: No, it isn't. The ANDRITZ GROUP already derives a quarter of its sales from the service

Friedrich Papst

Responsibility: METALS,
FEED & BIOFUEL, HYDRO (pumps),
Group-wide manufacturing and
procurement
Joined ANDRITZ in: 1979

business. Not only does it offer stability with regard to sales and high profitability, it also significantly strengthens the long-term relationship with our clients. And service helps our customers obtain optimum performance from their equipment. The best example is the new Montes del Plata pulp mill in Uruguay, which is currently being erected and to which we supply equipment. There we have also concluded an eight-and-a-half-year service contract covering full maintenance.

In preparation for today's talk, I spoke about ANDRITZ to an economic journalist in Germany. The first thing he came out with was: "Oh, the acquisition kings!"

Wolfgang Leitner (laughing): Please tell your friend that he should not exaggerate! However, the fact is that in 2012 we were also able to achieve our aim of expanding our market position by acquiring companies suited to us, as well as through organic growth. We only acquire companies whose products and services complement or expand our existing portfolio in a way that makes sense. Schuler is a good example. Years ago we followed our customers' trend in the METALS business area and acquired a small manufacturer of presses for the metal processing industry. We thus already had a foot in the door. Schuler was owned by the same family

for 174 years and always one of the world's leading press suppliers for this industry, particularly car manufacturers. I have been in contact with the owners for years, and ultimately they decided that we could offer Schuler the best home in the long term.

With AES, Gouda, Bricmont, and Soutec, a further four companies were acquired in 2012. Are you not afraid that with the large number of acquisitions – more than 60 companies since the beginning of the 1990s – ANDRITZ will one day be taken over itself?

Wolfgang Semper: As somebody who was, so to speak, taken over himself – I came to ANDRITZ in 2006 with the acquisition of VA TECH HYDRO – I can say something about this. The first question ANDRITZ put to us at the time was: What technologies can we invest in, in order to secure and expand our market position? This shows how ANDRITZ approaches the question of acquisitions. No competitors are bought so as to be downsized or resold. On the contrary – since the takeover by ANDRITZ, the former VA TECH HYDRO has experienced considerable organic growth. Moreover, companies are not bought at any price. However, one can never rule out that an acquisition might go wrong.

Let's take a look at the regional markets. In the last few years, ANDRITZ has invested heavily in expanding its presence in South America and Asia, but now even China is faltering and the first European countries are already withdrawing. Has ANDRITZ chosen the wrong strategy?

Friedrich Papst: We think it's the right strategy. One can compare the ANDRITZ GROUP to a maritime fleet. This fleet is able to navigate steadily through the economic troughs because it is made up of five different ships, our five business areas, and one ship is sometimes able to cope better with the swell of the waves than another. This also applies to the regions. The crisis of 2008 and 2009 affected us less compared to companies within our sector because the weakness of the European and US markets could largely be offset by high demand in the emerging markets. Our global presence also considerably helped us in 2012. It would be a mistake not to be present in the emerging markets. We like to be where our customers are and where there is demand.

Finally, Mr Leitner, I would like to have a brief look into the future. What does ANDRITZ expect in 2013?

Wolfgang Leitner: The economic climate probably will not change significantly in 2013 and will continue to be challenging. However, as things stand, we expect ANDRITZ to perform well, whereby the visibility of future projects will be further reduced. We must adjust even more to these fluctuations and make the company more

Humbert Köfler

Responsibility: PULP & PAPER
(Service & Units), SEPARATION
Joined ANDRITZ in: 1987





flexible in terms of organization and cost. In 2013, we should again be able to increase our sales, not least because of the sales contribution from the first-time consolidation of Schuler as of March 1, 2013. We therefore also expect the net income to rise.

And what about your personal goals?

Wolfgang Leitner: What one has achieved belongs to the past – and every success is the crossbar for the future. **I**

Further data, facts, and figures on the 2012 business year are available in the online financial report at reports.andritz.com/2012/ – or e-mail us at investors@andritz.com to request a printed copy free of charge.



2012 BUSINESS YEAR: SATISFACTORY DEVELOPMENT

In 2012, sales of the ANDRITZ GROUP amounted to 5,176.9 million euros (MEUR). All business areas, mainly PULP & PAPER, contributed to this increase of 12.6% compared to the previous year's reference figure (2011: 4,596.0 MEUR).

The order intake amounted to 4,924.4 MEUR and was thus 13.7% below the extraordinarily high level of the previous year (2011: 5,706.9 MEUR), which included three large orders with a total value of approximately 1,400 MEUR. Due to these large orders, the order intake decreased in the HYDRO and PULP & PAPER business areas compared to 2011. The other business areas noted an increase of order intake.

The order backlog as of December 31, 2012 amounted to 6,614.8 MEUR and was thus virtually unchanged compared to the reference figure of last year (-1.0% versus December 31, 2011: 6,683.1 MEUR). In the HYDRO and SEPARATION business areas, the order backlog rose; all other business areas noted a decline.

The EBITA amounted to 357.8 MEUR, thus exceeding the reference figure of last year by 7.9% (2011: 331.5 MEUR). The EBITA margin amounted to 6.9% (2011: 7.2%); this slight decline is mainly attributable to the project mix in the PULP & PAPER business area (higher portion of large projects compared to 2011) as well as cost overruns on some projects and expenses for business expansion in the emerging markets in the SEPARATION business area.

The net income (excluding non-controlling interests) amounted to 243.6 MEUR (2011: 230.7 MEUR).

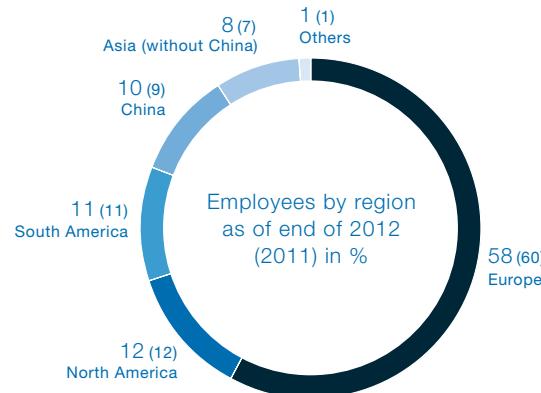
The total assets as of December 31, 2012 increased to 5,161.0 MEUR (December 31, 2011: 4,566.6 MEUR). This increase is attributable primarily to acquisitions and the issue of a corporate bond with a volume of 350 MEUR in July 2012. The equity ratio as of end of 2012 amounted to 20.0% (December 31, 2011: 20.6%).

Liquid funds amounted to 2,047.8 MEUR as of December 31, 2012 (December 31, 2011: 1,814.5 MEUR). The net liquidity amounted to 1,285.7 MEUR (December 31, 2011: 1,400.6 MEUR).

Investments in tangible and intangible assets amounted to 109.1 MEUR (2011: 77.0 MEUR) and focused mainly on workshop modernizations as well as the construction and/or purchase of office buildings.

The cash flow from operating activities, at 346.5 MEUR, was significantly below the previous year's reference figure (2011: 433.8 MEUR). This decrease was mainly due to project-related changes in the working capital.

At the end of 2012, the ANDRITZ GROUP had a total of 17,865 employees (+6.7% versus December 31, 2011: 16,750 employees). This increase is mainly due to the first-time consolidation of acquired companies. ▲



Into the right SHAPE



Dagmar Deckstein was business correspondent for the German daily newspaper "Süddeutsche Zeitung" in Baden-Württemberg. The research she conducted in the town of Göppingen, headquarters of the press manufacturer Schuler, in which ANDRITZ has acquired a majority stake, was in a way a journey into the past - Deckstein was born in Göppingen. For this report, she looked into the past, but above all at the current market position and future perspectives for Schuler, and spoke with Schuler CEO Stefan Klebert.

Whether for mudguards or car doors, sheet steel castings for washing machines or kitchen sinks, railway wheels or turbine blades for aircraft engines, drinks cans or euro coins – a variety of industries first have to mould metal or other materials into the right shape as part of their production process. One could use large presses produced by Schuler, for example, that process metal at a pressure of up to 50,000 tons. Today, in total an estimated [20,000 Schuler presses are installed around the world](#).

Louis Schuler opened his metalworking shop in Göppingen, Germany, back in 1839. In 1852 he began producing the first sheet metal processing machines and in 1895 he exported his first coin minting press to China. However, the breakthrough did not come until industrial mass production began in the automotive industry in 1924, when Schuler supplied the first car body press to car manufacturer Opel in Rüsselsheim, Germany. This is more or less the history of countless companies, which are present-day world leaders in the German-speaking world.

In long-standing studies, management consultant Hermann Simon from Bonn identified 1,533 companies as hidden champions. Schuler is one of these hidden champions, which are well known to their industrial clients but hardly at all to consumers. 174 years after the company was founded, Schuler has risen to become an international group that currently employs about

5,500 employees in 40 countries and [one of the world's leading suppliers](#) for machinery, plants, tools, processing know-how, and services to the metal processing industry.

In addition to virtually all car manufacturers and their suppliers, its customers include companies operating in the household appliance, metal forging, energy and electrical industries. The company's present size is due not least to the spectacular acquisition of its long-standing competitor Müller-Weingarten. For a long time, machine builders puzzled over which of the two German heavyweights would buy up the other. Robert Schuler-Voith, great-great-grandson of the founder Louis Schuler, was finally successful. Müller-Weingarten is a traditional company from Weingarten in the German region of Upper-Swabia and was founded in 1866. It has been merged with Schuler, along with its 2,300 employees and sales of 336 million euros.

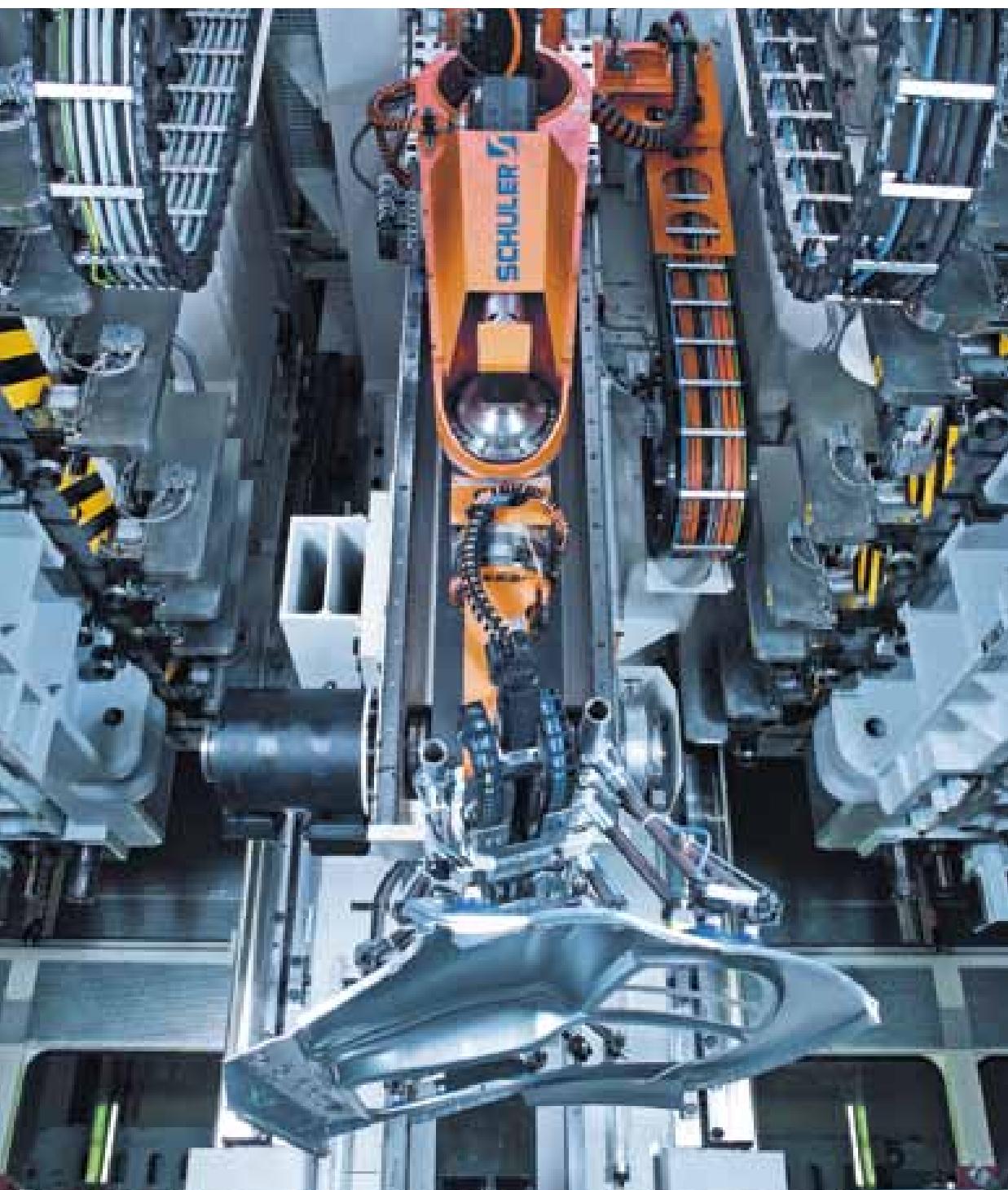
Things have been on the up ever since. After recording sales of just under 960 million euros in the 2010/2011 business year and an EBITDA margin of 8.8%, the company led by CEO Stefan Klebert – whose contract was extended in November 2012 until 2018 – achieved [sales of 1.2 billion euros and an EBITDA margin of 9.6%](#) in the 2011/2012 business year.

But despite the recent two years of high growth, things are not entirely rosy, even for Schuler – especially given the continuing uncertainty caused by the European debt crisis and the worldwide slowdown in the automotive sector that is already setting in. [After all, the](#)

automotive industry still accounts for a large part of the entire Schuler business. But even the business, which involves large press lines that take months to install, is subject to cycles. For example, Schuler is still busy working on the largest order the company has ever received, which came in just before Christmas 2011: The car manufacturer BMW ordered a total of seven press lines using ServoDirect technology for an amount "well into nine digits," as Schuler reported. The high-speed servo presses ordered represent a technological leap in the mass production of sheet metal parts. Operating at more than 20 strokes per minute, these 85 meter long machines, which are

designed to form sheet steel into body parts, are among the fastest in the world.

A factory tour in Göppingen. These presses were built in the huge production halls situated right opposite the company's distinguished headquarters on Bahnhofstrasse in Göppingen. The contrast could not be greater: On one side, there is the splendid building from the early 20th century with historic and art nouveau architectural features, and, on the other side, only a few steps away past the company's foundry, there is the pounding and hammering of the presses being tested. One of these giants weighing several tons is currently being hauled up onto a low-loader that will transport it



An automation robot conveys a car body part from one press to the next within a press line.



Schuler press line,
as also operating
at BMW in Leipzig,
Germany.

on the first stage of its long journey across the ocean to the client in China. Further down the long hall, packaging machines are waiting to be transported to a European cosmetics manufacturer that wants to package its deodorants and hairsprays in aerosols made using Schuler machines.

In addition to its largest plant in Göppingen, Schuler has a further six production sites in Germany. But Schuler presses are also manufactured in Switzerland, the USA, Brazil, and China. The production of presses is one aspect of its business. The other business segment, which is being extended, covers the servicing and maintenance of these machines. At present, only 20% of the Schuler machines, which tirelessly produce pressed parts in minutes or even seconds, are serviced and maintained by the firm's own team. Schuler's management sees great growth potential in this area.

Because there is one thing that must be kept firmly in view in today's globalized competition: the satisfaction of the customer.

Final stop on the factory tour: Production hall 2, the minting department where coin minting machines are produced. [Almost every euro coin has been made by a Schuler press](#). A "Ringmaster" minting press is currently being tested and is spitting out bimetallic coins similar to a two euro piece. They have copper-nickel on the outside, brass on the inside, and a hole punched in the middle. No, this is not emergency money for the post-euro period. It is stamped with the wording "1839/2009 – 170 Jahre Schuler" (1839/2009 – 170 years of Schuler) and an image of Louis Schuler's head. The edge of the coin is engraved with the wording "Equipment for Minting Technology."

In 2014, the 175th anniversary will be celebrated ... |

INTERVIEW WITH SCHULER CEO STEFAN KLEBERT: “WE COMPLEMENT ONE ANOTHER WELL”

Mr Klebert, after 174 years of company history, a new chapter is starting for Schuler. It will no longer belong to the Schuler-Voith family, and instead the Austrian technology company ANDRITZ calls the shots in Göppingen. Are you not a bit afraid of this new, unknown owner?

The takeover surprised everybody here at the company. But according to everything we know and can judge, we are gaining a sensible major shareholder. ANDRITZ has a similar history to our own. It is a renowned plant and machine manufacturer and a company with a high-tech focus. In my opinion, this is important for the long-term development of Schuler, and Schuler is therefore looking positively to the future.

Would it not have made more sense – given that the company belonged to the Schuler-Voith family – for it to have been taken over by your German neighbor and plant manufacturer Voith?

