



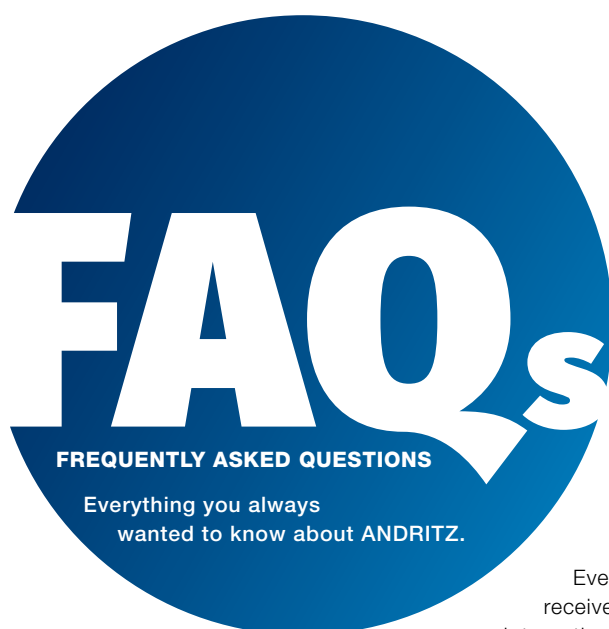
FAQs

FREQUENTLY ASKED QUESTIONS

Everything you always
wanted to know about ANDRITZ.

ANDRITZ

Annual report 2015



Every day, we receive a variety of interesting questions about very different issues concerning ANDRITZ. Customers, suppliers, financial investors and analysts, shareholders, journalists, and employees inquire regularly, mostly about current and future developments of the company. Answering these questions with the greatest possible transparency, comprehensiveness, openness, and speed is of utmost importance to us. That is why the most important questions about ANDRITZ, along with our answers, feature prominently in our current annual report. We hope that this annual report will answer some of the questions you may have. And if you cannot find the answers to your particular questions, please send an e-mail to faq@andritz.com – we promise to answer transparently, comprehensively, openly, and quickly!

Here, you will find the answers to the following questions:

Don't the Europeans want us to live as well as they do?

A large hydroelectric power plant is being built in Laos. It will provide power for the so-called tiger economies of Southeast Asia. We took a closer look at the lives of those affected and at the true impact of the project.

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Why does the future lie in Äänekoski?

In the forests of Finland, the future of the pulp industry is being rewritten. And this future lies in bioproducts. In Äänekoski, pulp and paper producer Metsä Group is building the most innovative bioproduct mill in the world.

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How many cars does China need?

1.5 billion people live in China, and it is expected that half a billion cars will be driving on Chinese roads by 2050. VW is currently building a new, superlative factory there.

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Who feeds 700 million babies?

Almost one in ten of the more than seven billion inhabitants of our world is a baby or toddler. 140 million children are born each year worldwide. A report on the booming baby food market.

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What strategy is ANDRITZ pursuing?

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How was the 2015 business year?

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How has the ANDRITZ share developed?

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ANDRITZ at a glance

The ANDRITZ GROUP

ANDRITZ is a globally leading supplier of plants, equipment, and services for hydropower stations, the pulp and paper industry, the metalworking and steel industries, and for solid/liquid separation in the municipal and industrial sectors. The publicly listed technology Group is headquartered in Graz, Austria, and has a staff of approximately 24,500 employees. ANDRITZ operates over 250 sites worldwide.

	Unit	2015	2014*	2013	2012	2011
Order intake	MEUR	6,017.7	6,101.0	5,611.0	4,924.4	5,706.9
Order backlog (as of end of period)	MEUR	7,324.2	7,510.6	7,388.5	6,614.8	6,683.1
Sales	MEUR	6,377.2	5,859.3	5,710.8	5,176.9	4,596.0
EBITDA ¹⁾	MEUR	534.7	472.0	255.2	418.6	386.2
EBITDA margin	%	8.4	8.1	4.5	8.1	8.4
EBITA ²⁾	MEUR	429.0	379.5	164.1	357.8	331.5
EBITA margin	%	6.7	6.5	2.9	6.9	7.2
Earnings Before Interest and Taxes (EBIT)	MEUR	369.1	295.7	89.8	334.5	312.7
EBIT margin	%	5.8	5.0	1.6	6.5	6.8
Earnings Before Taxes (EBT)	MEUR	376.4	299.4	80.3	330.4	321.7
Net income (including non-controlling interests)	MEUR	270.4	210.0	53.2	241.3	231.5
Fixed assets	MEUR	1,771.1	1,807.6	1,759.0	1,390.8	1,151.8
Current assets	MEUR	4,006.9	4,187.6	3,812.4	3,770.2	3,414.8
Total shareholders' equity ³⁾	MEUR	1,215.6	1,038.3	929.5	1,033.8	938.9
Provisions	MEUR	1,130.4	1,056.2	993.6	725.4	667.3
Liabilities	MEUR	3,432.0	3,900.7	3,648.3	3,401.8	2,960.4
Total assets	MEUR	5,778.0	5,995.2	5,571.4	5,161.0	4,566.6
Equity ratio ⁴⁾	%	21.0	17.3	16.7	20.0	20.6
Liquid funds ⁵⁾	MEUR	1,449.4	1,701.6	1,517.0	2,047.8	1,814.5
Net liquidity ⁶⁾	MEUR	984.0	1,065.1	893.1	1,285.7	1,400.6
Cash flow from operating activities	MEUR	179.4	342.1	93.7	346.5	433.8
Capital expenditure ⁷⁾	MEUR	101.4	106.5	111.4	109.1	77.0
Employees (as of end of period; without apprentices)	-	24,508	24,853	23,713	17,865	16,750

* Adjusted, see consolidated financial statements, chapter "C. Restatement of prio years", in the annual financial report 2015. 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 44,644 TEUR (2014: 78,038 TEUR), and impairment of goodwill at the amount of 15,273 TEUR (2014: 5,747 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. – Further notes: 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. The Schuler Group was consolidated into the consolidated financial statements of the ANDRITZ GROUP as of March 1, 2013. No pro forma figures are available for the reference periods of the previous years.



What are the market positions and goals of the ANDRITZ business areas?

We operate in four business areas that rank among the leading companies worldwide in their respective markets. The four business areas serve different markets: hydropower (HYDRO business area), the pulp and paper industry (PULP & PAPER business area), the metalworking and steel industries (METALS business area), as well as solid/liquid separation and animal feed/biomass pelleting (SEPARATION business area). This diversification helps to compensate for possible market-related fluctuations. The goal is that all four business areas should be able to offer their customers the entire portfolio of products and services.

ANDRITZ

ANDRITZ
Hydro

ANDRITZ
Pulp & Paper

ANDRITZ
Metals

ANDRITZ
Separation

ANDRITZ HYDRO

ANDRITZ HYDRO is one of the leading global suppliers of electromechanical equipment for hydropower plants. With over 170 years of accumulated experience and more than 30,000 turbines installed, totaling approximately 420,000 megawatts output, the business area supplies the complete product range, including turbines, generators, and additional equipment of all types and sizes – “from water to wire” for small hydro applications up to large hydropower plants with outputs of more than 800 megawatts per turbine unit. ANDRITZ HYDRO is also well positioned in the growing modernization, refurbishment, and upgrade market for existing hydropower plants. Pumps (for water transport, irrigation of agricultural land, and applications in various industries) and turbogenerators for thermal power plants are also allocated to the business area.

Global investment and project activity in electromechanical equipment for hydropower plants continued to be moderate in 2015. Due to the unchanged low electricity and energy prices, many modernization and refurbishment projects were postponed until further notice, especially in Europe. In the emerging markets, particularly in Africa and South America, some new hydropower projects are in the planning phase; however, these projects are expected to be awarded only in the medium term. Satisfactory project activity was noted both for small-scale hydropower plants and pumps.

	Unit	2015	2014	2013	2012	2011
Order intake	MEUR	1,718.7	1,816.7	1,865.4	2,008.4	2,096.2
Order backlog (as of end of period)	MEUR	3,640.9	3,708.6	3,722.4	3,842.3	3,671.4
Sales	MEUR	1,834.8	1,752.3	1,804.8	1,836.8	1,772.9
EBITDA	MEUR	183.6	177.2	176.8	182.4	174.3
EBITDA margin	%	10.0	10.1	9.8	9.9	9.8
EBITA	MEUR	145.3	144.8	146.9	153.2	147.7
EBITA margin	%	7.9	8.3	8.1	8.3	8.3
Capital expenditure	MEUR	27.4	39.4	44.5	56.7	44.3
Employees (as of end of period; without apprentices)	-	8,230	8,339	7,445	7,469	7,285

ANDRITZ PULP & PAPER

ANDRITZ PULP & PAPER is a leading global supplier of equipment, systems, and services for the production and processing of all types of pulp, paper, tissue, and cardboard. The technologies cover the processing of logs, annual fibers, and waste paper; the production of chemical pulp, mechanical pulp, and recycled fibers; the recovery and reuse of chemicals; the preparation of paper machine furnish; the production of paper, tissue, and cardboard; the calendaring 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, as well as gasification plants for power generation, flue gas cleaning plants, plants for the production of nonwovens, dissolving pulp, and panelboards (MDF), as well as recycling plants are also allocated to the business area.

The **international pulp market** saw very positive development in 2015. The prices for both long-fiber pulp (northern bleached softwood kraft) and short-fiber pulp (eucalyptus) remained stable at a high level due to a largely balanced supply and demand. Given this environment, the market for pulp mill equipment showed good project and investment activity. In addition to modernization projects for existing pulp mills, contracts were also awarded for new greenfield plants. However, the competitive environment and price pressure for pulp equipment suppliers continued to be challenging, especially for large-scale projects.

	Unit	2015	2014	2013	2012	2011
Order intake	MEUR	2,263.9	1,995.7	1,907.7	1,962.4	2,694.1
Order backlog (as of end of period)	MEUR	1,998.6	1,875.4	1,885.6	2,018.1	2,230.0
Sales	MEUR	2,196.3	1,969.3	2,005.3	2,282.2	1,884.9
EBITDA	MEUR	214.8	127.6	-11.5	156.2	138.1
EBITDA margin	%	9.8	6.5	-0.6	6.8	7.3
EBITA	MEUR	190.9	102.9	-35.7	134.6	120.4
EBITA margin	%	8.7	5.2	-1.8	5.9	6.4
Capital expenditure	MEUR	21.1	28.1	26.0	36.4	22.5
Employees (as of end of period; without apprentices)	-	7,324	7,236	7,136	6,774	6,208

ANDRITZ METALS

ANDRITZ METALS is the technology and global market leader in metalforming via the Schuler Group, in which ANDRITZ has a stake of more than 95 percent. Schuler offers presses, automation solutions, dies, process know-how, and services for the entire metalworking industry. Its customers include car manufacturers and their suppliers, as well as companies in the forging, household appliances, packaging, energy, and electrical industries. Schuler is also the market leader in coin minting technology and offers system solutions for the aerospace and railway industries. In addition, ANDRITZ METALS is one of the leading global suppliers of complete lines for the production and processing of cold-rolled strip made of stainless steel, carbon steel, aluminum, and non-ferrous metal. The lines comprise equipment for cold rolling, heat treatment, surface finishing, strip coating and finishing, punching and deep drawing, and the regeneration of pickling acids. The business area also supplies turnkey furnace systems for the steel, copper, and aluminum industries, as well as welding systems for the metalworking industry.

The **metalforming sector** for the automotive and the automotive supplier industries (Schuler) showed a mixed development in 2015. While investment activity in Europe and North America remained at the same satisfactory level as in the previous year, many project decisions were postponed until further notice, particularly in China due to the decline of the local automotive market. In contrast, satisfactory investment activity was noted in all other metalforming areas, for example, in forging and minting technology. Project activity for equipment for the production and processing of stainless steel and carbon steel strips remained unchanged at a low level during the reporting period due to continuing overcapacities in the international steel/stainless steel industries and the weak demand as a result of the overall economic environment. Selective projects targeted modernization and improvement of energy efficiency at existing plants, while investments in new plants were still limited. Project and investment activity in the aluminum sector was below the favorable level of the previous year.

	Unit	2015	2014	2013	2012	2011
Order intake	MEUR	1,438.6	1,692.8	1,233.8	324.2	318.6
Order backlog (as of end of period)	MEUR	1,332.5	1,566.1	1,427.6	451.4	465.1
Sales	MEUR	1,718.1	1,550.4	1,311.0	404.7	372.7
EBITDA	MEUR	104.8	134.0	76.6	28.0	21.5
EBITDA margin	%	6.1	8.6	5.8	6.9	5.8
EBITA	MEUR	70.5	110.2	53.5	25.1	19.4
EBITA margin	%	4.1	7.1	4.1	6.2	5.2
Capital expenditure	MEUR	40.2	27.9	32.7	2.6	1.8
Employees (as of end of period; without apprentices)	-	6,160	6,432	6,300	1,129	945

The Schuler Group was consolidated into the consolidated financial statements of the ANDRITZ GROUP as of March 1, 2013 and is allocated to the METALS business area. No pro forma figures are available for the reference periods of the previous years.

ANDRITZ SEPARATION

ANDRITZ SEPARATION is one of the leading global suppliers of technologies and services in the solid/liquid separation sector, as well as for the production of animal feed and biomass pellets. The comprehensive product portfolio for solid/liquid separation comprises centrifuges, filters and drying plants, screens, thickeners, separators, and transportation systems. The industries served include municipal and industrial wastewater treatment, chemicals, food and beverages, as well as mining and minerals. The service sector focuses on plant modernization, spare and wear parts, and process optimization.

Investment and project activity in solid/liquid separation equipment continued to show a mixed development in the industries served by ANDRITZ during 2015. While demand in the municipal/industrial wastewater treatment sectors as well as in the food and chemical industries was satisfactory, investment activity in the mining industry continued to be very low. Project activity in the animal feed industry was solid, both for mill expansion projects and greenfield plants. Project and investment activity in the biomass pelleting sector continued to be good.

	Unit	2015	2014	2013	2012	2011
Order intake	MEUR	596.5	595.8	604.1	629.4	598.0
Order backlog (as of end of period)	MEUR	352.2	360.5	352.9	303.0	316.6
Sales	MEUR	628.0	587.3	589.7	653.2	565.5
EBITDA	MEUR	31.5	33.2	13.3	52.0	52.3
EBITDA margin	%	5.0	5.7	2.3	8.0	9.2
EBITA	MEUR	22.3	21.6	-0.6	44.9	44.0
EBITA margin	%	3.6	3.7	-0.1	6.9	7.8
Capital expenditure	MEUR	12.7	11.1	8.2	13.4	8.4
Employees (as of end of period; without apprentices)	-	2,794	2,846	2,832	2,493	2,312

1811 - 1868 MASCHINENFABRIK VON J. KÖRÖSI



FAQ

How old is ANDRITZ?

Our company is 163 years old. In 1852, a Hungarian named Josef Körösi started an iron foundry in Andritz, a small suburb of the city of Graz in southern Austria. This company grew into ANDRITZ. Initially, the production program consisted of major investment goods such as cranes, pumps, and water turbines. ANDRITZ was converted into a joint stock company in 1900.

Some of the companies that ANDRITZ acquired are, in fact, even older than ANDRITZ itself:

For example, Sundwig was established 327 years ago, Kufferath 234 years ago, and Schuler 177 years ago.

FAQ

How many companies comprise the ANDRITZ GROUP today?

There are a total of 200 companies represented at more than 250 locations in 46 countries. The 2015 ANDRITZ financial report contains a detailed overview of all these companies.

Josef Körösi



Four questions about the strategy of ANDRITZ

Why does ANDRITZ have a global presence?

Our strategic goal is to be the global market leader in the markets we serve. ANDRITZ wants to enhance its presence and competitive position as well as develop growth potential primarily in emerging markets in South America and Asia. We are focusing our four business areas on markets with long-term, sustainable growth potential. Within these markets, we concentrate on continuously growing segments such as supplying equipment for generating renewable energy from hydropower and producing tissue and packaging paper. Customers benefit from the global presence of ANDRITZ through our global expertise and local proximity. With this mixture of local and global proximity to customers, we can help them achieve their objectives for productivity, profitability, and sustainability. Due to its worldwide presence, the ANDRITZ GROUP profits from growth in the emerging economies, which will certainly be the main growth regions for ANDRITZ in the next few years.

How important are technology and cost leadership?

ANDRITZ is active in highly competitive markets. To secure our market position and take advantage of growth opportunities, we have to invest in both technology and cost leadership. To support organic growth, the ANDRITZ GROUP invests on average three percent of annual sales in research and development to be the preferred supplier in terms of technology and cost. We focus on developing customized technologies that boost productivity in customers' facilities, minimize operating costs, and maximize energy efficiency as well as environ-

mental protection. In addition, ANDRITZ is constantly looking for opportunities to improve internal cost structures through operational and organizational measures. These include the regional and logistical optimization of own manufacturing capacities, bundling procurement, and cost discipline both in operating units as well as Group-wide functions.

Why does ANDRITZ continue to acquire other companies?

Because we aim to be a full-service provider with total process expertise in all of our business areas, and we want to grow in the long term. We would like to achieve this goal by developing our own products as well as acquiring businesses with complementary technologies and products. This is the only way to satisfy our customers' needs as best possible in terms of technology optimization and project execution with clear responsibilities. Since the early 1990s, ANDRITZ has acquired about 70 companies to strengthen and complement its existing product and service portfolio.

What are the company's financial goals?

For many years, the ANDRITZ GROUP has been pursuing the strategy of long-term profitable growth. Organic growth, complementary acquisitions, and a solid balance sheet structure are crucial cornerstones for achieving our financial goals. Since the year 2000, we have increased our annual sales by 14 percent on average while also incrementally increasing profitability (EBITA margin). Our medium-term goal for the next years is to achieve a sustainable EBITA margin of seven to eight percent.

Executive Board and Supervisory Board

Executive Board

Wolfgang Leitner

President and CEO with responsibility for central Group functions. Joined ANDRITZ in 1987, President and CEO since 1994.

Humbert Köfler

Responsible for the PULP & PAPER (Service & Units) and SEPARATION business areas, as well as Group Procurement. Joined ANDRITZ in 1987, member of the Executive Board since 2007.

Joachim Schönbeck

Responsible for the PULP & PAPER (Capital Systems) and METALS business areas, as well as Group Quality and Safety Management. Joined ANDRITZ in 2014, member of the Executive Board since 2014.

Wolfgang Semper

Responsible for the HYDRO business area as well as Group Automation and Group Security. Joined ANDRITZ in 2006, member of the Executive Board since 2011.

Supervisory Board

Elected members

Christian Nowotny (Chairman of the Supervisory Board), Klaus Ritter (Deputy Chairman of the Supervisory Board), Ralf Dieter, Monika Kircher, Fritz Oberlerchner, and Kurt Stiassny

Members delegated by works council

Georg Auer, Isolde Findenig, and Andreas Martiner

The ANDRITZ Executive Board





How's business, Mr. Leitner?

Four questions for Wolfgang Leitner, President and CEO of ANDRITZ, about the previous business year, current developments in the company and its markets, as well as main goals for the future.



ANDRITZ achieved record sales in 2015. Profitability also developed favorably and increased compared to last year. Are you satisfied?

Overall, the 2015 business year went very well for ANDRITZ. In spite of significant economic downturn in most emerging markets and the ongoing slow economic growth in Europe, we were able to reach an order intake of around six billion euros, which is only slightly below the record level in 2014. Thus, ANDRITZ has a solid order backlog for 2016. With regard to profitability, we have already made good progress in the PULP & PAPER business area. We have also implemented steps to strengthen our competitiveness in the METALS business area at Schuler and in the other divisions. In the SEPARATION business area, business still has not developed to our full satisfaction, although we have made some headway, but have not yet achieved our sales and earnings goals in full. We have introduced a series of measures here, such as development of new products, which should have a positive impact in 2016.

After achieving excellent results in previous years, Schuler saw a declining order intake in 2015. How do you assess the development at Schuler?

We are very happy with the acquisition of Schuler. The company has a globally leading position in the field of metalforming, with very highly qualified employees and a high level of technology expertise. Due to weaker demand in the automotive sector, especially in China, order intake for 2015 remained well below the levels of the previous years. Our customers, who have significantly expanded capacities in recent years, have delayed projects for now due to the – compared to previous years – lower demand for cars in China. However, the Schuler restructuring program that we announced in the summer of 2015 and for which we booked a one-off expenditure of around 78 million euros in the previous year was not triggered by lower incoming orders. It is actually a continuation of previously implemented measures to better realign the company to meet market demands and create synergies from the acquisition of Müller Weingarten in 2007. In connection with the purchase of Müller Weingarten, Schuler did launch a strategy program at the beginning of 2011 to focus on streamlining the company's organization and eliminating duplicate efforts. In addition, the Schuler business has shifted toward Asia and the product mix has changed significantly. We have already successfully developed new market segments, including systems for producing large-diameter pipes and railway wheels for high-speed trains. We are a system supplier for these products and are purchasing system components. This reduces the share of our own production and thus our capacity needs.

How has the slowdown of economic growth in China impacted the ANDRITZ GROUP? After all, the company has significantly expanded its presence in China in recent years.

China is currently undergoing a structural transition from an industrial society supported by comprehensive government investment programs to a consumer- and service-oriented society. These days, the focus is on the quality of growth rather than just quantity. Therefore, we can assume that economic growth in China will stabilize at a lower level over the long term. Nevertheless, this level will still likely be higher than in Europe or the USA. Our sales coming from China average around 15 percent, which is currently around 900 million euros. Although the effects of the current slowdown in China's economic growth are impacting us, they are certainly manageable. Over the long term, I am still convinced that China will remain a strong driver of global economic growth. The middle class is growing significantly every year and has income available to purchase goods aside from objects of everyday use. And the market penetration with goods like cars and household appliances is still quite low. Moreover, China plans to increase its investment in environmental protection to both stabilize the economy as well as meet its population's needs for a better quality of life. Therefore, the long-term sales potential for investment goods such as those provided by the ANDRITZ GROUP is high. So we remain optimistic for China and will continue to expand our presence there.

What are your expectations for 2016 and what goals has ANDRITZ set for itself?

I think that the global economy will move sideways compared to 2015, with corresponding risks, but also opportunities. Like many other companies, the ANDRITZ GROUP will have to adapt to the fact that emerging markets are now consistently experiencing lower growth rates than in the past, international competition will remain high, and project visibility will be shorter than before. Therefore, we will continue implementing our cost reduction measures that enable us to handle potential fluctuations in order intake with greater flexibility and further improve our profitability and competitiveness. We want to open up new sales opportunities with plans to strengthen our service business. In addition to cost optimizations that include shifting more production capacities and a greater percentage of procurement to emerging markets, we are focusing on developing new products. Successful research and development is a fundamental prerequisite here, and we are both prepared and in a position to allocate the funds for this purpose. In addition, acquisitions for complementing, strengthening, and expanding our product portfolio will continue to play a role in our growth strategy.

The 2015 business year

Sales

Sales of the ANDRITZ GROUP amounted to 6,377.2 million euros (MEUR) in the 2015 business year, thus up by 8.8% compared to the previous year (2014: 5,859.3 MEUR). All four business areas noted an increase in sales:

	Unit	2015	2014	+/-
HYDRO	MEUR	1,834.8	1,752.3	+4.7%
PULP & PAPER	MEUR	2,196.3	1,969.3	+11.5%
METALS	MEUR	1,718.1	1,550.4	+10.8%
SEPARATION	MEUR	628.0	587.3	+6.9%

Order intake and order backlog

The order intake of the Group amounted to 6,017.7 MEUR, thus almost reaching the record level of the previous year (-1.4% versus 2014: 6,101.0 MEUR). The business areas' development in detail:

- **HYDRO:** Considering the unchanged difficult market conditions, the order intake, at 1,718.7 MEUR, reached a satisfactory level slightly below the previous year's reference figure (-5.4% versus 2014: 1,816.7 MEUR). In this context, it should be noted that the large order for supply of the electromechanical equipment for the tidal lagoon hydropower project in Wales received in the first quarter of 2015 (order value: approximately 250 MEUR) has not yet been booked in the order intake. From today's perspective, this order is not expected to enter into force before the end of the first half of 2016.
- **PULP & PAPER:** The order intake developed very satisfactorily, increasing substantially to 2,263.9 MEUR (+13.4% versus 2014: 1,995.7 MEUR). This increase is mainly attributable to the receipt of the order from Fibria for supply of equipment for the new Horizonte 2 pulp mill, Brazil. The order value of comparable projects is around 600 MEUR.
- **METALS:** The order intake amounted to 1,438.6 MEUR and was thus considerably below the high level of the previous year (-15.0% versus 2014: 1,692.8 MEUR). This decline is mainly due to the postponement of metal forming projects for the automotive and automotive supplier industries (Schuler market segment).
- **SEPARATION:** At 596.5 MEUR, the order intake remained practically on the same level as in the previous year (+0.1% versus 2014: 595.8 MEUR).

The order backlog of the ANDRITZ GROUP amounted to 7,324.2 MEUR (-2.5% versus December 31, 2014: 7,510.6 MEUR).

Earnings

The earnings development was marked by the extraordinary expenditure in connection with the measures to optimize the Schuler value chain. To adjust Schuler's manufacturing capacities to the product mix and business volume, an amount of 78 MEUR was considered in the consolidated income statement, which was partly offset by project-related extraordinary effects of some 40 MEUR in the PULP & PAPER business area. The EBITA amounted to 429.0 MEUR (+13.0% versus 2014: 379.5 MEUR) and the EBITA margin increased to 6.7% (2014: 6.5%). Without the extraordinary effects booked in the reporting period, the Group's EBITA would have been 467.0 MEUR and the EBITA margin 7.3%. Profitability of the business areas developed as follows:

- The EBITA margin of the HYDRO business area decreased slightly compared to the previous year, from 8.3% to 7.9%, thus again reaching a favorable level.
- As a result of the extraordinary effects mentioned above, the EBITA margin of the PULP & PAPER business area increased significantly, reaching 8.7% (2014: 5.2%). Even without this one-off effect, the EBITA margin reached a very favorable level (6.9%).
- In the METALS business area, the EBITA margin decreased to 4.1% (2014: 7.1%) as a result of the financial provisions made to optimize the value chain at Schuler. Without these provisions for restructuring, the EBITA margin reached the very favorable level of 8.6%.
- In the SEPARATION business area, the EBITA margin, at 3.6%, remained unsatisfactory (2014: 3.7%).

The net income of the Group amounted to 270.4 MEUR (+28.8% versus 2014: 210.0 MEUR).

Net worth position and capital structure as of end of 2015

Total assets amounted to 5,778.0 MEUR (December 31, 2014: 5,995.2 MEUR). The equity ratio reached 21.0% (December 31, 2014: 17.3%). Liquid funds amounted to 1,449.4 MEUR (December 31, 2014: 1,701.6 MEUR) and net liquidity to 984.0 MEUR (December 31, 2014: 1,065.1 MEUR).