The Schuler board, of course, has no say over whom Mr Robert Schuler-Voith sells his personal assets to. I assume that the family shareholder had a good feeling about selling his shares to ANDRITZ. The desire to find a strategic investor who understands our business and has European roots was no doubt behind his decision.

There was initially some agitation among Schuler's staff. There was a fear that the new owner might crush Schuler. Was this justified?

There was that fear, yes. But it was quickly laid to rest. I can understand that staff might initially have concerns if a family leaves a company after almost 175 years. We must remember, however, that ANDRITZ is not a competitor in the traditional sense, it is opening up the metal forming market together with us. Both firms complement one another.

When and where did you first get to know ANDRITZ's boss, Wolfgang Leitner?

Our first meeting took place when he visited us here in Göppingen.

And how did you feel when you discovered that he wanted to take Schuler over?

ANDRITZ knows that we are a successful company with good prospects. They explicitly support the strategy we have pursued. I am happy that the new shareholder agrees with our thoughts and ideas.

Schuler is one of Germany's many hidden champions and has become one of the world's leading suppliers of forming technology. What is this exactly?

In a nutshell, the process involves changing the shape

of metals. Imagine a bath tub, for example. It started off as a simple sheet of metal before being pressed – often using Schuler machines – into the shape of a bath tub. The same applies to pans, coins, or deodorant and hairspray aerosols. However, the process is mainly used to press and stamp body parts or structural elements for cars into the right shape using our machines, and this accounts for the bulk of Schuler's business.



Schuler CEO Stefan Klebert

“With ANDRITZ, we found a strategic investor who understands our business and has European roots. Both companies complement one another well.”

As you say, your main clients are in the automotive industry. But the car business is visibly not doing so well, especially in Europe. Do you have to arm yourselves for another crisis as in 2009, when Schuler saw a 20 per cent drop in sales?

The automotive industry is subject to cyclical ups and downs. In the long term, however, the trend remains upward. The figures speak for themselves: in Germany 56 out of 100 inhabitants own a car, while only 2.3 out of 100 inhabitants in China can call a car their own. Considering that China has a population of 1.3 billion, this gives rise to a huge demand for motor vehicles. It will perhaps be less one year, but more the next. But I firmly believe in the future of the car, for the next 20 years in any case. I don't see what might significantly change. Schuler is unaffected by whatever drive concept wins through. Whether electric or combustion engines are used, the designs of the structural and body parts remain the same, and these continue to be what Schuler specializes in. It does not matter whether the material used is steel or something more lightweight such as aluminum or carbon. Our machines are needed for all these materials. The trend for the next ten to 20 years is clearly upward. Even so, we also try to expand in other growth areas, such as packaging and large pipes, to name but two.

In general, the economic prospects are getting gloomier. Are you still able to maintain your optimistic targets for the 2012/2013 business year? After all, you are aiming at maintaining the high sales level of 1.2 billion euros and increasing the EBITDA margin of ten per cent.

In the past business year our incoming orders were at a very good level of 1.3 billion euros, and it is only now

that we are processing them. Despite a slight cooling of the economy and the likely slow-down in business, we see no reason to change our medium-term forecasts, especially since our business does run in long cycles. In addition, many companies learned from the last crisis in 2008 that one should react level-headedly to such a slump rather than hastily putting on the brakes by introducing counter-productive savings measures.

Outside the automotive sector, where do you see future growth opportunities for Schuler?

We are of course focusing on new segments – packaging machinery, for example. It is a very interesting growth market, above all in the emerging markets. The five per cent of sales that Schuler currently realizes in this branch should be expanded. It was not by chance that I previously mentioned deodorant and hairspray aerosols. With growing prosperity, demand for such cosmetics products is growing in emerging markets such as China or India. The same applies to drinks cans, which is a business that is also not particularly volatile. Another growth segment is machines for manufacturing the electrical steel needed for electric drives, that is for the actual components of electric motors: small, stamped, multi-layer sheets are pressed into stacks that are then wrapped around the copper coil.

Can you see any synergies or opportunities for cooperation with ANDRITZ? In opening new markets such as China or India, for example?

Initially I see purchasing synergies, especially as far as volumes are concerned – with regard to materials and components such as steel, engines, hydraulics, or pneumatics, for example. Interesting joint negotiating positions on purchasing should arise. Otherwise, it remains to be seen which existing structures we are able to use together in foreign markets, for example joint service or sales offices. But I am sure that these will be intensively examined together. ■



Whether for mudguards or car doors, sheet steel castings for washing machines or kitchen sinks, railway wheels or turbine blades for aircraft engines, drinks cans or coins – a variety of industries have to press metal or other materials as part of their production process. Today, 20,000 Schuler presses are installed around the world.

OTHER IMPORTANT ACQUISITIONS

Allied Environmental Solutions (AES)

Headquarters: Columbia, Maryland, USA

Employees: approx. 40

Annual sales: approx. 30 million euros

Business area: PULP & PAPER

Profile: ANDRITZ Environmental Solutions is a leading supplier of flue gas cleaning systems for utilities and various power generating industries (for example operators of fossil-fired power stations) in the USA.

GMF-Gouda

Headquarters: Waddinxveen, Netherlands

Other locations: Germany, France, USA, China, Singapore

Employees: approx. 140

Annual sales: approx. 40 million euros

Business area: SEPARATION

Profile: ANDRITZ Gouda is one of the leading manufacturers of drying solutions for the food industry (for example for the production of baby food), the chemical industry, and the environmental sector of municipalities.

Bricmont

Headquarters: Pittsburgh, Pennsylvania, USA

Employees: approx. 85

Annual sales: approx. 30 million euros

Business area: METALS

Profile: ANDRITZ Bricmont supplies furnace systems to the aluminum and steel industries.

Soutec

Headquarters: Neftenbach, Switzerland

Other locations: USA, China

Employees: approx. 90

Annual sales: approx. 30 million euros

Business area: METALS

Profile: ANDRITZ Soutec is a leading global supplier of laser and rolled seam resistance welding systems for the metalworking industry. These welding systems are used in particular to manufacture light components, for example car body parts.

Common goals forge strong bonds: Extract from an ANDRITZ Soutec advertising visual.

High-flyer with its feet **ON THE GROUND**



Günter Ogger is one of Germany's renowned business journalists and is considered a critical investigator of mismanagement in large corporations. He worked as an editor for the business magazine "Capital" and the editor-in-chief of the technology magazine "High Tech." Here, Günter Ogger analyzes the performance of the ANDRITZ share.

There are only a few shares on offer on Europe's stock markets whose value has risen as much as ANDRITZ's share. When the company's share first appeared on the Vienna Stock Exchange list on June 25, 2001 under the ISIN code AT0000730007, it was being sold

for 2.63 euros. By the end of 2012, it was worth over 17 times more, at 48.54 euros.

This [share price increase of exactly 1,746% over eleven years](#) is all the more striking when one considers that it has been achieved by a company that is neither a high-flyer in the so-called new economy nor operating in any other privileged branch, such as financial services. The charm to which ANDRITZ shareholders increasingly succumb is remarkable. Michael Buchbauer, Head of Investor Relations at ANDRITZ, explains: "For us, it has always been important to build up reliability and a good track record with investors. 'Promise and deliver' is our motto. This enables us to earn trust and develop a reputation on the financial market in the long run."

The ascent of the Graz-based company is therefore not about aerial acrobatics. With the exactness of a precision rolling mill – one of ANDRITZ's countless products – the company, which is active in five different business areas, has consistently managed to increase its sales and profits. Investors have been delighted almost more by the fact that its financial data seem to be every bit

as resilient as one of its stainless-steel turbine shafts. 1.3 billion euros in net liquidity, five billion euros in sales, 244 million euros in net income, an equity ratio of 20%, no net debt, and an annual average growth rate in sales of 17% in the last ten years – ["how does the company do it?" is the question asked by many critical shareholders.](#)

Michael Buchbauer has the answer: "Our long-term development shows that we have achieved a steady balance between organic and acquired growth." Many groups have overstretched themselves with expensive acquisitions. ANDRITZ has avoided major errors because it has not diversified but instead remained in its traditional areas and has never bitten off more than it can chew. "We do not buy at any price and certainly not for the sake of growth, but only when we are able to strengthen our existing portfolio and thus our market position," says the Investor Relations manager about the company's acquisitions strategy.

The company's growth, which has been as rapid as it has been persistent, has turned this company, managed for the last 18 years by its President and CEO, Wolfgang Leitner, into one of the most valuable blue chips on the Vienna Stock Exchange. With [market capitalization of about five billion euros](#), ANDRITZ has the sixth highest value of all 20 companies that make up the ATX stock exchange index. In the same period that ANDRITZ's share price rose by more than 1,700%, the ATX managed only 94%.

Birgit Kuras, member of the Executive Board of the Vienna Stock Exchange, praises the Styrian plant and machinery manufacturer and claims it is "the best example of the stock market flotation of a company led by excellent management, which also provides a significant impetus to the economy as a whole."

It is true that ANDRITZ's share price is no longer cheap. Anyone who bought shares at the end of 2012 paid more than 20 times the earnings per share and five times the book value of the company. The company's market capitalization is approximately the same as its annual sales – an impressive ratio for a company operating in the plant and machinery sector. The company's high valuation will only remain justified if it continues to grow as steadily as it has up to now.

Industrial shares are cyclical on the stock market; their price reflects the ups and downs of the economy. They are more volatile than food or pharmaceutical stocks, for example. In the past, also ANDRITZ has been unable to avoid the fluctuating mood on the financial markets. Its share price fell after both the collapse of US investment bank Lehmann Brothers in October 2008 and the outbreak of the European debt crisis in 2011. But a closer look at the data reveals a recurring pattern: **If the general trend is downwards, the curve of the ANDRITZ share price is flatter, while it rises steeply and briskly when the trend moves upwards.**

For example, the ATX lost a full 36% during the 2011 debt crisis, while ANDRITZ fell by a bearable 8%. In 2012, however, the index rose by 24%, while ANDRITZ stood out with an increase of 48%. In the times of crisis, relatively few shareholders were therefore selling, whereas many took advantage of the recovery.

This reflects the trust that investors have in the company. However, this has not been handed to ANDRITZ on a plate – trust is gained through openness and consistency. The Investor Relations department at ANDRITZ has been rewarded numerous times for its information policy – this year it won the ATX prize awarded by the Vienna Stock Exchange for the fourth time. The company's annual reports, the most important publication of any listed company, win worldwide recognition time and time again. A Frankfurt stock-broker explains why he likes ANDRITZ: **"They do not simply brag about the company's achievements, and they always deliver more than they have promised."**

What does the future have in store? ANDRITZ has managed to regularly exceed its targets over many years – and this applies to both sales and profits. President and CEO Wolfgang Leitner, who holds almost 30% of the shares via his holding company Certus, is always happy to speak about the plans for the coming year: "We want to continue our long-term, profitable growth."

An ambitious target, but one the company has always managed to beat.

Forecasts are, of course, always difficult when they relate to the future – the aphorism from Kurt Tucholsky hits the nail on the head in the current situation. Rarely has the economic trend been so dependent on the unpredictable decisions of governments and central banks. If they steer the wrong course, a cooling-down of the world economy is inevitable – and some even fear a recession. If this happens, ANDRITZ will also be affected. As far as its share price is concerned, it is important that the company is well prepared both geographically and in terms of its product portfolio. The Graz-based technology company benefits from both the international division of labor in the globalized economy and the worldwide trend towards renewable energy and careful use of natural resources. ANDRITZ, globally present in 180 locations, is increasingly concentrating on high growth regions such as Southeast Asia and is thus able to compensate for the recessive trends in Europe.

The most convincing argument in favor of buying its shares is no doubt the quality of its management, which has always understood how to meet client's changing needs with the right products. The company's share has, according to various analysts, above-average prospects in the medium and long term.

Time will tell (whether they are right) ... ■



Birgit Kuras

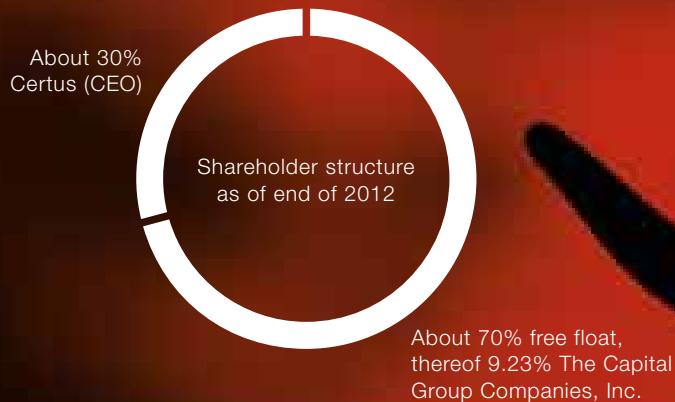
Executive Board member of
the Vienna Stock Exchange.

Key figures of the ANDRITZ share	Unit	2012	2011	2010	2009	2008
Earnings per share	EUR	2.36	2.25	1.74	0.95	1.37
Dividend per share	EUR	1.20 ¹⁾	1.10	0.85	0.50	0.55
Payout ratio	%	50.8	49.0	48.9	52.9	40.3
Equity attributable to shareholders per share	EUR	9.76	8.75	7.34	6.14	5.30
Highest closing price	EUR	50.00	37.75	34.46	20.97	21.77
Lowest closing price	EUR	32.83	27.41	19.75	8.75	7.98
Closing price at end of year	EUR	48.54	32.05	34.40	20.26	9.08
Market capitalization (as of end of period)	MEUR	5,048.2	3,333.2	3,577.1	2,107.0	944.3
Performance	%	+47.9	-7.6	+67.8	+111.0	-54.4
ATX weighting (as of end of period)	%	10.6128	9.2705	7.3211	4.3701	2.9209
Average daily number of shares traded ²⁾	Share unit	345,754	568,138	461,546	614,058	977,276

1) Proposal to the Annual General Meeting 2) Double count, as published by the Vienna Stock Exchange. Source: Vienna Stock Exchange. Note: On April 23, 2012, the ANDRITZ share was split in a ratio of 1:2; all historical share price data and key figures were adjusted accordingly.

Basic data on the ANDRITZ share

ISIN code	AT0000730007
First listing day	June 25, 2001
Types of share	No-par value shares, bearer shares
Total number of shares	104 million
Authorized capital	None
Free float	About 70%
Stock exchange	Vienna (Prime Market)
Ticker symbols	Reuters: ANDR.VI; Bloomberg: ANDR, AV
Stock exchange indices	ATX, ATX five, ATXPrime, WBI



Share price at IPO:
2.63 euros

Relative share price performance of the ANDRITZ share versus the ATX since the IPO





Fair winds for HYDROPOWER



Cristina Krippahl comes from Lisbon, works for various German media, and is Germany correspondent for the Portuguese business journal "Diário Económico" and for TSF radio station. She has focused on economic issues and energy topics for many years. In her report, she talks about Portugal's energy policy, which is much acclaimed worldwide and based on a well-balanced mix of wind and hydropower.

Water is a fateful element in the history of Portugal. Over centuries, the sea has offered this small country on the edge of Europe access to new worlds and riches, and it has provided food and work through fishing. Long gone is the time of the great discoverers, and even the role of fisheries has also sharply declined. Instead, hydropower is becoming increasingly important to the Portuguese. **Hydropower gives this country, which has few raw materials, the hope of a low-carbon, renewable energy source and should end its dependence on imported electricity.**

Since 2008, ANDRITZ HYDRO has been involved in turning the Portuguese dream of energy self-sufficiency into a reality. **"Portugal is the only country in Europe that decided already in 2007 to increase production of hydropower alongside wind power,"** says ANDRITZ HYDRO manager Jean-Claude Riesterer. According to him, this is because of the volatility of wind power, which the country does not want to become reliant on. In 2010, wind power and hydropower covered 53% of Portugal's energy consumption. Since then, this astonishingly high level has fallen slightly, although this has been due to periods of unusual drought. Portuguese politicians are nevertheless sticking to their aim of increasing the already considerable proportion of renewable energy.

ANDRITZ HYDRO has been involved since the outset. Initially the energy supplier Energias de Portugal (EDP) signed a contract with the company for four years. This related to the expansion of one of the oldest hydropower stations in the country. The Bemposta station in the River Douro region, close to the Spanish border, has been in service since 1964. With ANDRITZ's help, capacity was increased by 80% in 2008. For EDP, this first experience of cooperation with ANDRITZ HYDRO in Bemposta was apparently very satisfactory. In the next three years, one contract came after another for the power stations in Baixo Sabor, Ribeiradio, Ermidia, and Foz Tua. "It's not often you get a client like this," says Jean-Claude Riesterer. EDP board member António Ferreira da Costa lists some of the reasons:

"An important criterion is the proven quality of a manufacturer's technology. On the international market, it is simply impossible to bypass the name of ANDRITZ HYDRO."

According to the EDP production manager, another factor in the decision to award a contract is the readiness of a foreign partner to work closely together with Portuguese companies on-site. ANDRITZ was happy to do so from the word go. It is therefore no coincidence for Ferreira da Costa that **ANDRITZ is involved in four out of eight hydropower projects.** The cooperation is going well from ANDRITZ's point of view, too. "Very well, even," says Riesterer, adding that, "after a short period of acclimatization, the cooperation was optimal. Mutual trust has grown. EDP quickly learned

42°

10°

8°

6°

If the entire hydropower capacity installed by ANDRITZ HYDRO in Portugal is fully operated, it could supply power to around 1.3 million people.

40°



that ANDRITZ puts together very competent teams for its projects."

With sales of more than 15 billion euros in 2011, EDP is one of Europe's largest energy suppliers and, according to Ferreira da Costa, Portugal's largest investor both at home and abroad. The energy giant collaborates with more than 500 companies worldwide and it also intends to expand its partnerships. ANDRITZ manager Riesterer stresses the projects' long-term nature. This is also why the current economic and financial crisis in Portugal has not negatively impacted the order situation. But quite different obstacles still have to be overcome, says Riesterer. Even if, generally speaking, everything is always well prepared, EDP does not always find it easy to obtain all the necessary approvals. To put it mildly, Portugal is still hampered by excessive red tape. The Secretary of State for Energy, Artur

Trindade, provides assurance that the government in Lisbon is aware of the problem: "In November 2012, a new law came into force that should simplify the approval procedure." The country's entire environmental legislation is also being reviewed by the government, according to Trindade, "in order to take better account of the interests of business in general and the energy sector in particular."

Portugal has also seen [protests by NGOs against large new hydropower projects](#). Most recently, the environmental organisation Quercus wanted to stop the Foz Tua hydropower station from being built. According to Ana Rita Antunes at Quercus, "we have laws that are excessively geared towards business interests." However, now that the government has promised that additional requirements will be complied with, Foz Tua is being built. "Of course, projects of this

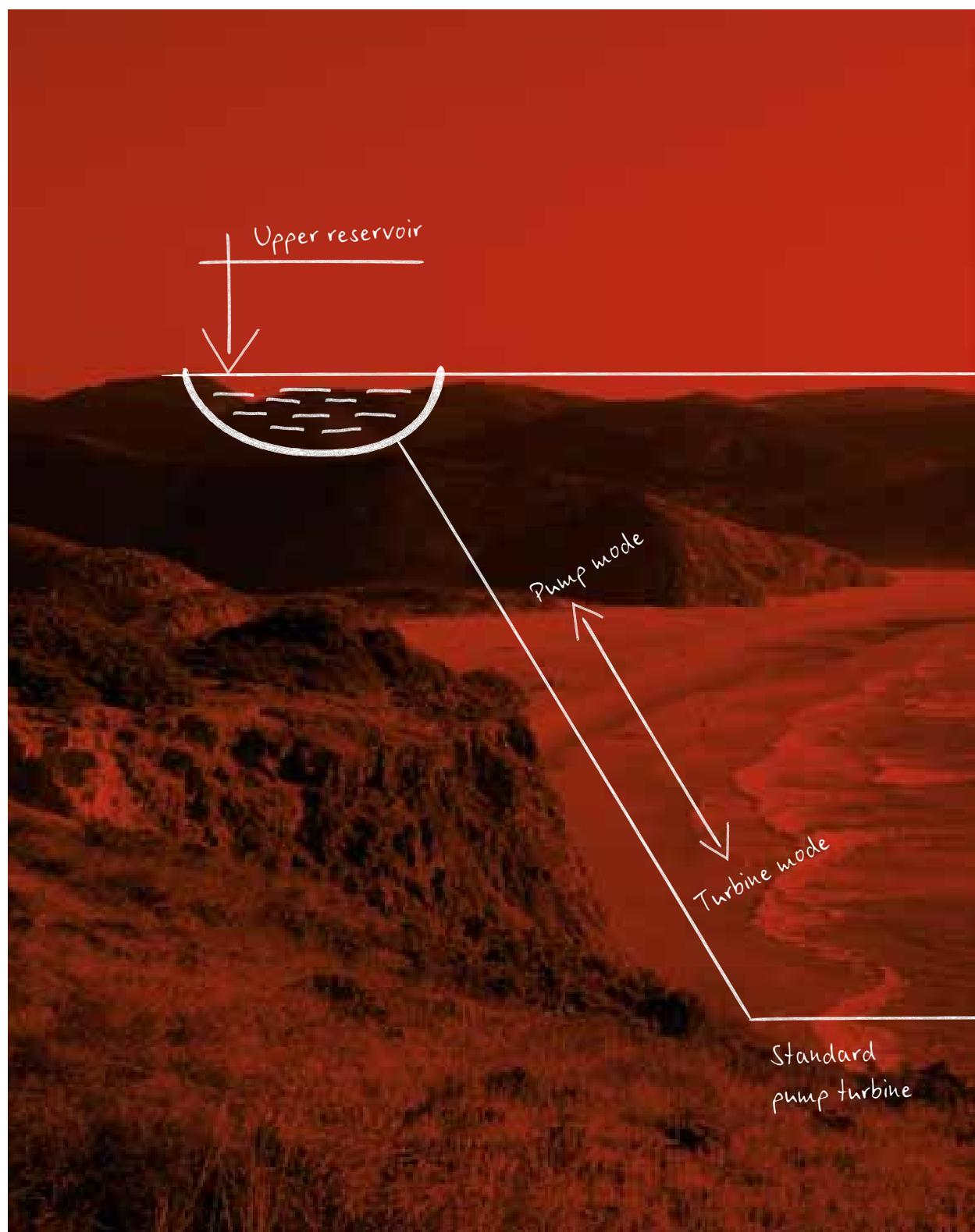
Examples for hydropower plants in Portugal, equipped by ANDRITZ HYDRO.

nature always have an impact on the environment," admits Ferreira da Costa, "but EDP strives to keep it to a minimum."

Jean-Claude Riesterer takes a similar view: "We support our customers by supplying them with information." He stresses the importance of dialogue and education: "It must be explained to people that the overall result is very, very positive. [Hydropower is the most sustainable form of electricity gen-](#)

[eration.](#)" This is because the stations have a very long lifespan. Moreover, hydropower is the cheapest means of generating electricity. It is also slowly being recognized internationally that wind power and hydropower complement each other and should be developed in parallel. "This is precisely what EDP realized seven years ago," says Riesterer.

Obviously, the descendants of the sailors still have a water-related spirit of discovery today. |

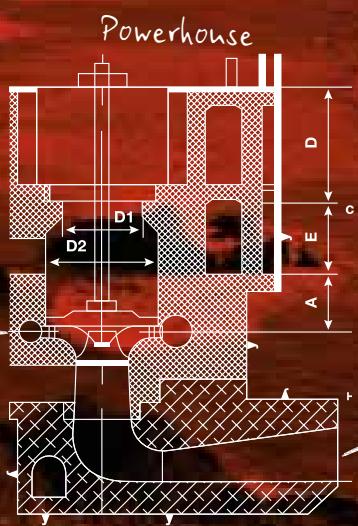


SMALL PUMPED-STORAGE HYDROPOWER STATIONS ON THE COAST

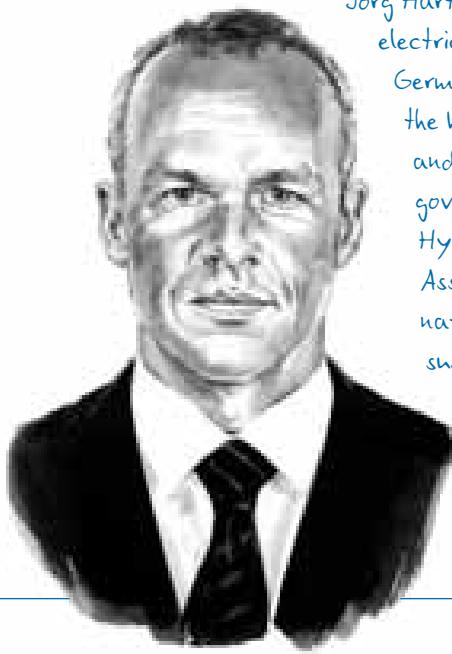
In order to make hydropower even more efficient, ANDRITZ HYDRO has developed new systems tailored to the conditions in Portugal. These involve small pumped-storage power stations with an output of 50 megawatts that can be built on a decentralized basis on the coast. Not only do they allow electricity to be produced where it is needed, they also solve the problem of volatility even before it is fed into the grid. As ANDRITZ manager Jean-Claude Riesterer points out: "Our customers expect smaller stations to cause fewer environmental problems and significantly shorter construction times, and that they can be built much closer to wind parks."

Capacity: 10 to 50 megawatts

Discharge: Five to 40 cubic meters per second



Protocol for SUSTAINABILITY



Jörg Hartmann is an expert in hydroelectric power. He works for the German KfW Entwicklungsbank, the World Wildlife Fund (WWF), and is also chairman of the governance committee of the Hydropower Sustainability Assessment Council, an international body that promotes sustainability in the construction of hydropower plants. In his essay, he describes the importance of hydropower and the challenges that the industry is facing.

Hydropower was the first and will remain the largest and most efficient source of renewable energy for many years. It is a key contributor to a climate-friendly future. Many hydropower projects fulfill additional needs, such as energy storage, water supply and irrigation, and bring sustainable development also to remote regions. Up to now, only about 30% of the global technical hydropower potential have been developed. The remaining 70% are mostly located in Asia, Latin America, and Africa, where power demand will grow strongly in the future in order to accommodate the economic and social development of these regions.

But as the Intergovernmental Panel on Climate Change noted last year, "[environmental and social concerns represent perhaps the largest challenges to continued deployment \[of hydropower\] if not carefully managed.](#)"

Careful management seems difficult to achieve. The conflicts between developers of hydropower projects on the one hand, and environmental and human rights activists on the other hand, continue to play out. Recent protests in countries like Brazil, India, Laos, and Malaysia were a result of the inundation of valuable ecosystems and agricultural land, the change of rivers with rich fisheries, and social insecurity among remote, often indigenous communities.



However, quiet change is underway in the hydropower world. There are promising signs that there may be less conflict in the future. Over the past 15 years, many stakeholders have been working to improve sustainability standards and provide new tools, resulting in an emerging consensus on sustainable hydropower. The community is now more confident in selecting projects, and avoiding potential damage. The knowledge of and experience with good practices that have been proven to work is essential. For example, there is growing consensus that the majority of the indigenous population should provide their free and informed consent before any projects impact their land and environmental impact has to be taken into account.

One of the tools contributing to this consensus is the Hydropower Sustainability Assessment Protocol. Originally written by the International Hydropower Association (IHA), the apex body of the industry, the Protocol was redeveloped between 2008 and 2010 by a coalition of very different stakeholders from around the world: government representatives from countries such as China, Zambia, or Norway, international NGOs like Oxfam, Transparency International, WWF, and The

Nature Conservancy, commercial and development banks, and experts from industry.

The Protocol works like a scorecard. Assessments using the Protocol can establish whether a project complies with international good practice, or even best practice, across a range of sustainability issues. Users of the Protocol can then decide whether they want to be associated with a project. Or they can decide to improve the project in order to bring it up to the desired standard. *In many cases, project developers – despite investing millions in social and environmental mitigation – simply do not know how their projects compare against international benchmarks. Now managers have a measuring tool.*

Upon official release of the Protocol in June 2011, a group of equipment suppliers, including Alstom, Voith, IMPSA, and ANDRITZ HYDRO, became a sustainability partner of the IHA. Due to the fact that equipment suppliers do not initiate or develop projects by themselves, their efforts are focused mainly on propagating wide application of the Protocol and thereby encouraging global recognition. *Just like project developers, equipment suppliers have a substantial interest in supporting sustainable solutions in order to mitigate related risks and protect their own reputation.*

The Protocol is overseen by the Hydropower Sustainability Assessment Council, a global organization that objectively keeps assessment results credible. The more stakeholders become active users, and act upon what they find out, the better we can overcome conflicts over hydropower and secure hydropower's place in the future global energy mix. ■



Hydropower is the most efficient source of renewable energy and a key contributor to a climate-friendly future. However, environmental and social concerns will be the biggest challenges for continued deployment of hydropower.



The rising demand for electricity worldwide and the efforts by many countries to reduce their dependence on fossil fuels and increase their efforts to protect the environment by using renewable hydropower are the main driving forces in the hydropower market.

ANDRITZ HYDRO

MARKET DEVELOPMENT

In 2012, project activity worldwide for electromechanical equipment in hydropower plants continued at a satisfactory level. However, the market volume declined slightly compared to the previous year. In Europe and North America, investment activity continued to focus largely on modernization and rehabilitation of existing capacities. In contrast, there are several new hydro-

power projects in the emerging markets, particularly in South America and Asia, which are currently being implemented or in the project phase. Satisfactory investment activity in equipment for small-scale hydropower plants is continuing worldwide. Solid project activity, mainly in India and the Middle East, was noted for pumps to irrigate agricultural land, transport drinking water, and for use in the power plant sector.





The reconstruction of the Assiut dam – the oldest dam on the Egyptian part of the Nile – will not only substantially improve conditions for shipping and irrigation, but also lay the foundations for generating energy from sustainable hydropower. The four bulb turbines of ANDRITZ HYDRO with a total output of 32 megawatts will supply around 75,000 households with green energy as from 2017.

The Hydromatrix technology developed by ANDRITZ HYDRO is an innovative and low-cost concept consisting of a matrix of pre-assembled modules for small turbine/generator units that can be combined flexibly for different power plant arrangements.



IMPORTANT EVENTS

In Albania, Energji Ashta and its owners, the Austrian utilities VERBUND and EVN, successfully commissioned the Ashta hydropower station (consisting of Ashta 1 and Ashta 2), which is the [largest matrix hydropower plant worldwide](#). ANDRITZ HYDRO supplied the entire electromechanical equipment, including 90 Hydromatrix units. The Hydromatrix technology developed by ANDRITZ HYDRO is an innovative and low-cost concept consisting of a matrix of pre-assembled modules for small turbine/generator units that can be combined flexibly for different power plant arrangements. Ashta has a total output of 53 megawatts and will supply [240 million kilowatt-hours of electrical energy a year for 100,000 Albanian households](#).

The Gössendorf hydropower plant, Austria, was also commissioned successfully. The two ten megawatt bulb turbines and 13 megavolt ampere generators supplied by the business area have an annual electrical energy output of 90 million kilowatt-hours, supplying a total of 23,000 households. In addition, the business area supplied the entire control equipment, including automation, protection equipment, and connection to the control center.

In Indonesia, modernization work was completed on the Larona hydropower station. The order comprised the delivery of two generators, including an output increase from 65 to 85 megavolt ampere, replacement of the runners, refurbishing of the excitation and protection systems, as well as complete installation and commissioning of the turbine/generator units.

At the Santo Antônio power plant, Brazil, the second of two bulb turbines supplied by ANDRITZ HYDRO Inepar was turned successfully for the first time. The first of the bulb turbines was commissioned successfully in March 2012. As part of a consortium, ANDRITZ HYDRO Inepar will supply bulb turbines, generators, turbine governors, and excitation systems for 12 of the 44 machine sets as well as all the control systems for all 44 units.

Following the rehabilitation work, three Kaplan turbines and the electrical equipment at the Tavagnasco hydropower plant, Italy, were commissioned under an order from Utilizzazioni Eletro Industriali.

Two pumping stations were also commissioned for the Bheema sub-project in Andhra Pradesh, India. The order covered supply and installation of six [pumps for irrigation of agricultural land](#). The Indian state of Andhra Pradesh is frequently hit by widespread drought. As some 70% of the population makes a living directly or indirectly from agriculture, the Indian government launched the Jalayagnam project for irrigation of all agricultural land. The ANDRITZ deliveries cover a total of eleven sub-projects.

IMPORTANT ORDERS

Newfoundland and Labrador Hydro, Canada, ordered the delivery, installation, and commissioning of the electromechanical equipment for Muskrat Falls hydropower station, comprising four 212 megawatt Kaplan turbines, generators, and automation equipment.

As part of the new Assiut dam project, the business area was awarded an order by the Egyptian Ministries of Energy and Water Supply to deliver and install four bulb turbines (eight megawatts each), generators, the electrical equipment, and the hydromechanical equipment. [Reconstruction of this oldest dam on the Egyptian part of the Nile](#) will not only substantially improve conditions for irrigation and shipping, but also lay the foundations for generating energy from sustainable hydropower. The four bulb turbines with a total output of 32 megawatts will supply around [75,000 households with green energy](#) from 2017.

ANDRITZ HYDRO is to supply three 173 megawatt Francis turbines, three generators, and the electrical power plant equipment for Cerro de Aguilá hydropower station, Peru.