The ANDRITZ financial report 2015

The financial report offers further data, facts, and figures on the 2015 business year, including management report, outlook, risk management, corporate risks, research and development, corporate governance, the Supervisory Board report and the ANDRITZ GROUP's consolidated financial statements. The financial report is available for download at www.andritz.com or can be requested as printed copies free of charge by sending an e-mail to investors@andritz.com.

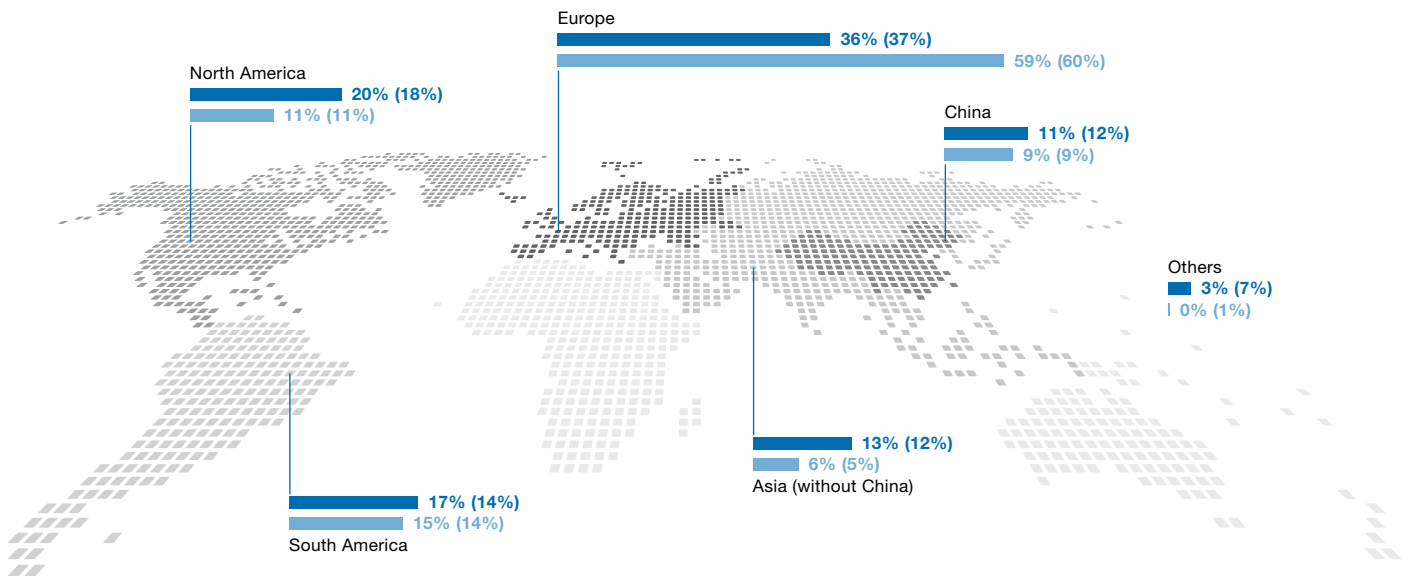


Order intake by region 2015 (2014)

Order intake amounted to 6,017.7 million euros in 2015 (2014: 6,101.0 million euros)

Employees by region as of end of 2015 (2014)

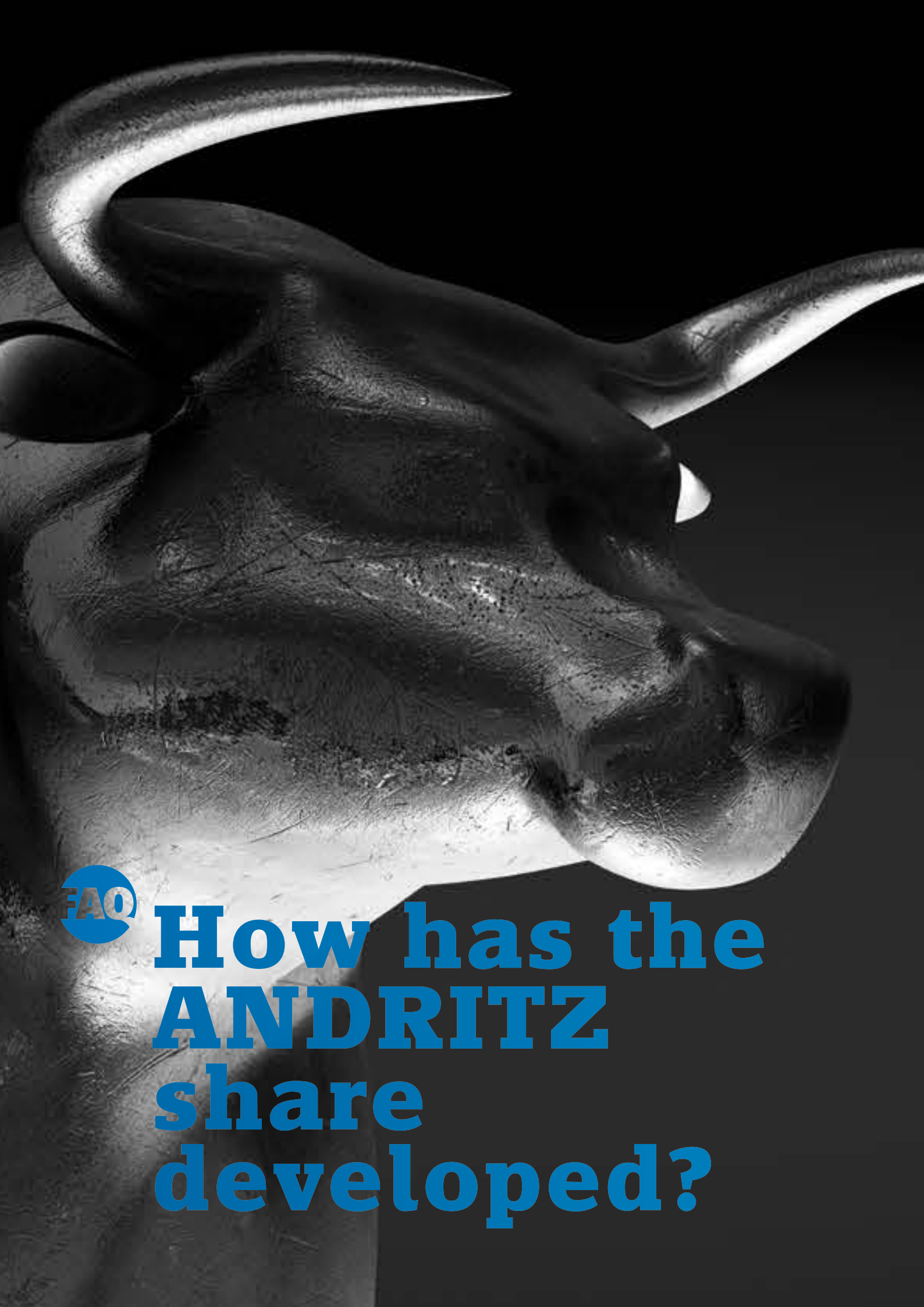
ANDRITZ had a staff of 24,508 employees in 2015 (2014: 24,853 employees)



Important acquisition

Schuler AG, a member of ANDRITZ, signed a contract for the acquisition of a 51 percent stake in the Chinese press and machine tool manufacturer Yangzhou Metal Forming Machine Tool Co., Ltd. (Yadon) during the reporting period. Yadon is one of the leading manufacturers of mechanical presses in China and has annual sales of approximately 120 million euros. The acquisition was approved by antitrust authorities; closing of the acquisition is expected at the end of the first quarter of 2016. Yadon is based in Yangzhou, Jiangsu Province, around 300 kilometers north of Shanghai, and has a staff of approximately 1,000 employees at three locations in China. The main customer segments served by Yadon include household appliances, metal working, and the automotive supplying industries. The investment in Yadon extends Schuler's product portfolio in the middle and lower price segments and provides access to a customer base not yet served in China, the largest market in the world for presses.





**How has the
ANDRITZ
share
developed?**



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

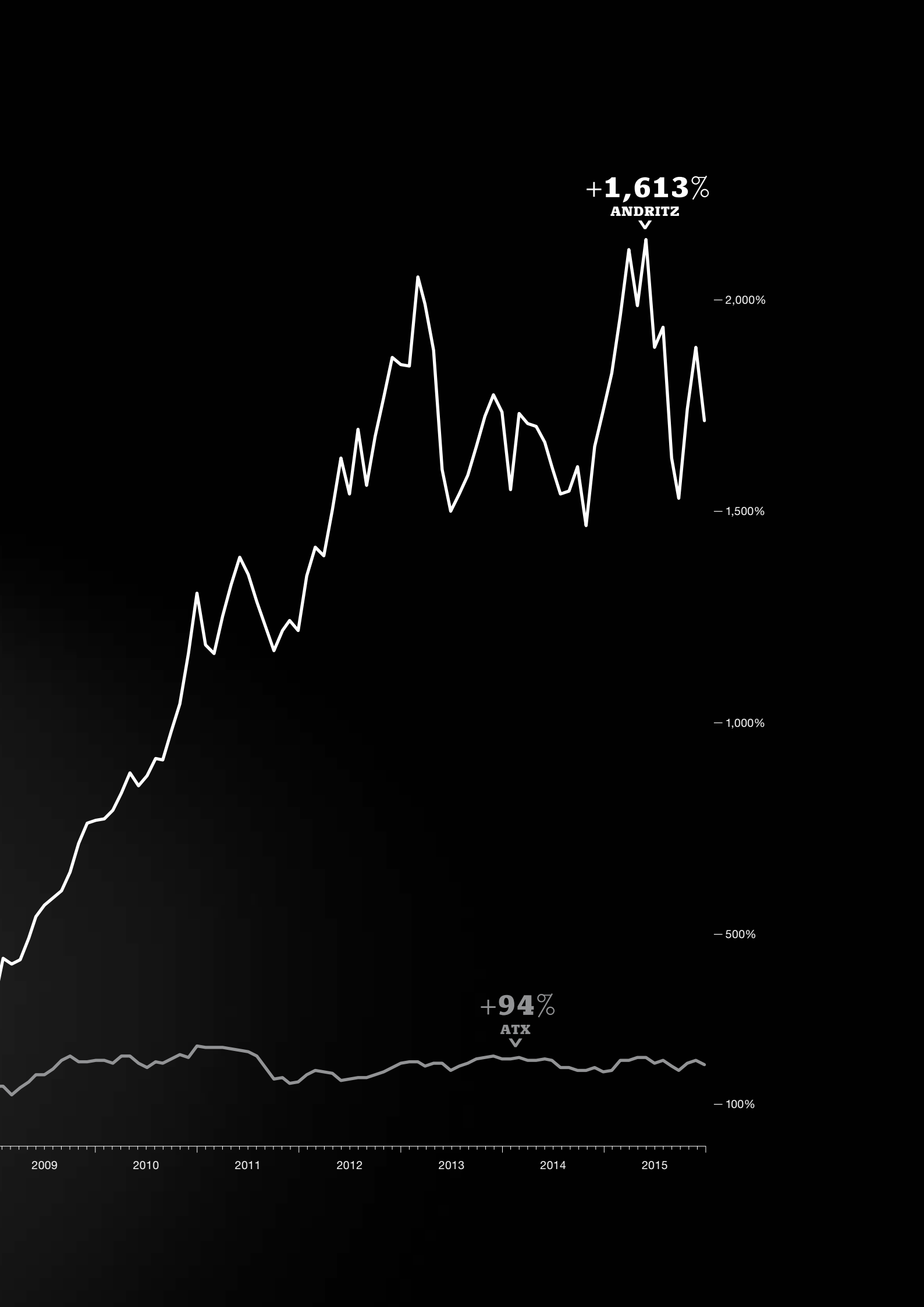
Share price at IPO:
2.63 euros

Closing price at year end 2015:
45.05 euros

Performance since the IPO (June 2001 to end of 2015):
ANDRITZ: +1,613%
ATX: +94%

Performance 2015:
ANDRITZ: -2.1%
ATX: +9.4%





+1,613%
ANDRITZ
▼

+94%
ATX
▼

—2,000%

—1,500%

—1,000%

—500%

—100%

2009

2010

2011

2012

2013

2014

2015

The economic downturn in emerging countries impacts the stock markets

Development in the international financial markets was impacted by growing uncertainty with regard to the economic downturn in emerging markets in South America and Asia in 2015. In particular, stocks from companies that generate a high percentage of their sales in China, especially in the Chinese automotive industry, came under pressure. In this economic environment, the ANDRITZ share price decreased by 2.1 percent in 2015. The ATX, the leading share index on the Vienna Stock Exchange, rose slightly by 9.4 percent. The highest closing price for ANDRITZ shares in 2015 was 57.49 euros (April 13, 2015), while the lowest was 38.14 euros (September 24, 2015).

FAQ

How many ANDRITZ employees hold stock in the company?

An estimated 800 to 1,000 employees are ANDRITZ shareholders. They hold one to two percent of the capital stock.

Transparent communication policy

Since its initial public offering in 2001, the ANDRITZ GROUP has focused its Investor Relations activities on continuous, transparent communication with institutional and private shareholders. In 2015, meetings were held with international institutional investors and financial

analysts in Amsterdam, Berlin, Boston, Brussels, Chicago, Denver, Frankfurt am Main, Geneva, Hong Kong, Innsbruck, London, Los Angeles, Melbourne, Milan, Montreal, Munich, New York, Paris, San Francisco, Singapore, Stegersbach, Sydney, Tokyo, Toronto, Vienna, Warsaw, Zurich, and Zürs. ANDRITZ gave presentations to private investors at various roadshows and financial conferences throughout Austria. At the 2015 Capital Market Day attended by 20 national and international financial analysts, the Executive Board provided information on current developments and expectations for the ANDRITZ GROUP's business areas and goals over the medium to long term.