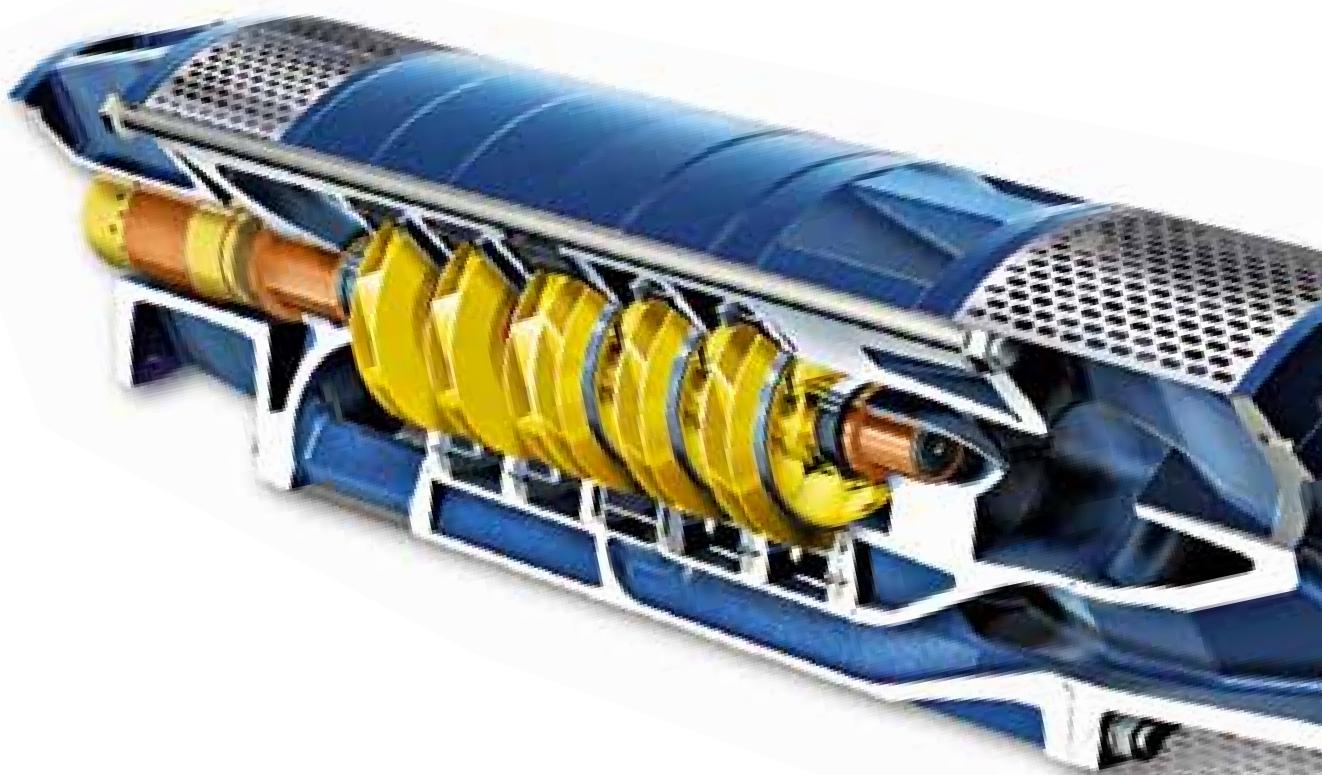


From Çetin Enerji, a subsidiary of the state Norwegian utility Statkraft, the business area received an order to supply the electromechanical equipment for the Çetin hydropower project, Turkey. The project comprises two hydropower stations equipped with three Francis turbine units (total output about 400 megawatts) and two Kaplan turbine units (total about 100 megawatts). In addition, both power stations are to be fitted with small-scale hydropower units. The utility company TIWAG, Austria, ordered the penstock supply for the Kaunertal power station. **The penstocks to be delivered weigh 9,250 tons in total.**

Upper Tamakoshi Hydropower Limited ordered the supply, installation, and commissioning of the electro-mechanical equipment for Upper Tamakoshi power station, Nepal. Following its completion, the power plant will supply peak energy into the Nepalese grid with six high-pressure Pelton turbines (79.5 megawatts each). Three modernization orders were awarded to ANDRITZ HYDRO in the USA: 12 motor generators each with an output of 38 megavolt ampere were refurbished for the New York Power Authority at the Lewiston hydropower station in New York State. The 133 megawatt Francis runner at the Hoover hydropower station, Arizona,

will be upgraded on behalf of the Bureau of Reclamation. Brookfield Renewable Power ordered the refurbishment of the 107 megawatt generator at the Wells hydropower plant, Washington.

For Inga 2 power station, DR Congo, the business area will rebuild and repair two 178 megawatt Francis units. As part of a consortium, ANDRITZ HYDRO is responsible for the entire mechanical part of the rehabilitation work, including the repair and overhaul of the penstocks, the hydraulic steelworks, and the two Francis turbines. In order to achieve high efficiency with optimum performance, high reliability, and low maintenance requirements, all core parts of the turbines, with runner diameters of 6.2 meters, will be newly designed and replaced by modern, robust equipment. With the modernization and repair of the two turbines, which have been out of service for many years, the government of DR Congo – drawing on a loan from the World Bank – is taking an important step towards **improving the country's national electric grid, which presently suffers frequent outages.**



As part of a consortium, ANDRITZ HYDRO as consortium leader received the order from Kalehan Enerji Üretim ve Ticaret to supply and install the electromechanical equipment for Beyhan-1 hydropower station, Turkey. The consortium's scope of supply comprises three turbine/generator units, transformers, switchgear, and the entire electrical equipment. In addition, a small-scale hydropower unit will be supplied to generate power from ecological water flows in order to preserve fauna and flora. The Francis turbines with an output of 186 megawatts each to be supplied by the business area are among the largest of their kind ever used in Turkey. Beyhan-1 is the first of four Kalehan Enerji power stations planned on the Murat River in eastern Turkey and [a cornerstone of the energy supply in the Turkish growth market.](#)

Minicivil, Colombia, awarded the business area a contract to supply and install the electromechanical equipment for the Carlos Lleras hydropower plant. The order includes two 40 megawatt Francis turbines and two 42 megavolt ampere generators.

As member of a consortium, the business area received an order from JKPD C (Jammu Kashmir State Power Development Corporation), India, to supply three Francis turbines each with an output of 151 megawatts, the governors, and three butterfly valves for the Baglihar II hydropower station. The turbines, which are particularly subject to abrasive wear because of the high solids content of the water in India, are [very robust thanks to a special coating technology.](#)

The Electricity Supply Board (ESB) ordered refurbishment of the Cliff and Ardnacrusha hydroelectric power plants, Ireland. The work includes modernization of two 10 megawatt Kaplan turbines and a 22 megawatt Francis turbine, including generators.

Three submersible motor pumps of this type used for drainage purposes will be delivered by the business area to an iron ore mine in the USA. The pumps are 13.4 meters long and have an outer diameter of just 80 centimeters. A complete pump unit weighs 9.5 tons.

The electromechanical equipment for the Vrutok and Raven hydropower stations is to be refurbished for AD Elektrani Na Makedonia (ELEM), Macedonia. The main focus of the order is to increase the output of four existing generators in the Vrutok power plant.

Schweizer Kraftwerke Sarganserland AG has awarded ANDRITZ an order for revision of the hydraulic equipment – three Francis turbines (93.3 megawatts each) and three pump turbines (53 megawatts each) – and refurbishment of the turbine runners at the Mapragg hydropower plant, Switzerland.

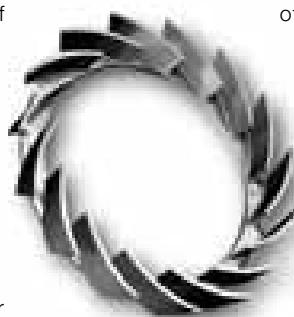
Five Francis turbines (15 megawatts each), the penstock, and weirs will be refurbished for the Ramu 1 hydropower station on behalf of PNG Power, Papua New Guinea.

In the small-scale hydropower sector, ANDRITZ HYDRO received numerous important orders from all over the world during the reporting period and could thus confirm its leading market position for this product range.

Verbund Innwerke ordered refurbishing of the automation equipment in the Neuötting and Perach hydropower stations, Germany. The order comprises engineering, supply, and commissioning of the control systems, turbine governor, and static excitation equipment.

The business area received an order from Pea Ridge Mine, USA, to supply three submersible motor pumps. The pumps will be used for drainage purposes in an iron ore mine, which was shut down for 17 years and is now resuming operations due to the increased demand for iron ore.

Three submersible motor pumps for emergency equipment to drain mine galleries will be supplied to a mining company in China – the pumps are the most powerful submersible motor pumps in the world. Another 25 submersible motor pumps were ordered for the [drinking water supply to Riyadh, Saudi Arabia.](#) |



iPad versus **PULP**



Kurt Schäfer is Vice President Fiber at RISI, the leading information provider for the global forest products industry. His primary responsibilities are focused on the area of paper-grade pulp. He publishes a monthly commentary on the world pulp market and produces long-term pulp forecasts. In this analysis, Kurt Schäfer focuses on the emerging South American pulp market.

South America's pulp industry continues to be one of the key sources of growth in the world pulp and paper industry. **South America has almost doubled its share of production in the world pulp market over the past ten years**, and in 2012, three out of every ten tons of bleached market pulp produced in the world will come from this region. Over 90% of this pulp is exported, mostly to Europe, China, and North America. In the growing China market, South America has become the key provider of bleached hardwood pulp, with 50% of China's imports coming from South America in 2011. South America supplies the world with large amounts of both softwood (primarily radiata) and hardwood (eucalyptus) market pulp. Both pulp grades are well received in the marketplace, but it is in the **eucalyptus pulp** that producers find the most compelling combination of premium quality and competitive production costs. Eucalyptus pulp is the preferred hardwood pulp for many paper applications, including tissue paper, where it provides a certain kind of softness to the final product that many consumers equate with product quality. South American eucalyptus pulp often sells at a premium price compared to hardwood pulps made in other regions, and yet production costs are lower than the world average. Particularly in South America, pulp producers also invested a great deal in research and development of new eucalyptus grades that minimize the impact of plantation agriculture on the soil and surrounding area, while increasing the yield per hectare at

the same time. These very reasons and not least scale effects associated with new world-class production lines **provide South America with a significant cost advantage** over many other regions producing hardwood pulp.

Also the **high environmental and sustainability credentials** of South American market pulp contribute to its widespread acceptance. South American producers grow much of their own wood and have been among the leaders in developing a fast-growing wood resource that is planted and harvested in a responsible, sustainable manner. Environmental and sustainability certification of wood has become a key concern of pulp consumers over the past several years, and this is a source of competitive advantage for a number of producers in the region.

Resource efficiency and effluent issues also continue to grow in importance to pulp consumers. Working with key equipment suppliers, such as ANDRITZ, pulp producers have been building mills that reach high standards in terms of water consumption, water quality, and **reduced chemical and power consumption**. On the energy side in particular, the industry in South America and elsewhere has a compelling story to tell in terms of being consumers and producers of "green" energy from biomass. The chemical recovery process associated with the pulping process yields a high-energy cellulose-based product that the mills burn to supply the energy required to run the mill. Biomass boilers are integral to the operations and can even help to **generate surplus electricity that is sold to the grid**.

After a pause of almost four years, the process of building new pulp mills in South America is again moving forward rapidly. The financial crisis of 2008/09 brought new pulp mill development to a temporary stop worldwide, with the exception of China. The start-up of the new mill by Eldorado Brasil in late 2012 marks the end of this quiet period. Two other large bleached hardwood pulp mills are under construction in South America, and plans are being developed for some more in Brazil and Chile. Developers of these plans are facing a new and different reality in terms of the future of pulp demand, as consumption of printing and writing papers is in long-term decline in both North America and Europe.

The rapid adoption of iPads and e-readers poses substantial risks in terms of long-term demand for printing paper and thus the pulp that produces it.

There are, however, some strong tailwinds to support higher market pulp consumption, such as the rising demand for packaging board and tissue. The rapidly expanding use of the Internet, not only to search for information, but also to satisfy consumer needs, particularly by the younger generation, has led to online trading of industrial and consumer goods worldwide to rise sharply every year. Everyday consumer goods or gifts are ordered conveniently at home and sent around the globe. As a result, the demand for packaging – usually made of cardboard, so that these

goods can be shipped safely and undamaged – is also growing constantly. Especially in Asia, but also in many other regions of the world, this demand for packaging board, which is usually made from chemical pulp fibers and secondary fibers, is rising rapidly.

Tissue consumption worldwide is growing at a rate of about 4% per year, and this is relatively insensitive to swings in economic activity. Tissue consumption in China and some other emerging countries is currently growing by 10% per year or more, and most of the incremental production is based on wood pulp. In addition, the decline in printing and writing paper demand in North America and Europe is making deinking grades of paper less available in recycling streams, which is raising the cost of making paper from recovered papers. Reduced availability of recovered paper is causing tissue producers in particular to use more wood pulp in its place.

Finally, the potential growth of the Chinese market remains promising for South American pulp producers, especially for bleached hardwood pulp. China's paper industry produced 99 million tons of paper and paperboard in 2011, and consumed only 10 million tons of bleached hardwood pulp. Its consumption in China will grow faster than paper production for the foreseeable future, and thus China's demand for imported bleached hardwood pulp should further trend upward over at least the next decade. ■

Fast growing eucalyptus trees provide South America with a significant cost advantage over many other regions producing hardwood pulp. Also the high environmental and sustainability credentials of South American market pulp contribute to its widespread acceptance.



THE SUSTAINABLE SPIRIT OF ELDORADO

Eldorado Brasil started up the world's largest single pulp production line with a design capacity of 1.5 million tons per year in November 2012. With a single investment, this new company is on its way to becoming the fifth largest producer of hardwood pulp in the world. More importantly, the mill is designed to be sustainable at all stages of the process, having been equipped with the best available technologies and best practices in sustainability.

Located near Três Lagoas, Mato Grosso do Sul state, Brazil, the Eldorado mill construction and start-up was overseen by a very small internal group, relying very much on the expertise of EPC (Engineering, Procurement, and Construction) partners like ANDRITZ.

The scope of ANDRITZ's delivery was the woodyard (three chipping lines and the chip storage systems), the fiberline (the world's largest digester, washing, screening, and bleach plant), the drying/baling plant (two pulp drying systems with automated baling lines), and the white liquor plant (preparation of cooking chemicals and the largest lime kiln in South America). In addition, ANDRITZ supplied its IDEAS simulator and web-based training tools to prepare the local operators for taking over the plant.

The technical challenge on this project was one of scale. The main production technologies have been proven in other installations, as Eldorado did not want to take risks with prototypes of unproven systems in this large single-line installation. But, the scale-up of the technologies to this world-record volume of production was critical. Many of these systems are the largest ever manufactured by ANDRITZ or any other supplier.

Environmental sustainability is ensured through sustainable forestry and pulp production practices. Systems for spill control and the minimal release of air and water emissions are best available technologies. Social sustainability as practiced by Eldorado is also more than empty words in an annual report. The company is reaching out to the local communities with projects combatting child abuse, improving the schools, and supporting local programs that are far removed from the business of making pulp.

The Eldorado mill is one of the largest private investments in Brazil. At its height, there were close to 8,000 construction workers in the area and the mill provides permanent employment to thousands when the forestry operations are taken into account.

The new pulp mill of Eldorado Brasil focuses on ecological, social, and economic sustainability. The photo shows a Brazilian forest worker with eucalyptus seedlings, one of the mainstays of gentle forestry management.



ANDRITZ PULP & PAPER

MARKET DEVELOPMENT

The international pulp market was impacted by the global economic weakness in 2012. As a result, the price for NBSK (Northern Bleached Softwood Kraft) pulp fell in the course of the year from around 830 US dollars per ton in January 2012 to about 750 US dollars at the end of December 2012. After increasing in the first quarter of 2012, the prices for eucalyptus pulp remained relatively stable at around 750 US dollars per ton due to a largely balanced supply and demand up to the end of the year. **In spite of the unfavorable general economic conditions, the market for pulp mill equipment saw satisfactory development during the reporting period.** Good project activity was noted particularly for smaller and medium-sized modernization projects.

A biomass boiler plant will be delivered to the new Värtaverket combined heat and power plant in Stockholm, Sweden. The plant will cover the rising demand for district heating in Stockholm and largely replace fossil-based fuels like coal and oil with eco-friendly biomass.

IMPORTANT EVENTS

After a successful start-up by ANDRITZ PULP & PAPER, the greenfield Zhanjiang Chenming pulp mill, China, provides its neighboring paper producer with a local virgin fiber supply. The business area was the equipment supplier for the entire mill – from woodyard to finished pulp bales. **The mill reached the nominal annual production capacity of 700,000 tons**

in world record time – only 121 days from start-up (measured as a 30-day moving average).

The business area completed the conversion of the fiberline at Sun Paper's Yanzhou mill, China, for the production of dissolving pulp. Dissolving pulp has very high cellulose content, making it suitable for the production of rayon, acetate textile fibers, filters, and other high-value products. In Japan, Nippon Paper and Oji Paper selected ANDRITZ to convert existing digesters for the production of dissolving pulp. The Oji Paper delivery also includes a drying line.

CMPC Celulosa completed upgrades to the woodyard and fiberline and started up a new lime reburning kiln and causticizing plant, and a biomass handling system at the Santa Fe mill, Chile. CMPC's Laja mill started up a new evaporation plant and a recovery boiler with a capacity of 2,200 tons of dry solids per day.