For the sixth year in a row, the ANDRITZ annual report received an award at the world's premier and largest annual report competition, the ARC Awards in New York, which evaluates 2,000 annual reports from 35 countries. The 2014 ANDRITZ annual report received two awards at this competition – inter alia a gold award for its overall concept.

Broad coverage

The following 14 international banks and investment houses currently publish regular analysis reports on ANDRITZ: Baader Bank, Berenberg Bank, Citigroup, Commerzbank, Deutsche Bank, Erste Bank, Hauck & Aufhäuser, HSBC Trinkaus, J.P. Morgan, Kepler Cheuvreux, Raiffeisen Centrobank, Société Générale, UBS, and Warburg Research.

Key figures of the ANDRITZ share	Unit	2015	2014	2013	2012	2011
Earnings per share	EUR	2.60	2.04	0.64	2.35	2.25
Dividend per share	EUR	1.35 ¹⁾	1.00	0.50	1.20	1.10
Payout ratio	%	51.9	49.0	78.1	51.1	49.0
Equity attributable to shareholders per share	EUR	11.63	9.86	8.70	9.76	8.75
Highest closing price	EUR	57.49	47.58	54.94	50.00	37.75
Lowest closing price	EUR	38.14	37.00	37.93	32.83	27.41
Closing price at end of year	EUR	45.05	45.69	45.59	48.54	32.05
Market capitalization (as of end of period)	MEUR	4,685.2	4,751.8	4,741.4	5,048.2	3,333.2
Performance	%	-2.1	0.0	-9.4	+47.9	-7.6
ATX weighting (as of end of period)	%	9.5854	11.6479	9.5082	10.6128	9.2705
Average daily number of shares traded ²⁾	Share unit	355,821	305,027	316,787	345,754	568,138

Source: Vienna Stock Exchange 1) Proposal to the Annual General Meeting 2) Double count, as published by the Vienna Stock Exchange

Basic data of 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	< 70%
Stock exchange	Vienna (Prime Market)
Ticker symbols	Reuters: ANDR.VI; Bloomberg: ANDR, AV
Stock exchange indices	ATX, ATX five, ATX Global Players, ATX Prime, WBI



Three questions for Stefan Schantl, ANDRITZ Investor Relations

How has the ANDRITZ share developed since its initial public offering?

At the initial public offering in June 2001, the ANDRITZ share price amounted to 2.63 euros. By the end of 2015, the price had risen by 1,612.9 percent to reach 45.05 euros. For a comparison: The Vienna Stock Exchange's leading share index, the ATX, grew by 93.8 percent over the same period. ANDRITZ's market capitalization amounted to 274 million euros at its initial public offering and reached 4.7 billion euros by the end of 2015.

How much has been paid out in dividends to shareholders since the initial public offering?

In the 15 years since going public in 2001, the company has paid out a total of 7.25 euros per share in dividends. Coupled with positive market trends, this has yielded a very positive overall performance for ANDRITZ shareholders. The company will continue to pursue a dividend policy oriented toward continuity. Depending on business development, ANDRITZ aims to pay out around 50 percent of earnings per share for the respective business year to shareholders and to increase this payout ratio incrementally over the next few years to approximately 60 percent.

Who owns ANDRITZ?

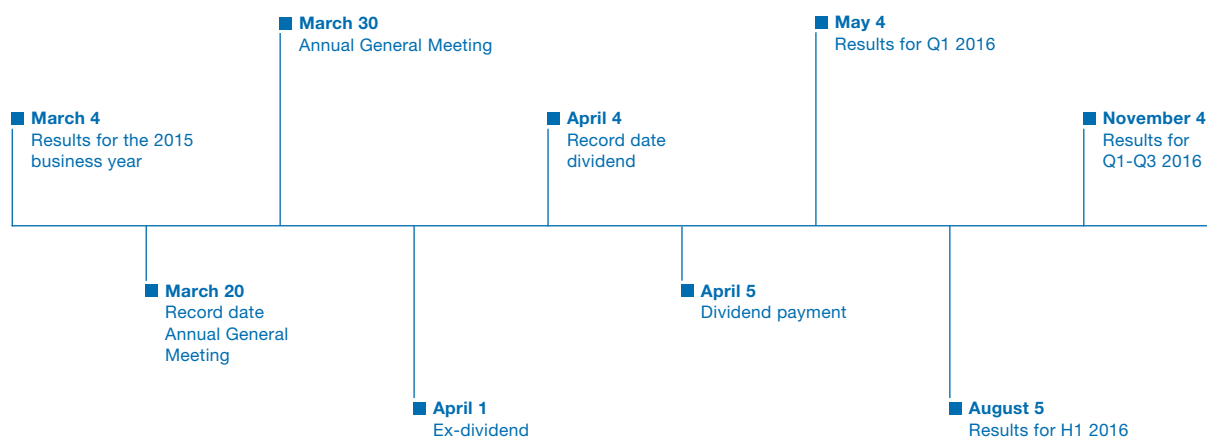
ANDRITZ has a very stable and well-balanced long-term shareholder structure. With a free float of just under 70 percent, national and international institutional investors and private investors comprise the majority of shareholders. These include FMR LLC (Fidelity Management & Research, a Boston, Massachusetts-based investment company founded in 1946), holding 6.7 percent, and The Capital Group Companies, Inc. (an investment firm founded in 1931 with headquarters

in Los Angeles, California), holding 3.96 percent. The majority of institutional investors is from the UK, USA, Austria, and Germany, while most private investors are from Austria and Germany. Custos Vermögensverwaltungs GmbH owns 25 percent plus one share, while Cerberus Vermögensverwaltung GmbH holds 0.77 percent. Some of the shares in these companies are held directly and some indirectly by the Custos Privatstiftung and by Wolfgang Leitner, CEO of ANDRITZ AG, respectively. Certus Beteiligungs-GmbH, whose shares are owned indirectly by the Manile Privatstiftung, holds 5.721 percent.

Stefan Schantl: "ANDRITZ has a very stable and well-balanced long-term shareholder structure."



Financial calendar 2016







Don't the Europeans want us to live as well as they do?

Thailand, Vietnam, Cambodia, and Laos are developing fast. The demand for electricity is rapidly increasing. A large hydroelectric power plant is being built on the Mekong River in Laos. It will provide power for the so-called tiger economies of Southeast Asia. This report takes a closer look at the lives of those affected and at the true impact of the project, which has been criticized by some European non-governmental organizations.

Keam, who lives in the small village of Ban Talan in the north of Laos, just finished feeding her pigs. Now, the 48-year-old woman sits on the terrace in the late afternoon sun and takes a short break before going back to the kitchen to cook rice for dinner. Even though it is not directly by the river, her house is built on stilts, and its brand-new teak planks are glistening in the sun. A good house is made of teak. Everyone here knows that.

"Actually," says Keam, "everything here is better now than it was before." Only the river is a little further away since she and the other local inhabitants moved. And it seems to her that this teak has not been stored quite as long as the teak used for her old house down by the river. Down by the river – that's where the reservoir for the new Xayaburi hydroelectric power plant on the Mekong will be situated. The reservoir will be 80 kilometers long, extending as far as the old royal city of Luang Prabang.

It directly affects 15 villages with exactly 664 houses and 2,980 people. All of them were resettled over the past few years.

Men and women from the government had gone to the villages, and month-long discussions were held with the inhabitants until all of them were happy with the results. After that, engineers and officials took detailed photographs of the old houses down by the river. A few months later, the new houses were built, further up on the slope. That's why the new houses sit on stilts, even though these weren't really necessary. But that's what the villagers wanted. They also want to continue raising



The 48-year-old Keam is affected by resettlements for the Xayaburi hydropower station. She says: "I am satisfied. Life has gotten better. Now we have a road, electricity, running water, sewage systems, a new school, and new jobs."

pigs. They just don't want to fish anymore: The river is too far away and, in the past few years, there were fewer and fewer fish anyway. Now, they are taking courses in frog and mushroom farming. That could become a new economic mainstay for the region. In the meantime, Keam's husband has found a job as a bus driver, which gives them a fixed income. "Fishing and frog or mushroom farming might not even be necessary to survive," says Keam. Recently, a paved road to Ban Talan was built. It goes past the new school, the new temple, and the new medical clinic. Keam's husband regularly drives along this road. Previously, no car could pass when it rained. You had to go on foot.

A few houses down the road, the mayor of Ban Talan is sitting on a terrace together with three people in uniform. Here, too, everything is made of teak. The men and women are from the government. They are monitoring the resettlement process and making sure everything is done properly. Today, they are here to verify survey results regarding the family income of the 58 resettled households in Ban

Talan. They do this every few months now. The results are satisfactory: 99 percent of the households now have more money than they did before. It is the same in all the other areas that have been affected by the resettlement.

Keam says: "I am satisfied." Her life has gotten better. Now, they have a road, electricity, running water, sewage systems, a new school, and new jobs. She is surprised when she hears that far away in Europe, and even in Bangkok, people are protesting against the power plant: "Don't the Europeans want us to live as well as they do?" she asks.

The responsibility for constructing the new hydroelectric power plant lies with the Xayaburi Power Company, which is owned primarily by the Thai construction group CH. Karnchang as well as by Thai and Laotian energy suppliers. The Xayaburi Power Company will operate the new power plant until 2048. Then the plant will be handed over to the Lao government. All of the electromechanical equipment, which includes seven Kaplan turbines with a capacity of 175 megawatts each and one unit of 60 megawatts for the domestic market as well as all the generators, is being supplied by ANDRITZ HYDRO. After the planned commission date of 2019, the power plant will have an estimated annual output of 7,400 gigawatt hours (about the capacity of an average European nuclear power plant) and will thus provide electricity for around one million homes. Most of the electricity will be delivered to Thailand, whose economy is booming. That will finance Laos' national budget. A smaller amount of electricity will remain in the country.

There are many more projects in the development pipeline, especially in Laos and Cambodia. The Xayaburi project has already set a benchmark for these future projects and will be regarded as a precedent in terms of world-class engineering and social and environmental responsibility.

After all, the Mekong has a hydropower potential of 50,000 megawatts – about as much as 50 medium-sized nuclear power plants could produce. So far, only ten percent of its potential has been tapped.

The region is rapidly developing. The demand for electricity is rising every year. Within the next 20 years, it will at least double. The inhabitants take part in this development. Their income is rising, and they, too, want to have access to amenities that are considered minimum standards in the industrialized world: running water, sewage systems, and electricity at home.

There are many reasons for using hydropower to generate electricity. You cannot rely on sun and wind at all times of the day, but the Mekong River has never run dry. It continually delivers enough energy to drive the turbines. In addition, hydropower is renewable and environmentally friendly – it does not require coal, gas, oil, or splitting atoms, and, above all, it does not create any CO₂ emissions, thus helping to reduce worldwide CO₂ emissions and tackle climate change. The water leaves the plant just as clean as it was on entering.

German project manager Dr. Michael Raeder works for the Xayaburi Power Company. From his office on the nine-

teenth floor of the Viriyathavorn Building, he has a good view of the Bangkok skyline. There is a small Buddhist altar in the hallway. "I gave up my old job for this project," he says. "I'm really fascinated by the careful and prudent planning that went into this project, and I am convinced that we are treating the people and the environment with absolute fairness." The critical questions asked regarding large hydropower projects are always similar:

1. *How many people have to be resettled, and is this resettlement socially acceptable?*
2. *How do you ensure that the river's water quantity is not adversely affected?*
3. *How do you ensure that sediment will still be transported downstream?*
4. *How do you ensure that both upstream and downstream fish migration is not impaired?*

Long before the first sod was cut for the Xayaburi Dam, these issues were researched and reviewed extensively.

The Mekong River Commission, an intergovernmental organization, discussed the impact of the project on Laos, Cambodia, Thailand, and Vietnam – the concerns were taken into account when the project was implemented. Experts submitted opinions and second opinions; environmental organizations came onto the scene; governments pushed for perfection – including product quality and regulations governing compliance and sustainability for suppliers such as ANDRITZ HYDRO. Enormous pressure was put on all parties involved to solve the challenges in the best possible way. Michael Raeder summarizes the results as follows:

1. *Resettlement:* The resettlement is constantly monitored and supervised by international sociologists and experts. Those involved are part of the process; there are new jobs and educational opportunities. The infrastructure was improved, for example, with new houses, roads, and hospitals. All in all, the standard of living increased signifi-

If you speak to the people in Laos and tell them that there are environmental organizations in Europe that are opposed to the new hydropower station, you will usually encounter incomprehension. Time and again, we are asked: "Don't the Europeans want us to live as well as they do?"



cantly. “The results have been thoroughly positive,” says Raeder. “All those affected are better off than before.”

2. *Water quantity:* The Mekong originates in the Tibetan Himalayas, flows through uninhabited mountainous areas in China, and then through Myanmar, Laos, Thailand, and Cambodia, before entering the intricate and fruitful Mekong Delta in Vietnam. Around 60 million people make their lives and livelihoods alongside and from the river. During the wet season, fish spawn in the flooded riverbanks. They multiply so furiously that, at the beginning of the dry season, when the Mekong River retracts from the flood plains, millions of fish can be caught and dried: food supply for the entire year. The Xayaburi hydroelectric power plant will not change that because it is a so-called run-of-the-river power plant: Exactly the same amount of water leaves the plant that enters the reservoir

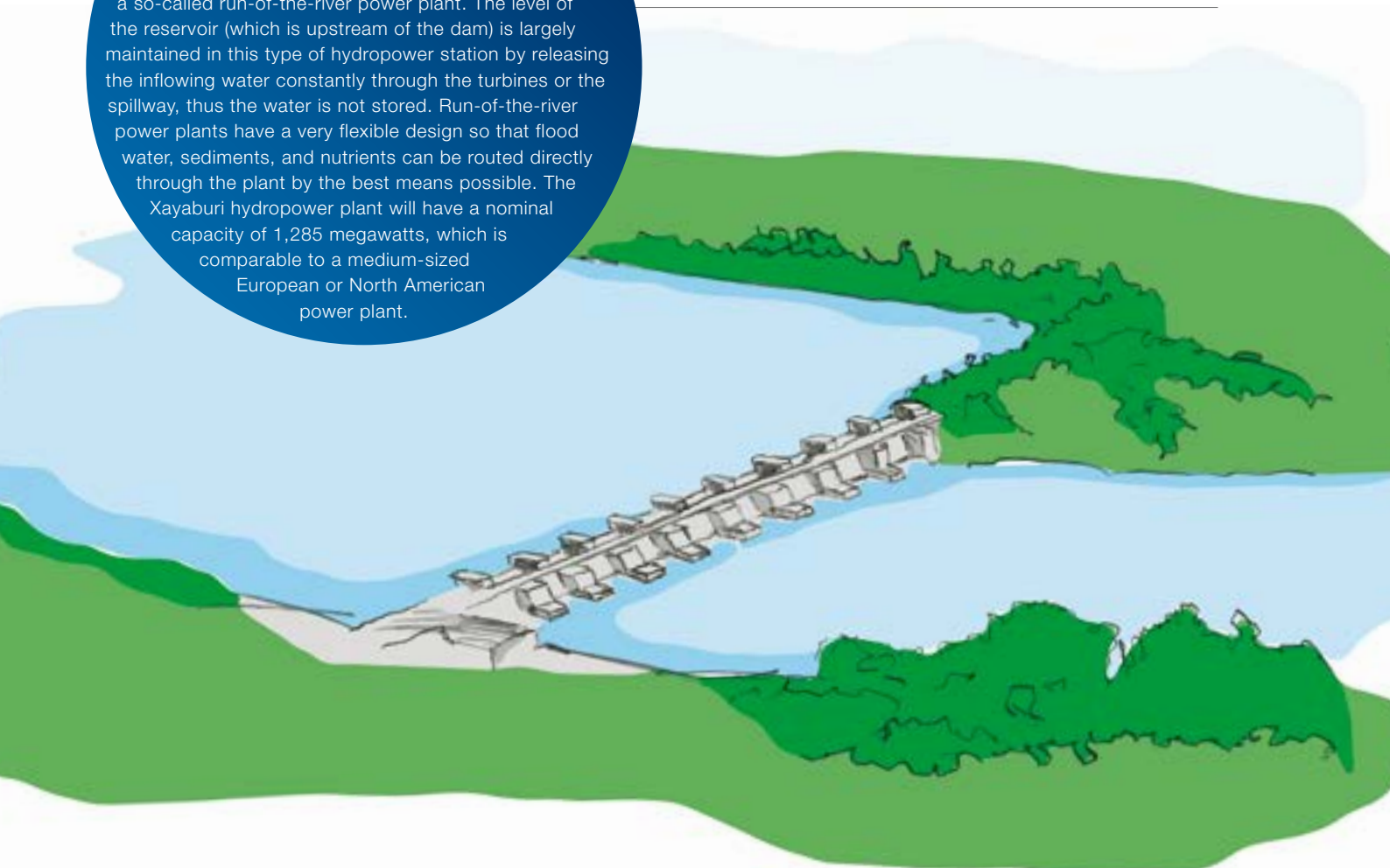
further upstream. No water is held back and the complete flow is passed through the projects, either through the turbines or, in case of high flows, additionally across the spillway. Unlike storage power plants, the reservoir of a run-of-the-river plant has virtually no storage capacity and therefore the Xayaburi project cannot alter the flow regime of the Mekong River. At the very beginning, during initial impounding, the reservoir has to be filled in order to ensure that the water has a certain drop height (or “head”) when it flows to the turbines. Filling it would take the Mekong only about two days. “Then, theoretically, the lake would be full,” says Michael Raeder. “But we will do it over several months, and at the lower reaches, it won’t be noticeable at all. The fear that this project might dry out the Mekong Delta is just not true. We won’t be holding back a single drop of water.”

3. *Sediments:* There are concerns that the flow velocity at the upper reaches of the river might decrease because of the power plant. As a result, sediments (i.e. deposits) would sink to the ground and wouldn’t reach the lower reaches anymore; the Mekong Delta would lose its steady supply and could no longer compensate for the soil that is lost through erosion. However, extensive studies by inter-

FAQ

What is a run-of-the-river power plant?

The Mekong Xayaburi hydropower plant in Laos is a so-called run-of-the-river power plant. The level of the reservoir (which is upstream of the dam) is largely maintained in this type of hydropower station by releasing the inflowing water constantly through the turbines or the spillway, thus the water is not stored. Run-of-the-river power plants have a very flexible design so that flood water, sediments, and nutrients can be routed directly through the plant by the best means possible. The Xayaburi hydropower plant will have a nominal capacity of 1,285 megawatts, which is comparable to a medium-sized European or North American power plant.



national experts show that 97 percent of all sediments that reach the hydropower plant will already be dissolved in the water. That is why the waters of the Mekong are usually brown. This suspension will flow through the power plant unhindered. Only three percent of the sediment will sink to the ground before the water enters the hydropower plant. None of the sediment inflow into the Mekong downstream of Xayaburi, i.e., for the longest stretch of the river up to the Mekong Delta in Vietnam, will be impacted. Large amounts of money have been invested in this project in order to further improve the already high water quality and large so-called low-level outlet gates have been implemented. These gates can be used for sediment management. This process of sediment routing will be done especially in the rainy season, when the Mekong swells and carries the most amount of sediment downstream. Not all of it, however, will make it there. South of Xayaburi, there are hundreds of cement factories and other companies that mine sand and gravel directly from the Mekong.

4. Fish migration: The Mekong is one of the most species-rich bodies of water in the world. Nowhere else can you find the largest freshwater fish in the world: a giant catfish that can grow up to three meters long and weighs up to 300 kilograms. In the Xayaburi area, about 300 different fish species are presumed to exist, out of which about 120 could be confirmed during the investigations conducted by the Xayaburi Power Company. Scientists studied the fish migration at Xayaburi in great detail. The result? ANDRITZ HYDRO will install so-called fish-friendly turbines. Their special design reduces the pressure differences within the water flow to a minimum as the water passes over the runner blades. When fish die, it is not so much because of the turbines themselves but because the fishes' swim bladders can burst when the pressure changes too fast. When it comes to downstream migration, we are looking primarily at fish larvae, which are not affected by these processes. Larger fish are kept away from the turbines by a 150-millimeter screen and instead are redirected to safe water slides, which they zip down unharmed. Helping the fish migrate upstream is more difficult.

In order to study the issue, the Xayaburi Power Company constructed a special testing facility on the site to determine the actual swimming abilities of the fish in the Mekong. It bought catches of live fish from the fishermen along the river. Forty-two fish species were found, and 2,000 fish were tested via radio-frequency identification (RFID) technology. The fish were equipped with RFID transmitters and monitored as they made their way through the flow channels of the testing facility. The results were surprising: The water in the originally planned fish ladder moved too fast for them. All around the world, fish ladders are designed for salmon and trout, which need a flow rate of 2.5 meters per second. But it turns out that Mekong fish prefer a more leisurely pace. Most favorable for them are flow rates of 0.7 to 1.2 meters per second. Thus, the fish ladders had to be redesigned, and the overall slope had to be reduced from 5.0 to only 1.2 percent.

This led to a new problem: To accommodate a smaller slope angle, the ramp had to be longer – too long.

Tests showed that Mekong fish run out of steam after 800 meters, at which point they simply turn around. Why go through so much trouble if they could just spawn where they are? Therefore, the project operator limited the length of the fish ladder to 480 meters and, to overcome the remaining height difference, installed a lock system, the biggest of its kind worldwide. Like before, the Mekong fish swim into the fish ladder. But long before fatigue sets in, they have already entered the collection area at the base of the fish locks. Underwater cameras are used to determine when enough fish have accumulated and the journey upwards can start, just like in a ship lock. At the



Tum Isomboon is the mayor of Ban Talan, one of the resettled areas. Together with government representatives, he has just checked the results of a survey on family income in the 58 households in Ban Talan that have been resettled. This monitoring process is conducted every few months. The result is satisfactory: "99 percent of all households now have more money than they did before – the same as in all the other areas that have been affected by the resettlement."

top, an artificial flow attracts the passengers upstream. The fish locks have been designed with redundancy in mind, in case one of them should fail. Altogether, the fish migration system has a price tag of over 250 million euros, or about one-tenth of the total construction costs of the entire power plant.

Michael Raeder is satisfied with the project: "We believe that, thanks to extensive research and involvement of all the stakeholders, we were able to achieve excellent results in almost all matters." That is important because Xayaburi, too, must prove that hydropower is one of the most sustainable and environmentally friendly energy sources on earth. Only when that is understood will Southeast Asia be able to meet its huge demand for electricity without resorting to nuclear power or fossil fuels, and only then will Southeast Asia be well prepared for the future.

For Keam and her family, this future has already begun. ■





FAQ

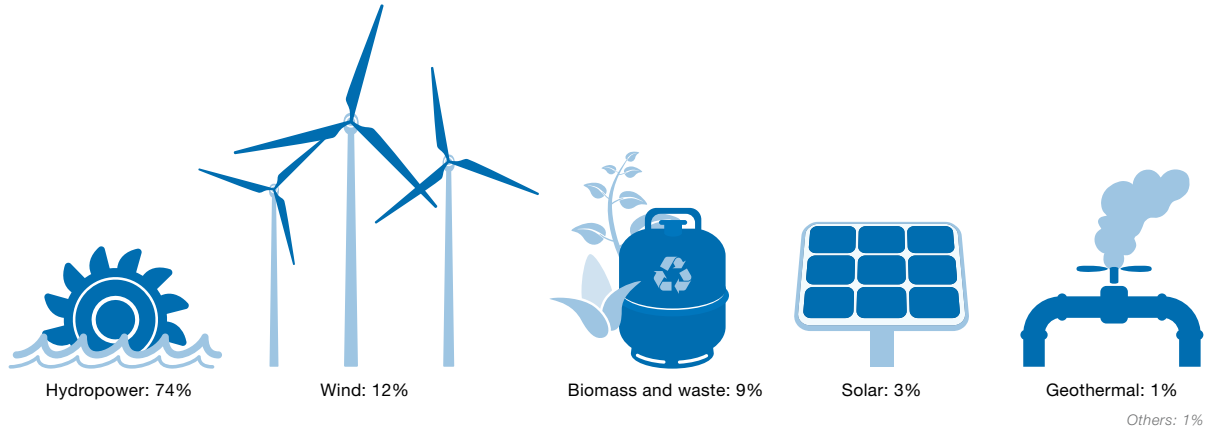
What is the hydropower potential of the Mekong?

With a length of just under 5,000 kilometers, the Mekong is among the top ten of the world's longest rivers. It is the longest river in Southeast Asia, spanning China, Myanmar, Laos, Thailand, Cambodia, and Vietnam, and has a gradient of around 5,000 meters. The technically feasible hydropower potential amounts to 50,000 megawatts of energy, only 5,000 megawatts of which are being used so far. Seven hydropower stations are already operating, three are under construction, and nine are in the planning.

The International Energy Agency expects the energy demand in Southeast Asia to increase by up to 80 percent in the next 20 years.

Facts and figures about hydropower

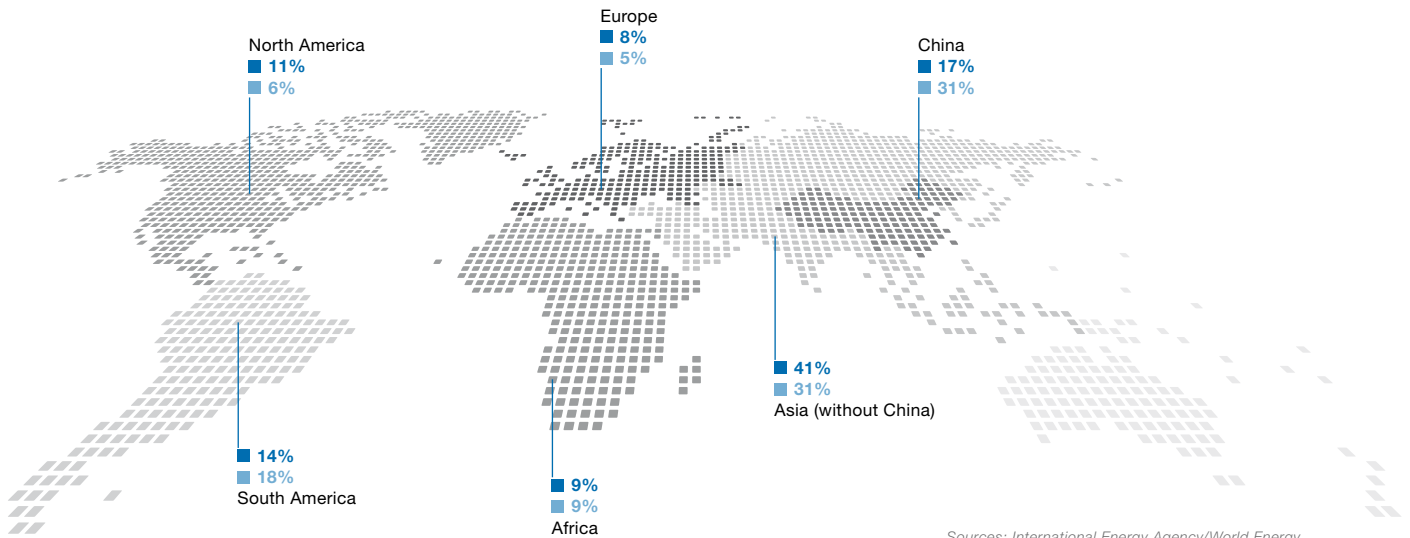
- Hydropower meets 16 percent of the world’s electricity needs.
- Twenty-two percent of the world’s electricity production comes from renewable energy sources. Among the renewable energy sources, hydropower plays by far the most important role, accounting for 74 percent of electricity generated:



- To date, only about 25 to 30 percent of global hydropower resources have been developed, and the remaining 70 to 75 percent are located mainly in areas where the power demand will grow strongly in order keep up with the social and economic development of these areas.
- The current global installed capacity for hydropower amounts to 1,137 gigawatts. Installed capacity is expected to grow by an annual average of 3.6 percent through 2025.
- The global potential of hydropower is estimated at a total of 4,500 gigawatts, considering the specific regional factors in regard to technical feasibility. 161 gigawatts are under construction, mainly in Asia (China) and South America:

■ Technical potential of hydropower by region

■ Hydropower capacity under construction by region



Sources: International Energy Agency/World Energy Outlook 2015 and Hydropower & Dams World Atlas 2015



Four questions for Alexander Schwab, Director Market Management, ANDRITZ HYDRO

What are the benefits of using hydropower to generate energy?