ANDRITZ started a **six-year service contract with Fibria's Barra do Riacho mill, Brazil**, to provide maintenance of instrumentation, automation, and electrical systems and will also perform millwide maintenance for the new Montes del Plata pulp mill being built in Uruguay. In addition, a millwide maintenance contract was signed with Veracel Celulose, Brazil.





The greenfield Zhanjiang Chemming pulp mill, China, started up successfully. ANDRITZ was the equipment supplier for the entire mill – from woodyard to finished pulp bales. The mill reached the nominal annual production capacity of 700,000 tons in world record time – only 121 days from start-up (measured as a 30-day moving average).

A rebuild of the press section for a machine producing fluting and testliner was completed for Oudegem Papier NV – VPK Packaging, Belgium. For Količev Karton, Slovenia, ANDRITZ rebuilt the wet section of a board machine, incorporating a new hybrid former design so that the mill can produce higher value packaging grades.

The world's most efficient recovery boiler in terms of power-to-heat ratio was started up for Iggesund Paperboard, Sweden. The new boiler has a capacity of 2,400 tons of dry solids per day and will increase Iggesund's electricity production from 210 to 520 gigawatt-hours per year, helping Iggesund to [free itself from fossil fuel emissions](#).

The steel Yankee is an energy-efficient component for drying tissue paper. ANDRITZ started up the world's widest (7.4 meters) steel Yankee cylinder for a customer in Indonesia. Doh-Ei Paper, Japan, started up a tissue machine with a steel Yankee, marking the first delivery of this ANDRITZ technology to Japan. In China, ANDRITZ successfully started up five tissue machines in 2012, four for the Hengan Group. The Hengan Group is now running nine ANDRITZ tissue machines including steel Yankees – two of which are fitted with the largest steel Yankees in operation worldwide. Three EPC deliveries of ANDRITZ bubbling fluidized bed biomass boilers were started up for Hämeenkyrön Voima Oy, Finland; E.ON Värme Sverige, Sweden; and Grupo Empresarial ENCE, Spain.

Metsä Fibre's Joutseno mill, Finland, started up an ANDRITZ biomass gasification plant including biomass

dryer and gasifier. The product gas from the plant is being used to replace fossil fuels in the mill's lime kiln.

IMPORTANT ORDERS

North Star Pulp Industrial Complex, Russia, ordered fiberline systems and a pulp drying line for its Amazar mill. JSC Arkhangelsk Pulp and Paper Mill, Russia, selected ANDRITZ to supply equipment for a new semi-chemical pulp line. The technology will [improve the fiber quality and reduce production costs as well as minimize the effluent discharge](#). The new plant will use birch and aspen as raw material and produce 1,000 tons per day of fluting and testliner pulps. Ilim Group, Russia, selected ANDRITZ to modernize its white liquor plant, including lime mud drying and kiln operations.

China CAMC Engineering Hong Kong ordered wood-yard systems, fiberline equipment, a white liquor plant, a pulp drying plant, a chemical recovery boiler, and an evaporation plant for a mill in Svetlogorsk, Belarus. ANDRITZ will supply two tissue machines to C&S Paper Yunfu, China. This will be the first PrimeLine ST machines in China. The design was created to reduce drying costs. The entire drying process uses steam only. The steel Yankee combined with steam-heated hood allows for the maximum possible output with remarkable cost savings by operating with relatively cheap steam.

ANDRITZ received an order from Hengan Group, China, to supply another four tissue machines with steel Yankees. This [will bring the number of ANDRITZ](#)



tissue machines in the Hengan Group to 13.

Zellstoff Pöls AG, Austria, ordered a PrimeLine MG paper machine including a steel Yankee with a diameter of 6.7 meters for the production of high-strength paper for shopping bags, medical packaging, and food packaging. The scope of supply also includes the stock preparation plant, approach flow system, calendering, and the automation systems.

Ningbo Asia Pulp & Paper, China, ordered two lines for processing recycled mixed office waste for a new board machine. Fujian Liansheng Paper Longhai ordered a 350 tons per day mixed office waste processing line, a 250 tons per day line for processing old newspapers, a paper machine approach, and a sludge handling system.

A circulating fluidized bed boiler with a useful heat output of 330 megawatts will be delivered to Fortum Värme's new Värtaverket combined heat and power plant in Stockholm, Sweden. The biomass boiler plant will be one of the largest of its kind worldwide. With the new plant from ANDRITZ Energy & Environment, which will cover the rising demand for district heating in Stockholm, **fossil-based fuels like coal and oil can be replaced largely with eco-friendly biomass.**

A new biomass-fueled boiler for a combined heat and power plant will be delivered to Karlstads Energi, Sweden.

Norgener, Chile, ordered two dry flue gas desulphurization plants for a coal-fired power plant in Tocopilla. The scope of supply includes design, engineering, manu-

facture, installation, and start-up of the plants on EPC basis.

In the nonwovens sector, Precot Meridian, India, ordered a complete new nonwovens production line. The unique technology developed by ANDRITZ uses **waste from spinning mills to produce cotton pads for cosmetic applications.** Eruslu Tekstil, Turkey, ordered a second spunlace line to **more than double production capacity of baby wipes products.**

Nan Liu, Taiwan, awarded the business area an order to supply the widest spunlace line in the world for its Pinghu facility. This line will meet the rapidly increasing demand for wet wipes in China.

After the successful start-up of the largest and fastest MESIM (Mechanical Simultaneous) film stretching line in the world for a customer in Europe, ANDRITZ Biax received an order for the delivery of a MESIM line to China. Zhejiang Nanyang Technology ordered a 5.1 meter wide line for the production of various PET films. In addition, ANDRITZ received orders for conventional stretching lines from the Chinese producers Bazhou City Shengfang Fuxing Color Printing Packing and Zhejiang Yunsu Film Industrial. In Saudi Arabia, the business area received an order for an 8.7 meter turnkey line from Rowad Global Packaging.

For the panelboard industry, Kastamonu Integrated Wood Industry, Russia, ordered a wood processing and pressurized refining system with a design capacity of 1,440 tons per day for a greenfield plant. This will be the largest pressurized refining system for panelboard production installed in Russia. |

ANDRITZ spunlace line for the production of wet wipes. Eruslu Tekstil, Turkey, ordered a similar line for the manufacture of baby wet wipes.



Follow YOUR NOSE



Jürgen Schönstein is a geographer and journalist. In two decades as a New York City-based correspondent for several major German publications, he has covered business and politics, as well as science and technology. He is editor-in-chief of ScienceBlogs.de, a science-themed blog portal within the "National Geographic" network. For his report about sewage treatment in New York City, he simply had to follow his nose.

To the sewage treatment plant? Just follow your nose!" Yet, it is not quite that simple, on this dark November morning, to find the wastewater treatment plant on New York City's Wards Island. Although the plant, which was first constructed in 1937, covers almost one quarter of the island's area, it ducks neatly behind two gigantic highway and railroad bridges. And although its odor does announce its presence to the approaching visitor, I have to stop and ask for directions twice before I finally reach the entrance, where Alex Robatto is waiting for me.

Robatto is the New York Area Field Supervisor for ANDRITZ SEPARATION. He and his service team are in charge of maintaining the decanter centrifuges here on Wards Island and in most of the other sewage treatment plants throughout the city on behalf of the New York Department of Environmental Protection, which is responsible for the water supply. These decanter centrifuges make sure that the dirt flushed by New Yorkers day in, day out from their homes and off their streets into the city's **sewage pipe network, which is almost 10,000 kilometers long**, is separated from the wastewater in order to protect the environment and even be able to make valuable fertilizer from it.

The city operates a total of 14 such plants to treat the 5.4 million cubic meters of wastewater that are discharged daily. The largest and newest of these plants, at Newtown Creek in Brooklyn, by itself can take in about half of the total wastewater volume produced by the city's eight million residents –

but once the sludge has been discharged from those shiny metal digestion towers (the most recent landmark in this hipster neighborhood), it has to be shipped in tankers to one of nine dewatering plants in the city. Most of it will be treated on Wards Island, with the rest going to its sister plants in Hunts Point (Bronx) and Brooklyn's 26th Ward.

In addition to the 80 decanter centrifuges that New York has purchased so far for its entire sewage treatment system, the Newtown Creek plant also operates 24 larger centrifuges, model BSC 3114. They are used to thicken the sludge to a pasty consistency, which can be pumped into the digesters. Alex Robatto and his team of ten experts service all these centrifuges. The separation process, which removes all solid matter from the wastewater sludge, starts by actually putting something in first: An emulsion of polymer acting as flocculent ensures that the widely distributed solid particles (in this phase, the sludge is 97-98% water) clump together. "The polymer has a positive charge, which attracts the particles in the sludge," explains Robatto. "Bigger particles lead to better separation." The bowl inside the decanter centrifuge, **rotating at 2,300 revolutions per minute**, accelerates this mix of sludge and polymer to **3,000 times the force of gravity**.

While passing through the around two meter long bowl, where it is conveyed by a scroll, the solid matter is increasingly thickened due to the centrifugal forces. Cake is what engineers call the solid matter coming out at the end of the centrifuge; it has the consistency and color – and also the aroma – of peat moss. The cake is typi-

cally 30% solids and 70% water. Every minute, each of these centrifuges processes about 750 liters of slurry. The daily capacity of Wards Island alone – provided all 13 decanters are running simultaneously – is almost 14,000 cubic meters of sewage.

The separated water – which from now on is called centrate – may have a milky appearance, but it is essentially free of solid particles. It will be pumped back to the head of the plant for further treatment. The cake is sent through a hopper to a conveyor belt and is either carted off to a landfill or processed further in a pelletizing plant and then can even be used as fertilizer.

The challenge of New York City's sewage system is that it mixes sanitary sewer flows with street runoff; the lat-

ter contains sand and grit, broken glass, and all kinds of other abrasive substances, increasing the wear on the centrifuges' interior. This problem, compounded by heavy rainfalls, can be controlled by optimizing the sludge and polymer flows accordingly, but in the end, parts will wear out. After several maintenance cycles, the whole bowl and scroll rotating assembly is due for dynamic balancing – this is a more complex task, Rabbato explains, for which the unit has to be shipped to a special workshop in Scott Depot, West Virginia. This maintenance will take a centrifuge off-line for two to four weeks.

New York City's waterfront and wetlands count amongst the most sensitive in the world. The city stopped draw-





ing its drinking water from local wells 170 years ago and is now supplied from reservoirs far outside its borders in the Catskill Mountains. But the Hudson River and the East River not only run through a metropolitan area with more than eight million people; they also sustain important nature and recreation areas. Only around six kilometers downriver from Wards Island, on the elaborate fishing piers of Gantry State Park in Long Island City, leisurely fishermen reel in record-breaking bluefish and striped bass from the brackish water of the East River. The beaches of Coney Island in Brooklyn, which attract more than 11 million visitors annually, and the Gateway National Recreation Area, a 10,767 hectare

nature preserve around New York Bay, depend on the wastewater treatment system doing its job properly. New York City spends 262 million US dollars annually on water treatment alone.

But keeping to the pollution standards, which were established with the Clean Water Act of 1972, is not the only challenge: 5.4 million cubic meters of wastewater every day, that's the water volume of a lake, one kilometer wide and six meters deep. Cleaning such a huge volume in nature would take several weeks; in New York City's plants, Alex Robatto explains at the end of my tour, the treated water needs to be discharged from the plants within seven hours. ▀



ANDRITZ SEPARATION

MARKET DEVELOPMENT

Project activity for plants and machinery used in municipal and industrial solid/liquid separation saw satisfactory development in 2012. Good investment activity was noted in the environmental sector: The municipal waste water treatment area concentrated on the Middle East and Asia (due to changes in the legal framework, project activity for centrifuges declined in China) and the industrial effluent treatment sector focused particularly on South America and China. In the mining sector, investment activity dropped slightly as a result of the global economic weakness.

IMPORTANT ORDERS

Stolensky Mining and Beneficiation Plant (SGOK), a leading supplier to the Russian iron and steel industry, ordered four hyperbaric filter units with a total filtration area of 480 square meters and residual moisture of only 6-9% for an iron ore pellet plant to be erected in Stary Oskol. [More than 900 tons of fine magnetite iron ore will be processed per hour](#), increasing

SGOK's iron ore concentrate production by 25% to an overall total of 15 million tons per year.

Enrestechology, a leading Mongolian mining company, ordered eight heavy-duty belt presses for treatment of overburden (the material covering the economically valuable minerals). As the water from the dewatering process is to be re-used in the washing plant, the belt presses are designed for high-quality performance and water recovery with most reliable water properties, thus meeting the technology standards of the washing plant and the environmental regulations.

Fertiker, France, is a specialist for the treatment of biodegradable waste by anaerobic digestion. Its biomethane plant in Plouédern produces electricity from a 400 kilowatt co-generator, which is fed biogas produced in a waste digestion process from a mixture of sludges, grease, and pig manure. In addition to the gas, the digested material has a liquid fraction, which is sent to a treatment plant, and a solid fraction, which is composted and dried. For solid/liquid separation, Fertiker awarded ANDRITZ an order to supply a decanter



centrifuge that can adapt to various feedstocks. The centrifuge either runs without polymers, still achieving a capture rate of more than 70% with very high dryness (30%), or it runs with polymers as a separation additive and achieves capture rates beyond 95%.

For a customer in Thailand, ANDRITZ will supply a centrifuge/dryer combination for a new stevia plant. **As a sugar substitute in soft drinks and desserts, stevia is becoming more and more important within the food industry.** Most of the stevia plantations and production sites are located in Asia and South America.

Three hyperbaric disc filter units were successfully refurbished in a coal washing plant in Stonava, Czech Republic. After 20 years of operation, the residual moisture was too high and the coal could no longer be sold at the highest rates as a result. After exchanging the mild steel troughs (now stainless steel) and the complete filtration unit, the internal conveying system and locks, the units now run with the same results as new equipment.

Matjuschinskaja, Russia, ordered two hyperbaric filter units with a total filtration area of 120 square meters and three heavy-duty belt presses. The business area also provided a highly automated operation system, which is crucial to uninterrupted and safe operation of the coal washing plant. The system shows the core data and statistics and allows for continuous monitoring of the process details to ensure the most effective operation. All components can be monitored and controlled individually.

With the recent boom in shale gas exploitation in the USA, ethane is now available as an inexpensive source of energy, which has triggered an increase in the production of petrochemical goods. One of the major PVC producers in the USA also decided to expand production and build new facilities in a plant in the Midwest. As part of the investment, this longtime ANDRITZ SEPARATION customer ordered a large fluid bed dryer system with two decanters, thus combining both the ANDRITZ drying and dewatering technologies. ■

Mineral mining in Utah, USA. ANDRITZ delivers a wide range of dewatering technology for the mining and minerals industries.



Business as tough **AS STEEL**



Christoph Lindner is Managing Director of Consultic. The company is a member of PSYMA Group AG, a holding company comprising 16 international firms researching various industries. He is an expert on the global steel market and has also prepared studies for ANDRITZ. In his analysis, Christoph Lindner explains the underlying reasons for the current turbulence on the steel market and ventures a glance into the future.

Driven by the extremely high demand for steel in China, global steel production increased by more than 50% between 2000 and 2008. It then fell by 8% in 2009 compared to 2008 as a result of the economic and financial crises. Nevertheless, China recorded a sharp rise in steel production (+14%) even in this economically difficult year.

The steel industry has not really recovered since then. In 2012, global steel production did rise again, but the price for most steel grades remained low. Consequently, most international steel producers again faced a major financial struggle, and many recorded losses.

There is a variety of reasons why the strong increases of the previous years came to an end and why current forecasts are pessimistic. For example, falling demand for steel in the European Union in the first half of 2012 (down by 9% on the same period in the previous year) can partly be explained by the debt crisis. Important customers, such as car manufacturers or those from the construction sector, are struggling in the face of the uncertain state of the economy and are therefore holding back on placing orders. The demand for long steel products, which are mainly used in construction, as well as the demand for flat steel, which is important in car and machine construction, were still under pressure until

the end of 2012. Alongside the accompanying low level of capacity utilization, steelmakers are still struggling with fluctuating prices for raw materials and in some cases harsh environmental and emissions standards. The times when the steel industry was able to rely on high growth powered by the driving force that was China are now over. In 2012, it became apparent just how dependent the steel industry is on China. Economic growth in China has now fallen to its lowest level since the global financial crisis of 2008/2009, and this is being felt worldwide. However, despite weakening global and local demand, China, as the world's most important steel producer, is not cutting back on production. This has resulted in a surplus production of 200 million tons of steel a year. This overcapacity is leading to very low profit margins for Chinese steelworks, as well as a fierce price competition. The possibility of reducing overcapacities by closing plants is not being considered, or at least only to a marginal extent, out of fear of unrest among workers and the wider population. Instead, the building of new steelworks is being planned. Resolving the problem is therefore being postponed to the near future. China is seeking to export its surplus steel at low prices, mostly to its neighbors.