Most of the world's countries have developed concepts to help them reach climate targets in the medium- and long term. An important part of that is switching from fossil fuels to renewable resources to generate energy. However, both wind and sun are volatile energy sources and cannot guarantee a constant power supply by themselves. That leaves hydropower as the only renewable, environmentally friendly, and reliable source of energy that can also provide storage for large amounts of energy and stabilize the network. Hydropower is therefore essential to generate clean energy for the future.

Is it possible to build hydropower plants sustainably and responsibly?

Before ANDRITZ decides to pursue a project, we make sure that all relevant environmental and social issues have been addressed and that appropriate steps are being taken. When it comes to the projects we are involved in, the answer therefore is, yes, it is possible to build hydropower plants both sustainably and responsibly. The Xayaburi project in Laos is a good example of that. We are constantly advancing new technologies and setting new research priorities for solutions that are environmentally



Alexander Schwab: "Before ANDRITZ decides to pursue a project, we make sure that all relevant environmental and social issues have been addressed and that appropriate steps are being taken."

friendly, such as fish-friendly turbines for the best possible fish migration or oil-free turbine hubs to protect rivers from oil contamination. Special abrasion-resistant coatings are used in rivers with high sediment content to allow sediment to pass through the power plant.

What are the critical issues when building a hydropower plant, and how can they be alleviated?

The most critical factor is the planning phase. Every building project represents an incursion: The landscape is changed; people, fauna, and flora are affected. That requires careful analysis – incursion has to be minimized, and appropriate measures have to be taken to turn disadvantages into advantages. In Europe, for example, reservoirs were turned into popular recreational areas; in developing countries, they lead to a marked improvement of local infrastructure through the construction of new roads, schools, hospitals, and apartments and houses with better sanitation and electricity. Hydropower plants create new jobs as well, both directly and indirectly. With the construction of a hydropower plant, the local population often receives access to new training opportunities, and that leads to more opportunities for the future. For example, for more than three years, ANDRITZ HYDRO ran a training center for mechanics, electricians, and welders in southeast Anatolia at its own expense. Through this project, more than 100 graduates found a new livelihood, as all of the graduates found jobs after finishing their education. Hydropower plants have additional positive effects as well, such as providing flood control, drinking water, and water storage for agricultural irrigation, or rendering rivers navigable for shipping.

Why was ANDRITZ HYDRO awarded the contract for Xayaburi?

Apart from the modern technology we offer, another decisive factor was that we had already successfully supplied the Lao hydropower plant Nam Theun II with electromechanical equipment. Nam Theun II, which became operational in 2010, is internationally regarded as a showcase project for sustainable hydropower generation, with numerous social and ecological accompanying measures, which were successfully implemented in accordance with World Bank and International Monetary Fund guidelines.

Highlights 2015

Renewable hydropower from the sea

Tidal Lagoon Swansea Bay selected ANDRITZ HYDRO as part of a consortium as preferred bidder for the supply of electromechanical equipment for the world's first tidal lagoon hydropower project, located in Swansea Bay, Wales. The tidal lagoon hydropower plant will be located in the Severn Estuary and have an installed capacity of 16 units with over 20 megawatts each. The Severn Estuary has the second-highest tidal range in the world. In this estuary, Swansea Bay benefits from an average tidal range of 8.5 meters during spring tides. This hydropower station will supply clean, renewable, and predictable energy to over 155,000 households. It will reduce CO₂ emissions by over 236,000 tons and thus make an essential contribution towards Britain's goal to reduce carbon dioxide emissions.





Important events

The three Francis units and one small-scale hydropower unit delivered for the Beyhan-1 hydropower plant, Turkey, were handed over to the customer for commercial use. With an output of 186 megawatts each, the Francis turbines are among the largest of their kind in Turkey. Beyhan-1 will supply 1,250 gigawatts of renewable energy per year to the Turkish power grid.

The electromechanical equipment supplied for the Turkish hydropower station Ayvali, with a total installed capacity of 130 megawatts, was also handed over. In addition to the two main units, the delivery included two small-scale hydropower units in order to ensure the residual water use required by government regulations.

Important orders

ANDRITZ HYDRO was awarded an order by Daelim Lotte Joint Venture to supply the electromechanical equipment, hydraulic steel structures, and penstocks for the Gulpur hydropower plant, Pakistan. The supply includes two Kaplan turbine/generator sets (52 megawatts each). Due to the high sediment content of the river, considerable abrasion is expected. A special design will thus enable a fast replacement of the runner blades and guide vanes when the turbine is installed. In order to keep service cycles to a minimum, the parts subject to high stress have a protective coating.

Himachal Pradesh Power Corporation ordered the complete electromechanical equipment for the new Shongtong Karchham hydropower plant in Himachal Pradesh, India. The scope of supply includes three Francis turbine units, the balance of plant, as well as control and protection equipment. The project is funded by KfW, Germany's largest development bank, and will thus comply with KfW's comprehensive environmental and social standards. The plant will have a total output of 450 megawatts and provide clean and renewable energy for approximately 800,000 Indian households.

VNECO Hoi Xuan Investment and Electricity Construction awarded ANDRITZ HYDRO an order for the design, delivery, installation, and commissioning of three bulb turbines and generators for the new Hoi Xuan hydropower station to be built in Vietnam. In addition, the business area will supply the mechanical and electrical equipment, including the automation and hydraulic equipment. The three bulb turbines have an output of 35 megawatts each and are designed for a maximum head of 26 meters. The plant will supply more than 425 gigawatt hours per year of renewable energy to Vietnamese households and to local industry.

Millennium Challenge Account awarded a contract for rehabilitation of the Nkula A hydropower station, Malawi, to a consortium led by ANDRITZ HYDRO. Nkula A has a total capacity of 39 megawatts and was the first hydropower plant in Malawi when it was commissioned in 1966. After almost 50 years in operation without any major overhauls, ANDRITZ will rehabilitate the intake structures, gates, and penstocks, and supply new turbine parts, generators, and new automation equipment.

The business area will refurbish the Andong hydropower station, South Korea, for Korea Water Resources. Two diagonal turbine generator sets, each with an output of 46.3 megawatts, are to be modernized. Korea Water Resources supplies a quarter of South Korea's renewable energy and operates the world's largest tidal power plant, located in Sihwa and equipped by ANDRITZ HYDRO.

The business area signed a contract with COPEL for the modernization of the Governor Bento Munhoz da Rocha Netto (Foz do Areia) hydropower plant, Brazil. This order includes replacement of the four Francis runners (419 megawatts each) as well as the supply of four new speed governors and voltage regulators.

ANDRITZ HYDRO received an order from the Electricity Generating Authority of Thailand for refurbishment of three of the five units at the Srinagarind hydropower plant, Thailand. The scope of supply includes three new 120-megawatt Francis turbines, three generators, and additional electrical equipment.

Mighty River Power, New Zealand, ordered the supply of three generators, Francis turbine components, and turbine governors for the Aratiatia hydropower station. Modernization of the three 31-megawatt units, which were commissioned over 50 years ago, will contribute substantially towards improving the efficiency and reliability of the power station. Mighty River Power is one of New Zealand's largest electricity companies, generating about 17 percent of the country's power supply. More than 90 percent of its electricity production comes from renewable resources.

For an order from the Song Da Corporation, ANDRITZ HYDRO is to deliver two 16-megawatt bulb turbines to the Xekaman Sanxay hydropower station, Laos, providing more than 131 gigawatt hours of electricity. This is now the third order that this customer has placed with ANDRITZ, following the successful deliveries for the Xekaman 1 and Xekaman 3 hydropower stations.

Electricité de France (EDF) awarded an order for a new 240-megawatt Pelton turbine, including generator, governor, and additional equipment for the La Coche hydropower plant, France. In contrast to the existing reversible pump turbines, the new turbine features much improved part-load running and smooth operation. The total installed capacity of the hydropower plant will be increased by 75 percent to 560 megawatts, with significant improvement in the plant's availability and flexibility.

LIMAK, Turkey, placed an order with ANDRITZ HYDRO for supply and installation of the gates and penstocks of the Yusufeli hydropower station (total capacity: 540 megawatts). The gates will have a total weight of 2,200 tons, and the penstocks will weigh 3,800 tons in total.

Statkraft Energi awarded the business area two important orders in Norway. The control systems for the Eidsfoss and Vrangfoss hydropower plants, installed in the 1960s, are to be upgraded. The scope of supply includes replacement of the local control system, as well as control systems for the turbine, generator, and intake structure. In addition, the business area will deliver the electromechanical equipment for the Hakavik hydropower plant. This order comprises a Pelton unit (5.5 megawatts),

the electrical equipment including the control systems, the shut-off valve, and a 100-meter-long penstock. As from 2018, Hakavik will supply 26 gigawatt hours of electricity a year to the Norwegian railway.

Salten Kraftsamband awarded ANDRITZ HYDRO an order to supply the electromechanical equipment for the Storavatn (two units with 27 megawatts and eight megawatts, respectively) and Smibelg (one 33-megawatt unit) hydropower stations, Norway.

The business area received an order from YaJiang Jin Tong Hydroelectric Development for the supply, installation, and commissioning of two 130-megawatt units for the Da A Guo hydropower station, China.

Thanh Binh ordered two units for the Song Lo 2 hydropower plant, Vietnam. The scope of supply includes two 15.5-megawatt bulb turbines, two generators, and additional equipment.

Two vertical Kaplan units (total output: 14 megawatts) will be supplied to Prime Que Phong for the Chau Thang hydropower station, Vietnam. The efficiency of the ANDRITZ HYDRO technology for the low head of this hydropower plant at only 21 meters was one of the decisive factors in awarding this order.

Automation of hydropower plants as well as protection and excitation systems also play an important role in upgrade and renovation projects. In this sector, ANDRITZ HYDRO received technically demanding orders worldwide during the reporting period, including projects for hydropower plants in Birsfelden, Switzerland; Miaowei, China; Tarbela, Pakistan; and La Venta, Mexico.

In the small-scale hydropower sector, where ANDRITZ HYDRO leads the world market, numerous important orders were booked, including those to supply the electromechanical equipment for the hydropower plants in Convento Viejo, Chile; Sigchos, Ecuador; Okkayasi, Turkey; Ringedalen, Norway; Manolo Fortich 1 and 2, Philippines; Nam Tha 3, Vietnam; New Post Creek, Canada; as well as Lower Nyamindi and South Mara, Kenya.

ANDRITZ HYDRO will supply 59 double-flow split-case pumps to irrigate 12,000 hectares of uncultivated desert in Egypt so that this land can be used for agriculture in the future. The project comprises the equipment for 11 pumping stations, the largest of which pumps two cubic meters of water per second.

The business area was commissioned to supply 11 double-flow split-case pumps for the water supply to the northern Chinese city of Hohhot. As the river water contains large amounts of sand, the pumps have a hard-wearing coating. The two pumping stations in Hohhot pump a total of 56 cubic meters of water per second.

As part of an agricultural irrigation project in southern Lebanon, the business area will supply four double-flow pumps in order to make use of the pressure in the pipeline upstream of the balancing reservoir to generate electricity. At peak times, the plant on the Litani River will provide an output of more than 4.7 megawatts.

ANDRITZ HYDRO is supplying pumps for a 1,200-megawatt thermal power plant in Vietnam. The eight booster pumps will be installed in the power plant's sea water flue gas desulfurization system.

160 pumps for drinking-water treatment plants in Iraq

ANDRITZ HYDRO will deliver 49 double-flow split case pumps (photo), 37 submersible motor pumps, 16 booster stations, two high-pressure pumps, and two sewage pumps for eight pumping stations at a drinking-water treatment plant in Iraq. 40 double-flow pumps, nine vertical-line shaft pumps, and six single-stage centrifugal pumps, including motors, will be supplied to five additional Iraqi pumping stations.





Why does the future lie in Äänekoski?



In the forests of Finland, the future of the pulp industry is being rewritten. And this future lies in bioproducts. In Äänekoski, pulp and paper producer Metsä Group is building the most modern, environmentally efficient, energy-efficient, and innovative bioproduct mill in the world. ANDRITZ is providing important technologies for the mill.

In the small town of Äänekoski in Central Finland, October 12, 2015: Kari Jordan, President and CEO of Metsä Group, lays the foundation for a new bioproduct mill unlike any other. "This mill combines several megatrends for the future," enthuses Jyrki Katainen, Vice President of the European Commission. Katainen, the former Prime Minister of Finland, knows what he is talking about. The new factory, he explains, is setting new standards: in designing closed-loop systems (i.e., returning raw materials to the production process and reusing waste materials); in decarbonization (i.e., production methods that release no or only small amounts of carbon dioxide into the atmosphere); in energy and resource efficiency; and in innovation and forming symbiotic partnerships with various industries.

The bioproduct mill at Äänekoski is scheduled to start production in the third quarter of 2017. It will be the start of a new era in the pulp industry: Äänekoski will not only be the largest pulp mill in the northern hemisphere, but also the most modern, environmentally efficient, and energy-efficient:

- The new mill produces 2.4 times more electricity than it consumes.
- By using the bark from the trees, the mill operates without the use of oil, gas, or other fossil fuels.
- The process generates very low emissions into the air and water. Most of the substances created in the process are purified and recycled.

The bioproduct mill will produce not only pulp, but also electricity, heat, biofuels, and biochemicals with the possibility of producing fertilizer, innovative road surfaces, textile fibers, biocomposites, and other new bioproducts. Some of the technologies in use here are already well-developed, while others still have to be perfected or developed from scratch. Thus, the Äänekoski mill is becoming a cross-sectoral business environment for the future of the wood-based pulp and paper industry.

For some time now, large new pulp mills have been built almost exclusively in the southern hemisphere, especially in South America and Southeast Asia. Because of the favorable climate there, eucalyptus trees grow much faster than Nordic trees, such as Nordic pine, spruce, and birch. The fibers of Nordic wood, however, are of a different quality, and this is one of the reasons for Metsä Group's investment in Finland. Another reason is the ever-growing demand for Nordic pulp, most notably in China.

The new mill will cost 1.2 billion euros – the largest investment in the history of the Finnish forest industry. Once it is completed, more than 15,000 cubic meters of

wood will be transported to Äänekoski, and a train with 40 wagons full of pulp will leave the mill to travel to the port of Vuosaari, Helsinki, every day. All in all, 6.5 million cubic meters of wood will be processed at the mill every year, four million cubic meters more than in the existing mill. Pulp production in Äänekoski will rise from 0.5 tons per year so far to 1.3 million tons. By the way, with forests covering almost 80 percent of the country, Finland is one of the world's leaders when it comes to forested areas (in comparison, forests cover almost 50 percent of Austria and about 30 percent of Germany).

In principle, producing pulp is quite straightforward. Simply put, you begin by debarking tree trunks, because bark cannot be used for pulp production. Then the logs are fed into a chipper, and the resulting wood chips are cooked at a high temperature and pressure together with cooking chemicals and water, which causes them to release the cellulose fibers. After this, the pulp is screened, and the brown color is removed with bleaching chemicals. Finally, water and chemicals are filtered and

Metsä Fibre's softwood and birch pulp, which are manufactured sustainably and cost-effectively, were specifically developed for the production of high-quality tissue and writing paper, specialty papers, and cardboard.



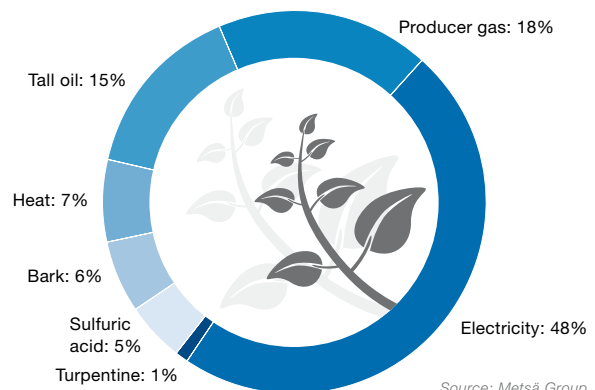
recycled, and the dried pulp can be packed in bales and shipped to customers.

However, producing pulp in industrial quantities in a way that is sustainable requires a lot of know-how. In 2015, Metsä Fibre awarded ANDRITZ PULP & PAPER an order to deliver a part of important production technologies for the new mill. ANDRITZ is supplying most of this technology from Finland: The engineers are based in Kotka, Lahti, and Varkaus, and a substantial part of the core equipment is fabricated in Savonlinna. With an order volume of more than 100 million euros, the technology supplied by ANDRITZ includes:

- A complete, three-line wood processing system: The tree trunks are debarked in huge drums (5 x 48 meters). The system can process up to 470 cubic meters of wood per hour and line. Afterwards, the trunks are transferred to the world's largest horizontally fed chippers.
- A softwood and hardwood fiberline: The softwood production capacity is 3,900 tons of pulp per day, the highest in the world. The fiberline contains a two-vessel, continuous-cooking plant with a digester-evaporation unit for steam recovery and pre-evaporation as well as seven so-called DD washers for brown stock washing and bleaching.
- An evaporation plant for concentrating black liquor: It is the most energy-efficient unit worldwide and has the largest capacity in Europe (1,650 tons of water evaporation per hour).
- The evaporation plant has an integrated chloride removal system to optimize the chloride and potassium levels in the black liquor and a methanol liquefaction plant to produce liquid methanol, which serves as a biofuel.
- The largest recausticizing plant in Europe, which can produce 16,000 cubic meters of white liquor per day. ■

The bioproduct business

Today, Metsä Fibre generates around 90 percent of its sales from pulp and 10 percent from bioproducts. The corresponding bioproduct sales figure for the new Äänekoski bioproduct mill will be 20 percent in the mill's first phase, with the following share of bioproducts:



The fibers of Nordic wood species, like pine, spruce, and birch, have a high quality. This is one of the reasons for Metsä Group's investment in Finland. Another reason is the ever-growing demand for Nordic pulp, most notably in China.





FAQ

Who is Metsä Group?

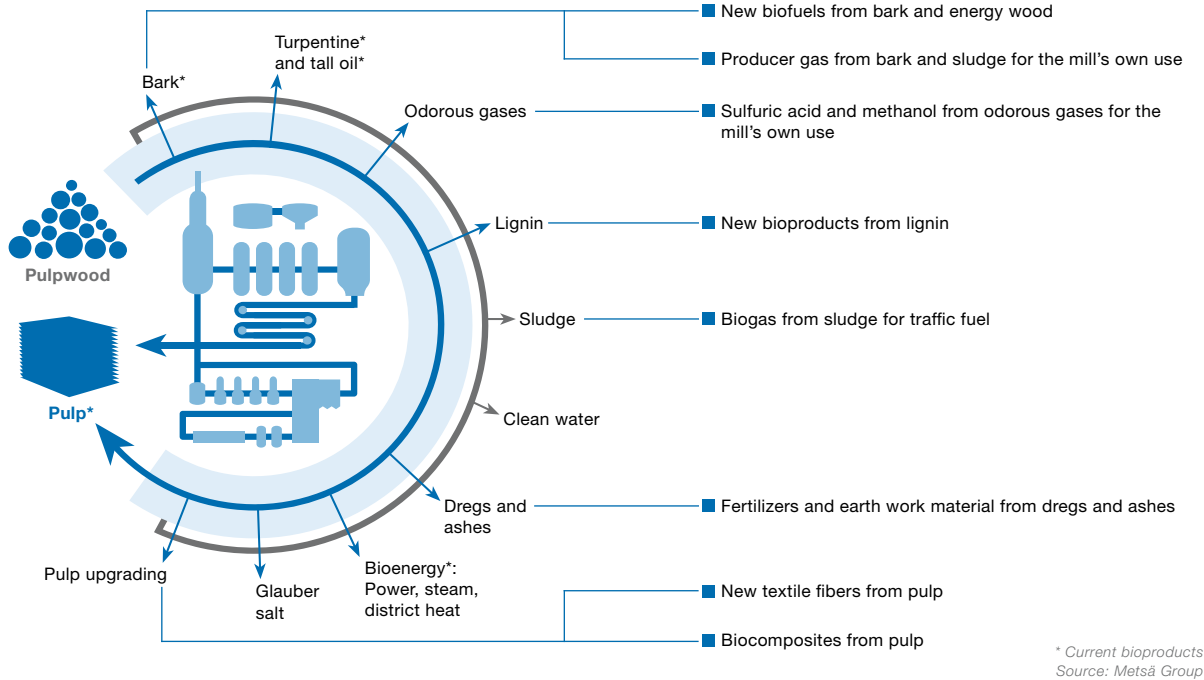
Metsä Group is Europe's largest cooperatively owned pulp, paper, and forest industry company. It belongs to the Metsäliitto Cooperative, which is owned by 116,000 Finnish forest owners. The Metsä Group operates in more than 30 countries and, in 2015, achieved a turnover of five billion euros. Its headquarters are located in Espoo, Finland. One of the subsidiaries of Metsä Group is Metsä Fibre, a leading global producer of long-fiber pulp.

Metsä Fibre has a staff of 850 employees in four pulp mills across Finland. In

2015 it achieved a turnover of 1.4 billion euros.



The bioproduct concept: The bioproduct mill in Äänekoski makes 100 percent use of all side streams



High-energy efficiency and energy self-sufficiency

Metsä Group's new bioproduct mill concept maximizes bioenergy sold; no fossil fuels will be used.

■ New bioproduct mill ■ Existing pulp mill

Gigawatt hours/year



ANDRITZ is a member of the world's leading sustainability platform for the forestry industry

ANDRITZ is a member of the World Business Council for Sustainable Development (WBCSD), a global organization that promotes a sustainable future for the economy, society, and the environment. This group of 200 international companies from more than 20 industries provides organizations with a platform for jointly realizing sustainable developments and for sharing knowledge, experience, and examples of best practices. Since 2012, ANDRITZ PULP & PAPER has been an associate member of the WBCSD Forest Solutions Group (FSG), a leading sustainability platform for the global forestry industry and its stakeholders. Full members of the FSG are leading global forestry companies and manufacturers of forestry products, such as Fibria, Portucel, Metsä Group, Mondi, Stora Enso, and UPM, most of whom are long-term ANDRITZ customers. The goals of the working group include the introduction of joint performance targets for sustainably produced forest products, such as pulp and paper, and an ongoing dialog with stakeholders, for example, non-governmental organizations (NGOs), which work closely with the FSG on individual projects.



Three questions for Matthew Reddy,

Director of the WBCSD Forest Solutions Group

Pulp production uses a lot of wood, water, and energy. How can one achieve sustainable pulp production to meet world-class environmental standards?

It is true that pulp production requires large volumes of water and energy. However, the energy used in modern pulp mills and biorefining processes is generated from forest residues and side-stream resources, making these mills carbon-neutral and energy self-sufficient. Some mills even supply excess energy for district heating and electricity, thus providing a valuable community service. Metsä Group's Äänekoski bioproduct mill, for example, produces more than twice the amount of renewable energy that it actually needs in operation, raising Finland's total renewable energy output by two percentage points and thus contributing significantly to climate change mitigation. At WBCSD, we expect to see more of this type of biomass-to-energy generation in the future as we move towards low-carbon economies. Metsä Fibre, for example, recycles around 95 percent of the water extracted back into the internal water loop, so we can say that the water requirement is high, but water consumption is very low. Pulp mills are long-lived, high-value assets, and there are a good many older mills still working very well. Over time and with the help of leading solution providers like ANDRITZ, we expect more mills of the standard that Äänekoski represents. The mill has the modern technology and processes, with such features as multistage biological treatment for water and advanced renewable energy technologies.

Pulp mills have been built for years in the southern hemisphere because of the fast-growing and cheap wood and the favorable climate there. Now, Metsä Group is building a large pulp mill in Finland. Is this a new trend?

There is a long history of sustainable forest management and development of forest products in Finland. Companies like Metsä Group have been at the cutting edge of innovation and sustainability in this sector, and we see the development of newer and larger pulp mills as an evolutionary step in the ongoing quest for greater efficiency and productivity. The type of pulp mill that we are seeing now is really of the next generation, able to provide the raw materials for a range of innovative new products used in personal care, fabrics, and intelligent packaging, and at the same time producing energy on a usable scale. These next-generation mills are designed to meet the demand for new bioproducts, and we can certainly observe that this trend is emerging in Finland faster than anywhere else. A recent report by the FAO, the Food and Agriculture

Organization of the United Nations, shows that many countries in the northern hemisphere have strong policies that support the development of forest-based bioeconomies, and Finland is a leading nation in this low-carbon economic growth strategy. The favorable policy environment, EU financial support for strategic investments, and high-tech company clusters are the key to fostering the growth of these new biomills and refineries, and we expect this trend to continue and accelerate.

Matthew Reddy: "Finland is a leading nation in low-carbon economic growth strategy."



What is the position of the WBCSD regarding pulp mills?

The WBCSD does not have a position on pulp mills per se, but it generally supports efforts to improve resource efficiency and lessen our dependence on fossil fuels. The Forest Solutions Group of the WBCSD, of which both ANDRITZ and Metsä Group are members, applies membership principles and responsibilities that demonstrate how the key companies in the pulp and paper sector are taking a leading position on sustainability, especially through their operations. As part of the WBCSD's work at the climate conference in Paris at the end of 2015, the Forest Solutions Group is leading the Low Carbon Technology Partnerships Initiative and has showcased some of these new approaches to bioproducts as part of the economy-wide shift to low-carbon and sustainable solutions.



Three questions for Timo Merikallio,

Project Director, Metsä Fibre

For years, new pulp mills have been built especially in the southern hemisphere because of the fast-growing and cheap wood available there as a result of the climatic conditions. Why are you building in Finland?