This picture of the steel market is also, to some extent, applicable to the high-grade steel market, which only accounts for around 2% of the overall market. Extremely high growth rates are a thing of the past. Consider-

able increases in production in China led to the country becoming a net exporter of high-grade steel as of the middle of 2010. [The current difficult situation on the high-grade steel market is reflected, on the one hand, in lower profit expectations on the part of manufacturers and, on the other hand, in the current consolidation of the market.](#) This is exemplified by the sale of the high-grade steel producer Inoxum to Outokumpu and the spin-off of Aperam from ArcelorMittal, which will ultimately lead to a further reduction in new investment on the world market. An increase in demand for high-grade steel from the household appliance and the machine and plant construction sectors might counteract this trend somewhat.

The difficulties faced by the steel sector have understandably had an impact on suppliers of equipment and technology to the steel industry. Continuing overcapacity in the production of steel and high-grade steel and the lower investment that comes with it have led overall to a decrease in order intake, which is impacting on the business development of ANDRITZ and its competitors.

In the long term, it can be assumed that China's share of global crude steel production will continue to rise and that the country will influence the steel sector like no other. [No global market recovery can be expected before the second quarter of 2013.](#) However, the major steel producers are warning against excessive profit expectations ... [I](#)

Crude steel production 2003 until 2012
in million tons



ANDRITZ METALS

MARKET DEVELOPMENT

As a result of overcapacities in the steel and stainless steel industries, as well as the uncertain overall economic situation, project activity for plants and equipment for the manufacture and processing of strip made of stainless steel, carbon steel, and nonferrous metal was again very moderate in 2012. [Only selective investments were made worldwide](#). Satisfactory project activity was noted for industrial furnaces.

IMPORTANT EVENTS

The annealing and pickling line delivered to Bahru Stainless SHN BHD for a new stainless steel works in Malaysia went into operation. The line has an annual capacity of 240,000 tons (three-quarters of which is cold rolled) and is equipped with two decoiler groups, a scale breaker, three blasting machines, a stand-alone skin pass mill, and an acid regeneration and neutralization plant.

The 20-high precision rolling mills, delivered for TISCO Tianjin Iron & Steel Corp., China, started-up. Both the strip thickness (final thickness: 20 micrometers) and flatness tolerances were below the guaranteed values. TISCO Tianjin Iron & Steel is a member of the TISCO Group, China's largest stainless steel producer.

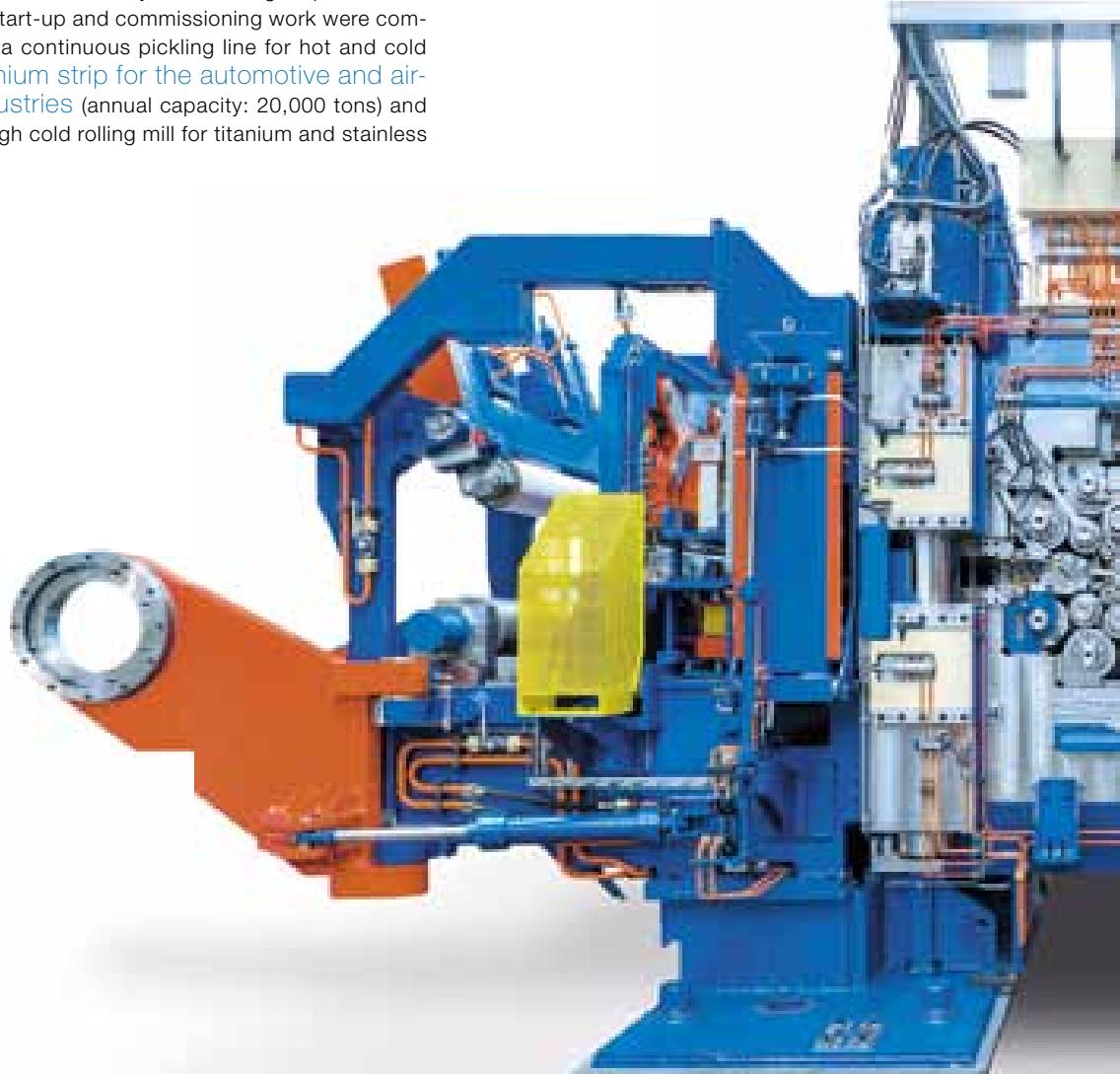
At Baoji Titanium Industry, China's largest producer of titanium, start-up and commissioning work were completed for a continuous pickling line for hot and cold rolled [titanium strip for the automotive and aircraft industries](#) (annual capacity: 20,000 tons) and for a 20-high cold rolling mill for titanium and stainless steel strip.

IMPORTANT ORDERS

As consortium leader, ANDRITZ received an order from voestalpine Stahl to supply the terminal equipment for the continuous strip annealing plant #2 at its Linz facility, Austria. This first plant in Europe for the production of non-grain oriented, high-quality sheet for the electrical industry is designed for an annual production of 250,000 tons. The 290 meter long line will process magnetic steel sheet with a thickness of 0.2 to 1.0 millimeter up to a maximum width of 1,600 millimeters. ANDRITZ also supplied hot galvanizing plants #4 and #5 for the Linz facility.

For Stahlwerk Ergste Westig, Germany, the business area will supply a 20-high precision rolling mill and a recoiling line for thin stainless steel strip. This order confirms the many years of good cooperation with this company – a member of the ZAPP Group – which already has several ANDRITZ rolling mills of different designs operating successfully for strip widths of 380 to 450 millimeters.

For Acroni d.o.o. Jesenice, Slovenia, the business area will install a precision leveling machine for steel plate



(7.0 to 40.0 millimeters) for the production of wear-resistant and high-strength steel grades. ANDRITZ will supply the entire mechanical equipment as well as the electrical equipment. This machine, fitted with an automated flatness measuring system, will be the most efficient of its kind worldwide in terms of flatness and residual stress balance.

An aluminum strip slitting line will be rebuilt for Alcoa at its mill in Davenport, Iowa, USA. Thus, ANDRITZ is supplying the entire mechanical equipment, including two strip processing lines ordered last year, for an Alcoa expansion project serving the automotive and aerospace industries.

Great Wall Motors, one of China's leading car manufacturers, ordered the supply of three fully automatic laser welding plants for linear seams from ANDRITZ Soutec. This equipment is used to weld car body parts together at the Xushui and Tianjin locations. ANDRITZ Soutec is also supplying two laser welding plants for non-linear seams to Arcelor Mittal for its San Luis Potosi facility, Mexico. The two plants will be used to [produce car body parts for General Motors vehicles](#).

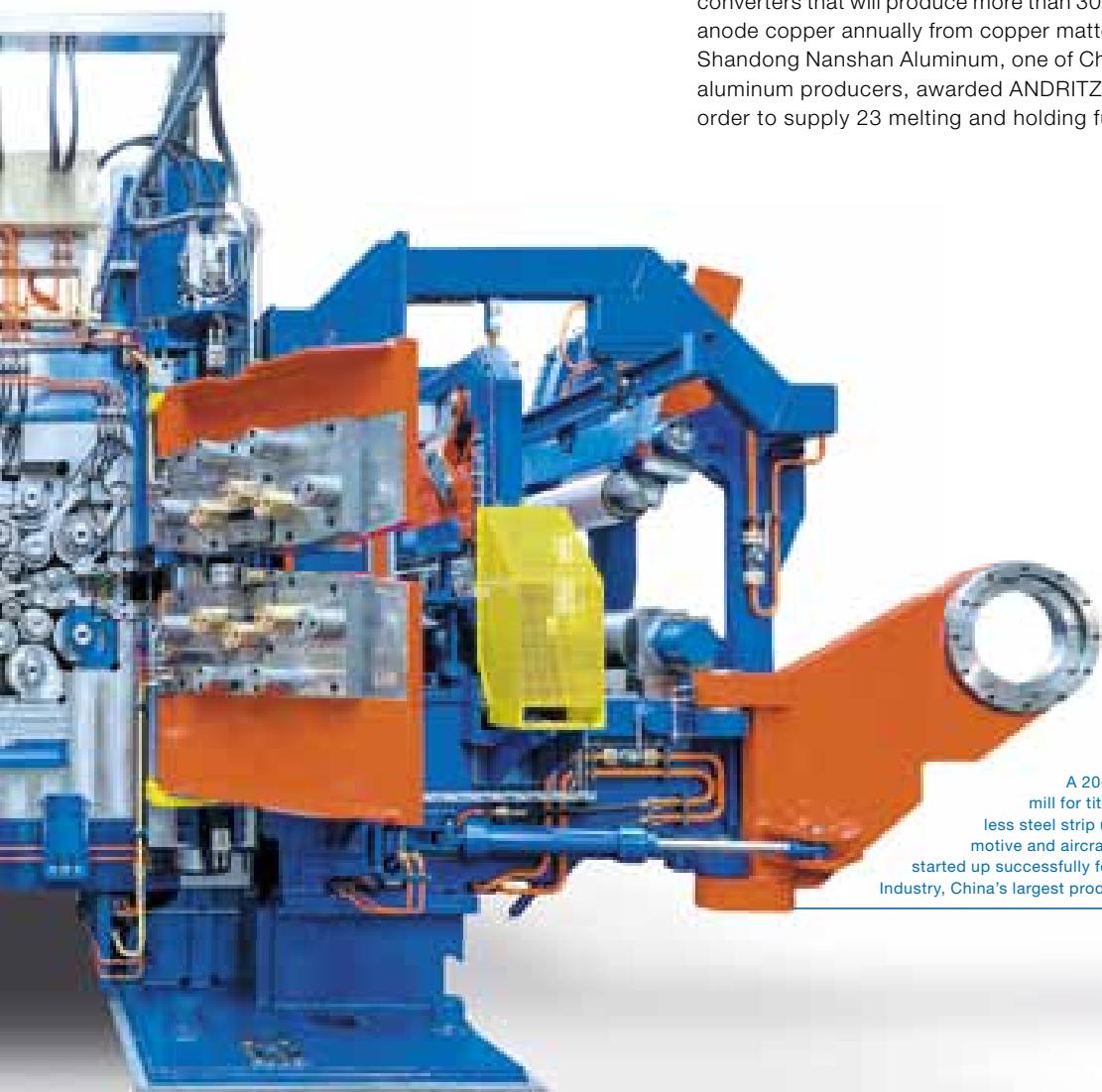
The business area was awarded an order by Vallourec & Mannesmann Tubes, one of the world's leading suppliers of seamless hot-rolled steel tubes, for the supply, installation, start-up, and commissioning of a new walking beam furnace for the heat-treatment of tubes at the Tuberie de Déville plant, France. The particularly energy-efficient angle burner used in this plant was specially developed by ANDRITZ for heat-treatment furnaces to optimize the furnace profiles and to achieve the best possible heating curve and uniformity of temperature. The newly developed burners easily meet the stringent emission limits of the European Union.

The business area will supply three new car bottom forging furnaces to Böhler Edelstahl, Austria. The furnaces are fitted with a special regenerative heating system developed by ANDRITZ that can [reduce consumption of natural gas by more than one quarter](#).

A new twin-chamber tempering plant comprising a fully automatic heat treatment plant for long forged products, a charging system, and an automatically operated hardening device will be supplied to the ThyssenKrupp VDM plant in Unna, Germany.

Kansanshi Mining, Zambia, placed an order for the supply of two copper anode furnaces and four Peirce-Smith converters that will produce more than 300,000 tons of anode copper annually from copper matte.

Shandong Nanshan Aluminum, one of China's leading aluminum producers, awarded ANDRITZ Bricmont an order to supply 23 melting and holding furnaces. ▀



A 20-high cold rolling mill for titanium and stainless steel strip used in the automotive and aircraft industries was started up successfully for Baotai Titanium Industry, China's largest producer of titanium.

The art of milling **WOOD**



Brigitte Röthlein is a physicist and also has a social science doctorate. She has been working as a popular scientific author for magazines, newspapers, radio, and television since 1979, as well as writing several scientific books. She asked RWE Executive Board member Leonhard Birnbaum why the German power company has built a wood pelletting plant in the USA to burn the pellets produced there on the other side of the Atlantic in Europe.

In its search for environmentally friendly energy sources, RWE AG, one of Europe's largest energy supply groups, is increasingly focusing on biomass – in particular on wood pellets as an additional fuel in coal-fired power stations. In order to meet the sharply rising demand for this product, the company has set up one of the world's largest plants for the production of wood pellets from virgin timber in the south of the US state of Georgia. This comes at a cost of approximately 120 million euros.

In this interview, Leonhard Birnbaum, member of the RWE Executive Board, speaks about the early experiences with the plant fitted with ANDRITZ technology, the art of milling wood, and the substantial contribution that wood pellets are making to reducing CO₂ emissions.

Mr Birnbaum, why is a company based in Germany operating a wood pellet plant as far away as in the United States?

It was not particularly easy to find a suitable location for it. We searched the entire world for a site where there would be enough virgin wood growing, as fast as possible, in sustainable forestry. Unlike Europe, the United States has a considerable amount of surplus wood from such sustainably run woods that has hitherto gone unused. This is particularly true for the state of Georgia, where demand for wood has fallen sharply in recent years due to the withdrawal of several pulp and paper producers. We also need a good infrastructure to supply the plant and to transport the pellets away. Moreover, there has to be sufficient qualified staff in the

region. We found all of this in Waycross, and we also received good support from the regional and local authorities that are responsible for business development.

You burn the pellets in power stations in Europe. Is it worth transporting them halfway across the globe?

Yes. Because we transport the pellets by rail and ship, the costs are relatively low. It would have been more expensive to obtain the wood from Romania, for example, because we would have needed trucks and would have had to reload them twice. As far as the CO₂ balance is concerned, we got scientists from the German Biomass Research Centre in Leipzig and the University of Utrecht to analyze the entire chain, from tree to power station. The result shows that we are producing 75% less CO₂ in our power stations compared to those burning coal.

Why do you go to the trouble of processing the wood into pellets rather than burning it directly?

Because pelletting enables us to dry and compress the wood. Pellets contain considerably less air and water than natural wood, and this enables us to save on transport costs. Pellets are also homogeneous in terms of their quality and burn better. Furthermore, they can be stored more easily and they don't go mouldy or rot.

We are familiar with pellets in the form of dog food or cat litter. Are wood pellets produced in the same way?

Only to a certain extent. Other pellets mainly contain

binders to hold them together. Wood, on the other hand, contains the natural glue lignin and does not require any additives. Our pellets are made solely from wood, which we mill and then press. It is a real art because the process must be fine tuned to the type of wood being used.

Why does the Waycross plant use ANDRITZ technology? We put the project out to tender and ANDRITZ submitted the winning bid for most of the equipment. Of course, one factor was the company's wealth of experience as a world leader in the areas of pellet manufacture, as well as pulp and paper.

What experiences have you had with the new plant so far? The plant is running very well, just as we imagined. It processes around 1.5 million tons of virgin wood into 750,000 tons of pellets every year. The bark that is stripped off the tree trunks supplies energy for drying the wood chips before they are milled. This means that the plant's heat supply is self-sufficient in energy terms and accordingly eco-friendly.

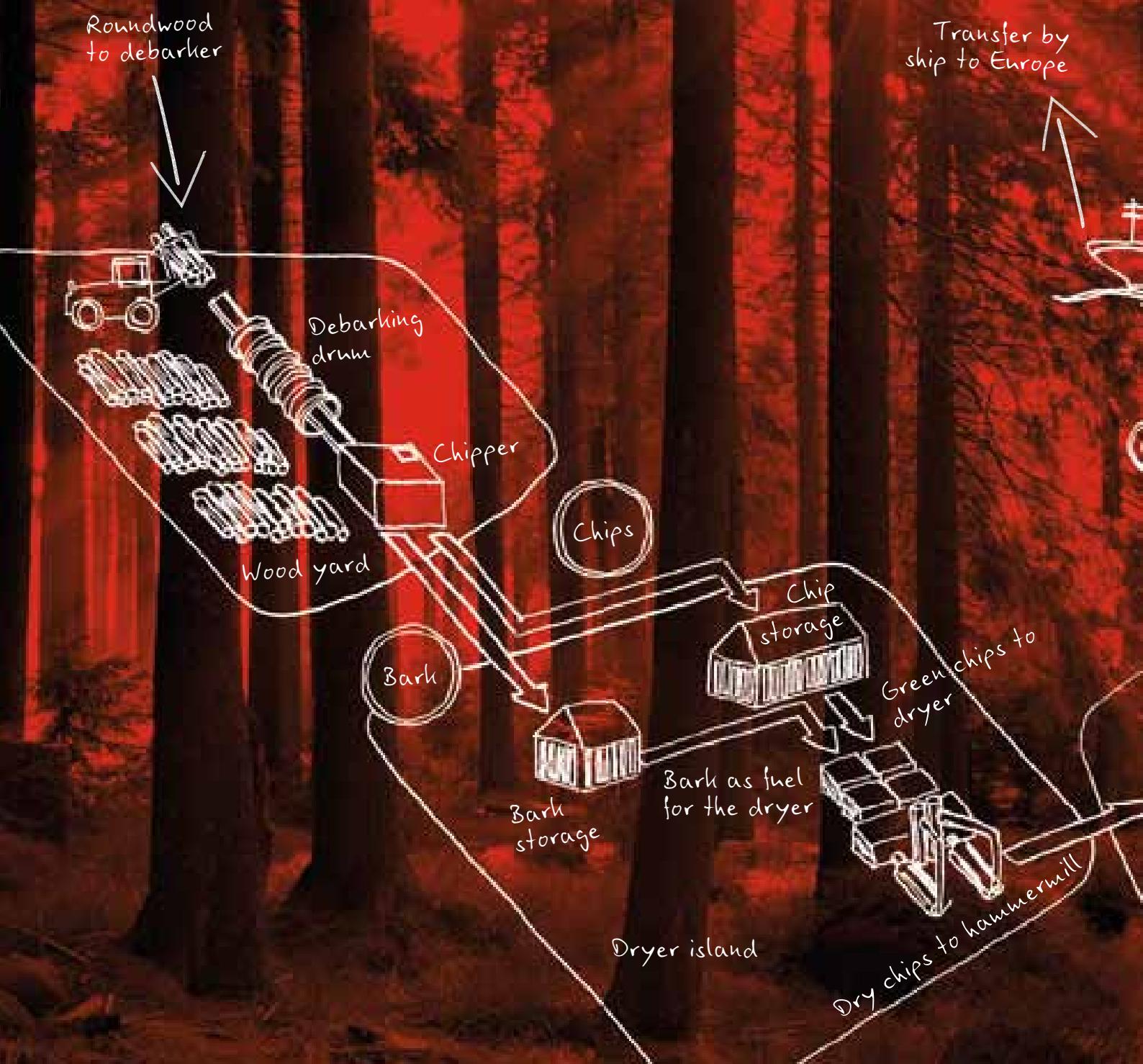
How do you see the future of wood pellets? Our investment in Waycross was around the 120 million euros mark and was strategically an important step towards securing our fuel base. We believe that the demand for wood pellets is continuing to grow. In the UK, we are already operating an adapted coal-fired power plant with biomass and achieving an output of 750 megawatts, and there are plans to convert other power plants. There might well be a shortage of wood pellets in the near future. [I](#)

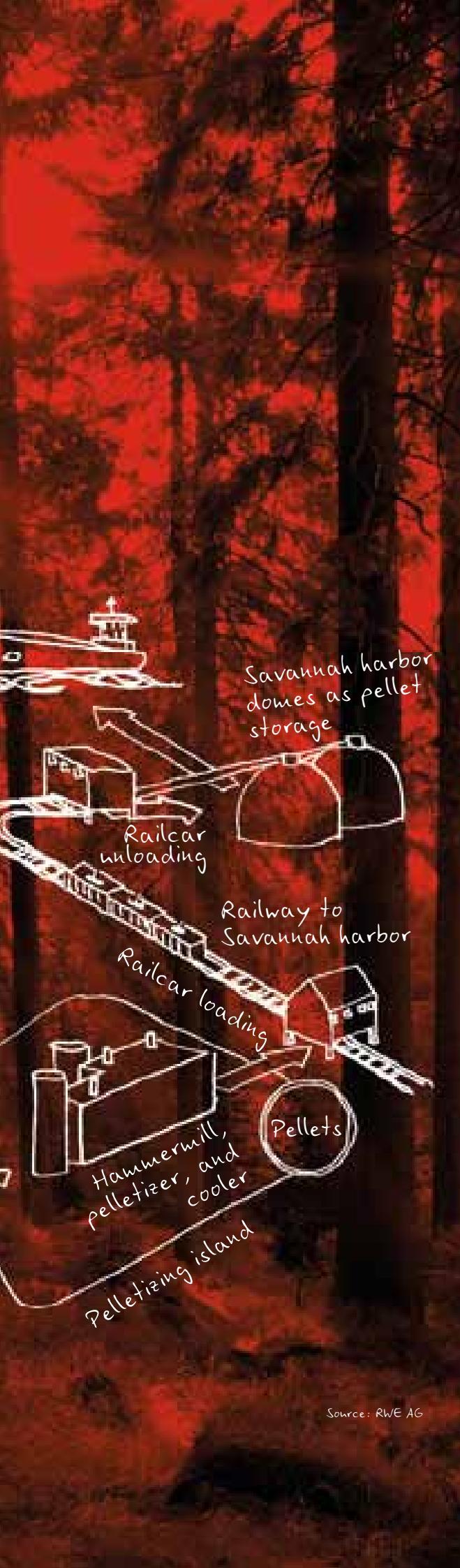
Leonhard Birnbaum

The 45-year-old chemical engineer specializing in process engineering has been working in a managerial position at RWE AG since 2008. As an expert on issues relating to energy and raw materials, he has been a member of the RWE Executive Board since 2010.



The way of RWE's pellets: from
the woods in Georgia, USA, to
their transport to Europe





ANDRITZ FEED & BIOFUEL

MARKET DEVELOPMENT

Global investment activity in the animal feed industry was at a satisfactory level in 2012, good project activity was particularly noted in Central and South America, Asia, and Eastern Europe. The special feed sectors also saw favorable development – the fish feed and shrimp feed industries in Asia and in Central and South America were very active. **The market for systems to produce pellets from wood and other biomass materials showed good project activity**, particularly in the USA, in Europe, and in the emerging markets of Asia and South America. All in all however, increasing competition was noted in the market for pelleting equipment.

IMPORTANT EVENTS

The business area noted a number of successful start-ups during the reporting period: for example, the start-up of greenfield aqua feed extrusion plants in Central America and Asia; animal feed pelleting lines in Eastern Europe, Asia, and South America; and a new greenfield straw pelleting plant for a customer in Eastern Europe – after the successful start-up, this customer ordered the supply of a second plant.

IMPORTANT ORDERS

In the animal feed sector, the business area received several important orders to supply new feed pelleting plants and extend the capacity of existing plants – including orders from vertically integrated meat and feed producers in Central and South America, Eastern Europe, and Asia.

For a customer in South America, ANDRITZ FEED & BIOFUEL was awarded the order for a high-capacity full-fat soy extrusion line for animal feed ingredient preparation.

Within the rapidly growing aquaculture feed segment, the business area booked numerous orders for extrusion lines for the production of fish feed, particularly in Asia, the Mediterranean region, and in Central and South America.

Orders for the delivery of extrusion and drying lines for the production of pet food were secured in South America, Australia, and Europe.

Customers in Europe, Asia, Australia, and the USA awarded the business area orders to supply systems and equipment for the production of pellets from biomass (especially wood and straw). These included an **order for pelleting lines for the largest wood pelleting plant in South East Asia**.

A customer in Scandinavia placed an order for the extension of a wood pelleting plant by adding the Bio-Max pelleting press recently developed by ANDRITZ. With a capacity of 12 tons per hour, BioMax is **one of the most powerful pelleting presses in the world.**

Harmonizing man and **MACHINE**



Geoff Poulton was born in England and writes for numerous international corporations as a business editor. His report looks at the development of automation technology, which is found in almost all ANDRITZ products, and asks whether humans will soon be replaced entirely by machines.

Openering the door, it's like entering a sauna: the air is heavy and warm, while clouds of steam billow around the high-ceilinged room. "Our Finnish colleagues feel especially at home here," jokes Gerhard Schiefer, Head of the Automation department at ANDRITZ. This is the testing location for pulp mill process and automation technology, dominated by a twin wire former, which is currently in the middle of a four-week virtual testing period. It is here that ANDRITZ tests its electrical automation equipment for an array of different technologies, which helps to **maximize process efficiency at production plants** around the world.

With ear defenders firmly on against the noise of the press, two of Schiefer's colleagues are huddled around a computer screen as the six meter high machine works away. Almost every piece of information imaginable about the power distribution, process efficiency, emissions, and condition of each component is displayed on the screen. It is in stark contrast to the twin wire press from 1950 that stands a few hundred meters away as a museum exhibit at the ANDRITZ headquarters in Graz, Austria; almost all elements of the process were controlled by hand on this machine. "Automation technology like this," Schiefer says, indicating the array of graphics on the screen, "means that **production has become more consistent, efficient, environmentally friendly, and safer.**"

Initially set up in 1984 to unify the Group's existing automation expertise that was spread around its different business areas, ANDRITZ AUTOMATION has grown to become a **global team of 1,200 experts**, serving both ANDRITZ's own five business areas and external customers. "Our core focus as a plant and equipment supplier means that we have unique technical expertise in the engineering and operating processes," explains Schiefer. "We help to bridge the gap between project planning and operations."

He cites the example of a new twin wire former-based drying line that was recently brought into operation at the world's largest dual-line pulp mill near the city of Três Lagoas in central Brazil (Eldorado pulp mill). "ANDRITZ AUTOMATION was involved in the initial commissioning phase, which enabled us to plan everything thoroughly with the customer. Given that this was a cattle breeding company looking to diversify its operations into pulp production, this was important as it gave us the time to help recruit and train the personnel that is now operating the plant."

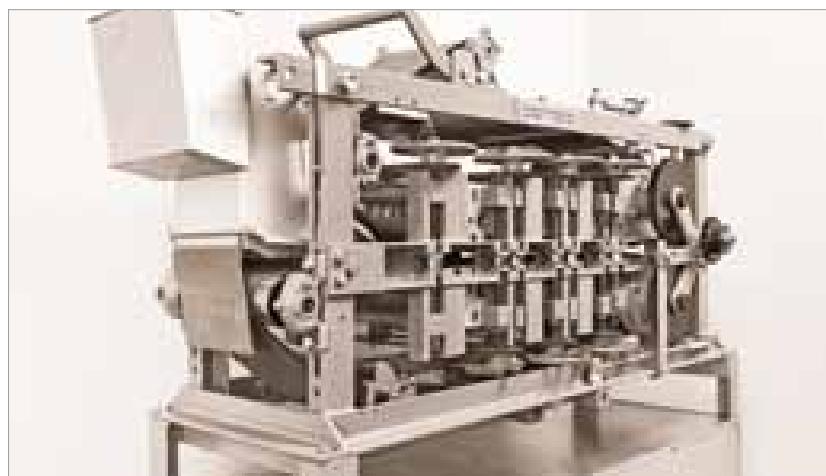
This represents one of the most important factors in the services offered by ANDRITZ AUTOMATION. Tailor-made, real-time process simulations allow customers to work together with ANDRITZ during the planning and installation phase to learn about the automation equipment and identify any areas for improvement. Depending on the location of customer and plant, this can either be done on site, as was the case in Eldorado, or at the ANDRITZ headquarters in Graz.

Electronic automation has changed the profile of workers needed to operate machines such as the drying line in Três Lagoas, [with a clear shift from blue-collar to fewer, but more highly qualified white-collar positions](#). Quality control, fault finding, speed regulation – all work that would previously have been carried out by hand by a team of workers, is now overseen by a much smaller group via computer. ["In emerging countries like Brazil, these positions are very highly valued – it is seen as an exciting opportunity to learn new skills,"](#) Schiefer explains. By reducing the need for hands-on work on what can often be potentially dangerous machinery, automation has also greatly reduced the number of accidents at production sites.

These same benefits from automation also help protect the environment. Fewer production stoppages reduce the need to carry out repeated machinery start-ups and

shut-downs, which result in higher emissions. ANDRITZ also incorporates emission tracking technology, enabling operators to see precisely how much energy they are using and what it costs – "a powerful tool in educating staff and raising awareness," Schiefer comments. With restrictions on harmful emissions on the rise, this can also help companies adhere to environmental laws and guidelines, avoiding costly fines.

Will man ever be totally replaced by machine? This is a question often asked, says Schiefer, but he thinks not, at least not in the foreseeable future. "The human element is vital for safety reasons. One of the major trends is looking toward utilizing web-based technology, which brings increased flexibility, allowing us to access data and control systems remotely via tablets. It will become less important for humans to be where the plant is, but they will remain involved in other ways." ■



An example of the rapid development of automation technology: twin wire presses from 1950 (left) and 2012 (below).



The War for TALENT



Tamara Dietl is a German journalist, university lecturer, and also coaches in personality, leadership, and ethics. She spoke to Fredmund Malik, an economist with worldwide recognition, at his management institute in Switzerland about the future challenges facing global corporations and how they can win the battle to attract junior executive managers.

For Professor Malik, many companies talk of the search for new staff in terms of a "war for talent". How can this war be won?

By making a company attractive to precisely this talent. Attractive companies are those that are successful. ANDRITZ

is one of them. And particularly attractive are those companies that are successful in finding solutions that customers and staff can see make sense. I always make it clear to managers that they must give people in their company the possibility of making sense of things. They

need this like they need air to breathe. Making sense of things is unbeatable when it comes to motivating people, especially in times of crisis. It also draws the focus towards the question of how talent can be used and deployed, because the war for talent is not won simply by looking for and finding talent, but by what one makes of the talent.

A central task of managers at ANDRITZ is to seek out suitable successors well in advance. This is ultimately about making oneself superfluous. How do you explain this to top managers?

MANAGERS SOUGHT AND SUPPORTED

One of the core tasks of Human Resources Management at ANDRITZ is to fill key positions worldwide. On the basis of its Group-wide management programs, it seeks out and fosters possible internal candidates for potential vacancies. This has enabled ANDRITZ to significantly increase its number of internal candidates in recent years. To continually achieve this goal, ANDRITZ has two leadership programs.

- On the basis of a Group-wide development program, high potentials are systematically identified and developed. The ANDRITZ global talent program involves the Leadership Development I course, project work with experienced senior managers at ANDRITZ, and a 360 degrees feedback module. This three-year development program aims to help participants improve their management skills, build up networks within the company, raise their visibility among top management, and take part in strategically important projects. The first 52 global talents successfully completed the program at the end of 2012.
- In the one-year Leadership Development II course, the focus is placed on answering the following questions: How am I perceived as a manager and how can I systematically improve my management behavior? After identifying areas for personal development, individual measures are defined and implemented. In addition, strategically important projects are carried out in global teams and presented to the top management. The results of these projects often provide the impetus for strategically relevant projects involving change.

I tell them that a master who remains better than his pupil will be praised for his mastery in posterity. A master who makes his pupil as good as himself lives on and creates continuity, but not progress. He remains bound by his own limitations. But a master who enables his pupil to grow even greater than himself creates a future – on the basis of innovation and progress. That is the highest goal of any master.

You describe the process of globalization and change in which we currently find ourselves as the "great 21 transformation". What do you mean by this?

We are experiencing a profound transformation process of historic proportions. What is happening goes far beyond a normal financial and economic crisis, and certainly beyond one that can be overcome in order to return to how things were before. What we are experiencing are the labor pains of a new world.

What will this "new world" be like?

It will be subject to completely different laws. The old world was shaped primarily by the laws of money and the economy. The laws of the new world are dominated by information, knowledge, insight, and the complexity and dynamism of highly networked systems. We will not get any further with our old response strategies. To overcome such dramatic changes, we need to introduce profound changes to our management systems, organizational structures, and strategies, as well as radical changes in the very way we think.

What consequences does this have for managers?

Never before have so many managers faced the chal-

lenge of having to learn new things and actively unlearn what they are familiar with. If knowledge is a crucial resource in the new world, then managers must also be able to accurately search for the right knowledge under the most complex of conditions. To do this they need new communications structures and new ways of making decisions and solving problems. This is because, nowadays, more people must contribute their entire knowledge, intelligence, and creativity in order to find the best solutions and implement them successfully.

In your opinion, what thought patterns must managers actively unlearn?

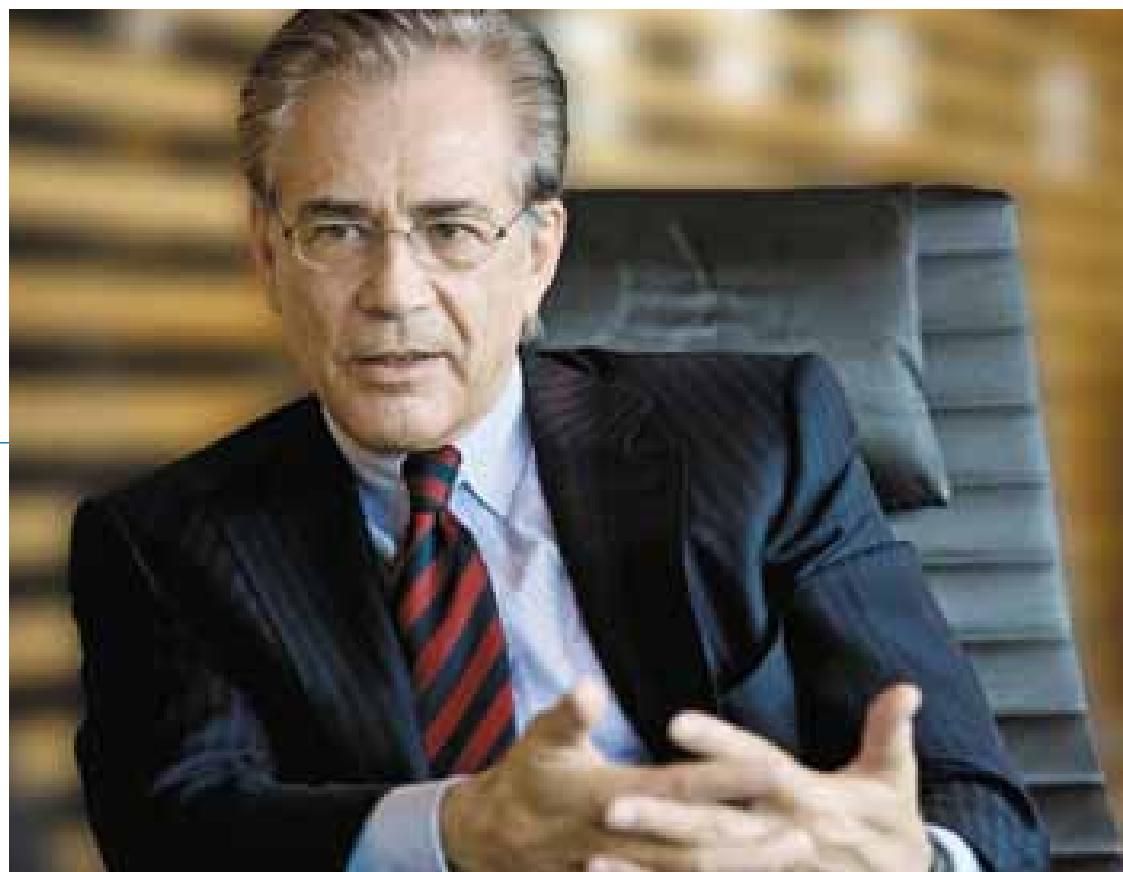
Most importantly, thinking in terms of "either ... or." The new world requires one to think in terms of "both ... and." For example, we must both compete and cooperate.

And what must managers learn?

The vital basis is the skills of good and proper management. This is what we at ANDRITZ have been successfully conveying for almost ten years with our Leadership Development programs. My understanding of management is based on the natural laws of functioning, and it is therefore independent of different cultures and operates universally. It also offers the invaluable advantage that one must learn it only once, though properly and well. However, the application framework is shaped by various cultures. It is comparable to driving a car in different situations: It is difficult for different reasons in the winter and the summer, whether traffic is heavy or not, whether one is driving in the countryside or in a city, on the left or the right. The actual process of driving is always the same: I have to steer, change gear, accelerate, brake, and turn. ■

Fredmund Malik

is a world-renowned economist whose research focuses on management. He owns and manages a company in St. Gallen, Switzerland, that helps companies transform and organize their management. Malik applies systems theory and cybernetics, amongst other things, to analyze and design management systems. He previously taught at the University of St. Gallen, where he is still a titular professor in business administration with a particular focus on management studies, and he is the author of numerous successful books.



Green WAVES



Thomas Vašek, born in Vienna, was in charge of the German edition of "Technology Review", published by the Massachusetts Institute of Technology (MIT), and was editor-in-chief of "P.M. magazine". Today, he is also a successful writer of books – and delves deep into the world of research and development work at ANDRITZ for this report.

Green is the color stimulus perceived when light enters the eye with a spectral distribution dominated by wavelengths between 520 and 565 nanometers. Green is also the Research and Development (R&D) trend at ANDRITZ. The technology Group and its customers – on one and the same wavelength – are pursuing common goals: **a greater focus on environmental protection and more energy efficiency** in machinery and equipment, as well as new **technologies for generating clean energy that help conserve natural resources**.

ANDRITZ's organic growth would not be possible without R&D. Each year, the industrial plant and machine engineering company invests 3% of its sales in R&D in order to expand its technological leadership. Thanks to this advanced green technology, ANDRITZ's customers enjoy the additional benefits of **increased productivity from their machinery and equipment and reduction of operating costs**.

These are some of the most important R&D projects in 2012:

Hydropower plant operators must not only keep an eye on the performance and cost efficiency of their equipment, but also on ecological standards. This is why ANDRITZ HYDRO develops technical solutions in close cooperation with its customers to combine maximum efficiency with maximum ecology. In order to investigate the **impact of hydropower plants on fish**,



Photo: Riku Isohella

for example, extensive studies were conducted with customers and a new turbine design was developed with fewer blades and less clearance between the runner and housing to reduce injuries to and stress factors for fish.

The combination of ecology and efficiency is also the main objective in the development of an [oil-free hub of a Kaplan turbine](#). Whereas conventional runners of Kaplan turbines are filled with hundreds of liters of oil that can escape if there is a leak, ANDRITZ has developed runners that operate with water instead of oil.

Another focus is the development of turbine coatings that provide protection against sand abrasion. Erosion damage results in reduced efficiency and higher maintenance and repair costs. Thanks to special abrasion test rigs and the long-lasting experience in hydropower plants, new coating processes have been developed that [minimize efficiency losses and extend maintenance intervals](#).

ANDRITZ PULP & PAPER is supplying the technology for the pre-treatment of biomass for the Liberty Project, the first commercial cellulosic ethanol plant for second-generation biofuel, which is being

installed by POET-DSM in the USA. The plant is to produce more than 75 million liters of cellulosic ethanol a year from corn crop residue. It uses the two-stage steam explosion process developed by ANDRITZ to support the low-cost conversion of biomass into sugar for the production of ethanol. At its R&D facilities in Europe and the USA, ANDRITZ has spent eight years working on processes for second-generation ethanol production. These processes use wood waste, for example, or plant remains from crop farming that are not used as food. ANDRITZ development work is concentrating on the chemical pre-treatment of the biomass and production of sugars to be fermented to make ethanol and butanol. Wood handling and processing play a special role in biomass pre-treatment. Any foreign matter adhering to the cellulose could interfere with the production process and must be removed. Micro wood chips measuring between four and six millimeters that are virtually free of foreign matter represent a particularly promising development. These micro wood chips could in future be used for the low-cost production of most types of biofuel.

The importance of biomass for the worldwide energy mix is growing significantly. In order to achieve legis-

Pilot plant for the torrefaction of biomass in Sønder Stenderup, Denmark. Torrefaction is a thermal process to increase the energy density of biomass. This improves the fuel properties of the CO₂-neutral biomass, requiring less fossil fuel in power plants. The energy content of torrefied biomass is 20% higher than that of white wood pellets.

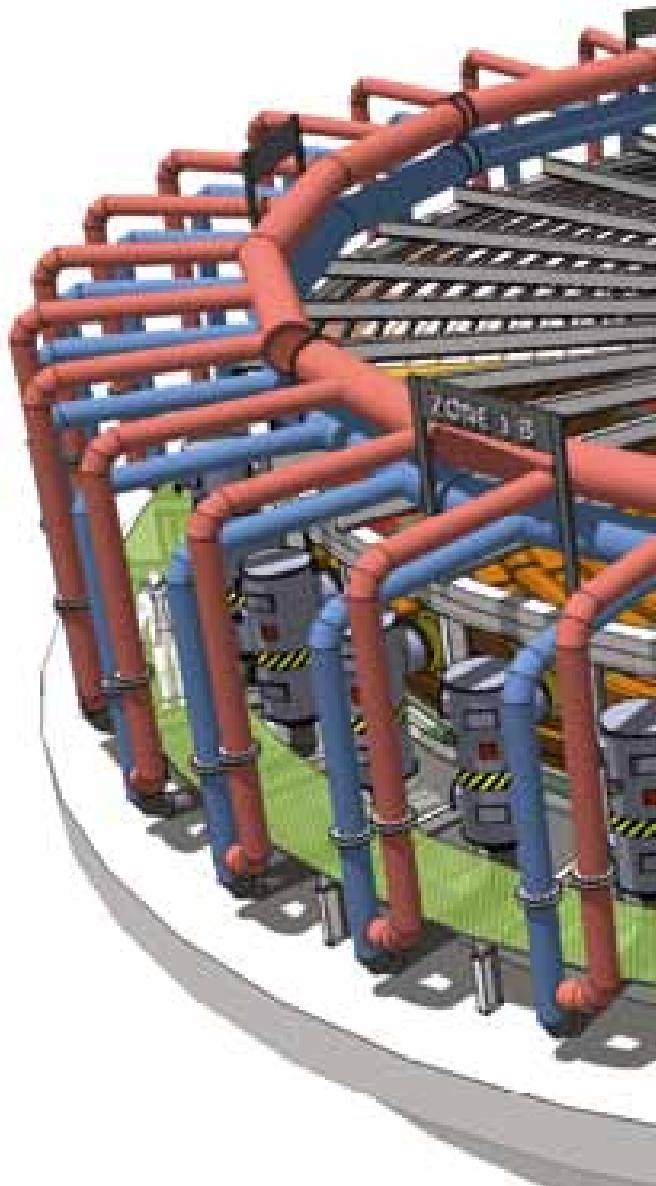




Dried biomass is the raw material for the production of second-generation biofuel. ANDRITZ is supplying the biomass pre-treatment technology for the world's first commercial cellulosic ethanol plant for second-generation biofuel, which is being installed in the USA.

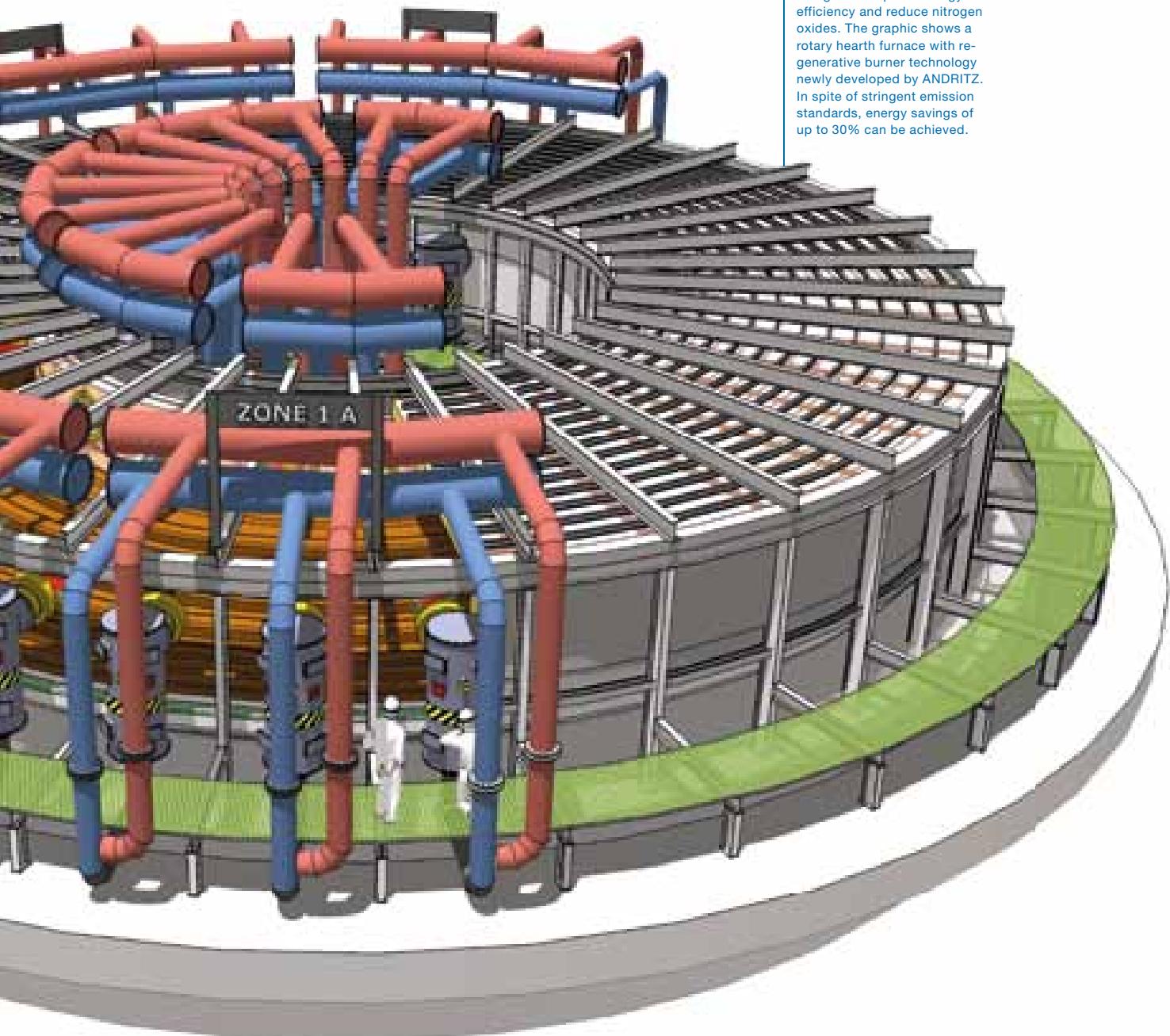
lated emission targets, coal-fired power stations are co-firing more and more biomass (wood chips and pellets) with coal. However, the use of untreated biomass is somewhat limited in existing plants. This is why ANDRITZ is developing technologies and processes to enhance the raw material for energy generating industries. **One of the most promising processes is torrefaction – a thermal process to increase the energy density of biomass.** This improves the fuel properties of the CO₂-neutral biomass, requiring less fossil fuel in power plants. By “parching” in a low-oxygen environment at relatively low temperatures, the biomass attains properties similar to coal. **The energy content of torrefied biomass is 20% higher than that of white wood pellets.** ANDRITZ is currently testing this innovative process in two pilot plants. ANDRITZ SEPARATION has started up a plant together with the local authority of the city of Frohnleiten, Austria. The plant is based on the ACB process (Accelerated Carbonized Biomass), newly developed by ANDRITZ. Woody biomass, like wood chips or sawmill chips, is compacted and torrefied. In the future, other low-cost biomass raw and waste materials are also to be upgraded in turnkey torrefaction plants (with a minimum commercial annual capacity of around 50,000 tons each) to become particularly energy-rich fuel. Another torrefaction pilot plant was erected in Sønder Stenderup, Denmark. The goal at this plant is

to test a large-scale concept with an annual production capacity of up to one million tons in future facilities. Process optimization and recycling processes are the focus of green innovations by ANDRITZ METALS. With the newly developed ZEMAP process (Zero Effluent Mixed Acid Pickling), **the nitrate load in the effluent produced in mixed acid pickling of stainless steel can be reduced to almost zero.** ZEMAP is part of a process chain together with the Pyromars process also developed by ANDRITZ, which can recover the pickling acid and such substances as chrome and nickel. In the ZEMAP process, the rinsing water is neutralized and evaporated, and the concentrate can be re-used in the Pyromars plant. In this way, the process not only recovers valuable substances, but also cuts the costs for waste water treatment significantly.



Other projects focus on recycling sheet steel with the aid of new dezincifying processes and on the development of new burner designs to improve the thermal efficiency of heat treatment furnaces. The prototype of a burner to reduce the nitrogen oxides in high-temperature furnaces has also been tested successfully. ANDRITZ FEED & BIOFUEL has started up BioMax, with an output of 12 tons per hour one of the world's largest pellet presses for biomass. ■

In the industrial furnace sector, research and development is concentrating on technologies to improve energy efficiency and reduce nitrogen oxides. The graphic shows a rotary hearth furnace with regenerative burner technology newly developed by ANDRITZ. In spite of stringent emission standards, energy savings of up to 30% can be achieved.





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March 1, 2013
Results for the 2012 business year

March 22, 2013
Annual General Meeting

March 26, 2013
Ex-dividend

March 28, 2013
Dividend payment

May 6, 2013
Results Q1 2013

August 7, 2013
Results H1 2013

November 6, 2013
Results Q1-Q3 2013

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