Our bioproduct mill will produce mainly long-fiber pulp from northern wood species. Northern trees have special qualities that provide excellent strength and runability. Metsä Fibre is the leading global producer of market softwood pulp and has extensive expertise to make use of these qualities. Moreover, the bioproduct mill is being built in

Timo Merikallio: "Metsä Group has long been cooperating successfully in large investment projects with ANDRITZ."



the existing mill area and forest industry cluster in Äänekoski. The location is ideal in terms of raw material availability, and the necessary logistics networks are already in place. The existing mill was completed 30 years ago and would have required modernization in the near future in any case.

How can you ensure sustainable pulp production?

Despite a significant increase in production, our bioproduct mill will remain compliant with the environmental permit granted to the present pulp mill. All production side streams will be reused, and all equipment solutions will be based on energy efficiency and the best available technology. For example, the effluent flow of the bioproduct mill will be very low due to recovery of bleaching effluents and bark press effluent. Besides, we have invested in a multistage biological effluent treatment plant, whose modern technology will play a significant role in operating in compliance with the current mill's environmental limit.

Why did you choose ANDRITZ as the supplier of key technologies?

Metsä Group has long been cooperating successfully in large investment projects with ANDRITZ, which is a strong equipment supplier in the global pulp industry. Our previous experience, together with ANDRITZ's reliability and competence, was emphasized when we awarded the order.



Two questions for Johan Engström,

Chief Technology Officer at ANDRITZ PULP & PAPER, Finland

Is pulp a sustainable product?

Yes, pulp is made of renewable raw materials, is biodegradable, and totally recyclable. Today, it is possible to make the same products from wood-based pulp as from oil-based "plastics". Textile fibers from pulp are also used for cloth and fabrics, and side streams from the pulping industry can be used as motor fuel and similar products. Green energy produced by combustion of black liquor (lignin), bark, and other side streams is an important by-product at a kraft pulp mill.

Why are Metsä Group and ANDRITZ a good fit?

Metsä Group and ANDRITZ share a long history of collaboration on large investment projects as well as common R&D projects. The Äänekoski bioproduct mill will feature some totally new process solutions in order to maximize energy efficiency. Metsä Fibre has been very open-minded about new raw material and energy-efficient solutions in combination with low emissions and water

consumption. Also, the bioproduct mill concept of maximizing the use of raw materials and side streams is well in line with our strategy.

Johan Engström: "Pulp is a sustainable product."



Highlights 2015

Important events

A mechanical pulping line delivered to JSC Arkhangelsk Pulp and Paper Mill (APPM), Russia, was successfully put into operation. The new line features ANDRITZ green liquor technology for pulp cooking, as well as systems for refining and washing. The mill produces semi-chemical pulp for the manufacture of corrugated board. With this new line, the production capacity of APPM has doubled, while production costs and wastewater volume have been substantially reduced.

Stora Enso's Varkaus mill in Finland started up a pulping line after conversion of the fiberline to produce high-Kappa pulp. The business area modernized the cooking plant, brownstock washing, and screening processes; supplied a new lime mud disc filter for the recausticizing plant; and increased capacity in the evaporation plant.

ANDRITZ completed a recovery boiler replacement for Zellstoff Pöls, Austria.

MSE Mjölby Svartadalen Energi, Sweden, started up an ANDRITZ biomass boiler. The supply also included fuel handling and flue gas cleaning systems, and a steam turbine.

New ANDRITZ tissue machines were successfully commissioned for various renowned customers around the globe.

Zhanjiang Chenming Pulp & Paper, China, started up a 65 megawatt gasification plant, which uses mill waste and biomass as fuel.

Suzano, Brazil, successfully ramped up its new ANDRITZ continuous digester for bleached eucalyptus pulp.

An ANDRITZ recycled fiber-processing line went into operation at Chongqing Lee & Man, China. In addition, a processing line for mixed office waste was started up for Dongguan Jianhui Paper, also in China.

ANDRITZ Pulp Technologies Punta Pereira S.A., a subsidiary of international technology Group ANDRITZ and Celulosa y Energía Punta Pereira S.A. (CEPP), which is a Joint Venture by Stora Enso and Arauco, settled the arbitration proceedings amicably in connection with several contracts for delivery of equipment and systems for CEPP's Montes del Plata pulp mill, Uruguay. The plant was handed over successfully to the customer during the reporting period, and the agreed production and performance parameters were surpassed.

Important orders

ANDRITZ PULP & PAPER was selected by SCA to supply production technologies and equipment for the extension of the Östrand mill, the largest industrial investment in northern Sweden. The scope of supply includes woodyard equipment, a pulp dryer, a major upgrade of the white liquor plant, and the extension of the recovery boiler.

ITC, India, ordered a new mechanical pulping fiberline consisting of two-stage refining and two-stage bleaching

in combination with several countercurrent washing stages for the Bhadrachalam mill. This will be the first mechanical pulping line in India for high-brightness board grades. Also in India, Krishna Tissue ordered a complete approach system for a multi-ply board machine.

Chenming Huanggang, China, ordered a continuous digester for the production of kraft and dissolving pulp. ANDRITZ is also supplying a burner system to dispose of non-condensable gases.

Corrigan OSB, USA, ordered wood processing systems for a new oriented strand board manufacturing facility. The scope of supply includes two portal cranes with an automatic log yard inventory management system and two debarking lines.

Enviva, one of the leading suppliers of biomass pellets in the USA, ordered woodyard equipment for two biomass pellet plants to be built in North Carolina. Each of the plants has an annual capacity of 500,000 tons.

PGNiG Termika, Poland, placed an order with the business area for new air pollution control equipment and the modernization of an existing flue gas desulfurization plant.

POSCO E&C selected the business area to deliver key equipment for a 50 megawatt bubbling fluidized bed boiler for a greenfield waste-to-energy plant in South Korea. The plant will incinerate 100,000 tons of preheated waste and generate electricity for 20,000 households, saving 85,000 tons of CO₂ emissions annually.

Iggesund Paperboard Workington, UK, ordered the rebuild of a board machine, including the supply of a new press section and feeder for sheet transfer. In addition, ANDRITZ will modernize a pulp-drying line for Iggesund Paperboard, Sweden, to increase capacity.

ANDRITZ will rebuild the existing deinking line at Shandong Huatai Paper, China, and supply a new drum pulper and stock preparation line for virgin fiber.

The paper producer Nepa, India, placed an order for a complete deinking plant to produce pulp for printing and writing grades as well as for newsprint.

JC Segezha Pulp and Paper, Russia, selected ANDRITZ to help increase capacity and improve the washing efficiency of one of its fiberlines. ANDRITZ will retrofit the cooking and screening plant and add a new drum displacer washer.

Phoenix Pulp and Paper, Thailand, placed an order for a lime kiln used in the chemical recovery system to increase the production capacity and quality of the lime.

Nippon Paper Industries, Japan, ordered a new evaporation plant to replace an old multi-effect system for sulfite liquor. The new plant will utilize energy-efficient ANDRITZ technology and is to be equipped with comprehensive cleaning features.

In the automation sector, ANDRITZ will supply engineering, switchgear, and programmable logic control for

the modernization of a transformer station for a customer in the USA. Zellstoff Pöls, Austria, signed a five-year contract for a simulation maintenance program that also includes an extended control package for the recovery boiler.

ANDRITZ MeWa received several orders for recycling equipment, e.g. from Flamy International for the Kovozber plant, Slovakia, for aluminum recycling, and from Remondis Elektrorecycling, Germany, for refrigerator recycling.

ANDRITZ will supply a nonwovens line for production of flushable wipes to Akinal Sentetik Tekstil, Turkey. For the same product, Suominen, Finland, ordered a new wetlaid line to be built in the USA.

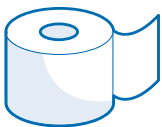
Zellstoff- und Papierfabrik Rosenthal, Germany, ordered a lime kiln upgrade, including ANDRITZ technology, to increase capacity and lower emissions in its white liquor plant.

Cartiere Modesto Cardella, Italy, selected ANDRITZ to rebuild its PM3 paper machine for quality improvements and a capacity increase.

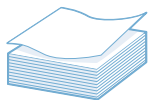
ANDRITZ PULP & PAPER and Fibria,

the world's largest eucalyptus pulp producer, signed a contract for the supply of all production technologies and equipment for Fibria's Horizonte 2 pulp mill in Três Lagoas, Brazil. The new production line will have an annual capacity of 1.95 million tons. The order covers EPC delivery of a complete woodyard, the fiberline, pulp drying equipment, and the recovery island (evaporation plant, recovery boiler, and white liquor plant). The Horizonte 2 project is one of the largest private investments in Brazil and will create 40,000 direct and indirect jobs over the two years of construction. During the peak of construction, the site will have around 10,000 workers. Once commissioned, Fibria's new pulp line will provide 3,000 direct and indirect jobs. Combined with the existing Horizonte 1 line (see photo), which was also equipped by ANDRITZ, Três Lagoas will reach a total annual production capacity of three million tons, making it one of the world's largest eucalyptus pulp production sites.

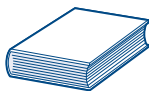
The pulp produced by Fibria is used to make different paper grades:



54% tissue



24% special papers
(for example, for
photos, labels, or
wallpapers)



22% printing and
writing paper







How many cars does China need?



1.5 billion people live in China, where there are only about 100 cars per 1,000 inhabitants, compared with 800 in the US. Despite the economic slowdown, the Chinese automotive market is booming in the long term: Every year, almost 20 million new cars are registered in China, and it is expected that half a billion cars will be driving on Chinese roads by 2050. Many of the cars' bodies will have been manufactured with presses by Schuler.

It is Wednesday, September 23, 2015. Dieter Wolf, commissioning engineer at Schuler, sets up his laptop in the new press hall of FAW-Volkswagen in Changchun, an industrial city in northeast China. The production hall measures almost 26,000 square meters and is 20 meters high; it needs to be big enough for up to three huge press lines to manufacture various car body components, after all. Dieter Wolf is standing in front of one of these giant presses. In a moment, he will start it up with his laptop.

11:15 AM, Beijing time – the Schuler team members from Göppingen, Weingarten, and Erfurt in Germany as well as from Dalian, China, gather around the press. With them, there are two engineers from FAW-Volkswagen and an interpreter. If the press line starts as expected, all of them will monitor the machine very closely: Are there any irregularities, strange noises, or other problems? This is not to be expected, however. Schuler, a company steeped in tradition, is famous for its utmost precision in mechanical engineering. It is not a coincidence that Schuler, which joined the ANDRITZ GROUP in 2013, is the global market leader in presses.

11:17 AM – Dieter Wolf presses a key. For a moment, nothing happens: no movement, no sound. Everyone is holding their breath. Then, a red LED light flashes. With a hissing sound, the slide descends. As of yet, everything is in slow motion, and the slide can be stopped immediately if something goes wrong. Later, when production starts, the machine will achieve a rate of 17 strokes per minute. Between one and four car body parts, depending on their size, are pressed per stroke. This means that 17 roofs, 34 fenders (double parts), or 68 outer door skins (quadruple parts) roll off the production line per minute, depending on deployment of the line. Older presses have about a third less capacity.

11:20 AM – The tension dissipates. Everything works fine: All the electric, electronic, and hydraulic systems are in order. The technicians at Bolster 4 of the servo press line PXL 91 heave a sigh of relief and brief smiles flit over their faces. It is an important moment for both Schuler and FAW-Volkswagen. For Schuler, these three press lines represent one of the biggest orders in the history of the company. For FAW-Volkswagen, a joint venture between the Chinese company First Automotive Works and the German company Volkswagen, it represents an important step to significantly increase their production capacity for the Chinese market.

Nowhere in the world are there more cars built and sold than in China. Nearly 24 million vehicles are produced in China every year; twice as many as in the US and four times as many as in Germany. By 2025, the number could grow to 40 million. By 2050, market experts expect to see up to 500 million cars on China's roads, which is about 10 times the size of the current car fleet in Germany. The main reason for this sharp increase in a country of 1.5 billion is an expanding middle class in which more and



Dr. Alaoui Mekkaoui, a Senior Manager at FAW-Volkswagen, is convinced of the quality of the Schuler presses, also as far as their accuracy is concerned. "We are extremely rigorous," says Alaoui Mekkaoui. "At the slightest flaw, we take the part out of production." In this case, the slightest flaw means deviations of a few thousandths of a millimeter.

more people can use a portion of their disposable income to buy a car.

FAW-Volkswagen's car plant in Changchun is the third-largest car factory in the world; only VW in Wolfsburg, Germany, and Hyundai in Ulsan, South Korea, have bigger ones. In a facility of 1.8 million square meters, 29,000 workers produce about one million vehicles per year for Audi and VW, among them, the models VW Magotan, VW CC, Audi A6L, Audi Q3, Audi Q5L, and Audi A4L.

Dr. Alaoui Mekkaoui, a Senior Manager at FAW-Volkswagen, shows us the Schuler presses that are already in operation in Changchun. The different buildings are so far apart that you have to take a car to get from one part of the facility to another. It is rush hour on the service roads. Trucks, buses, and cars back up at the crossroads. Police officers have set up platforms and use hand signals to direct the traffic. Alaoui Mekkaoui backs his car, one of China's top-of-the-line VW models, into a parking space in front of another production hall. Reverse parking has recently become mandatory. Backing out of parking spots has been the cause of a fair share of accidents.

In the press hall, we find the Müller Weingarten presses in full swing. Müller Weingarten has been a member of Schuler since 2007. These machines are still equipped with flywheel drives, while the new generation of Schuler presses has servo motors that act directly on the shaft and save energy. But the flywheel presses have been serving the

Time is money: Installation and start-up of a Schuler press line with ServoDirect technology at FAW-Volkswagen China took only nine months

April 2015:
Laying the foundation plates and preparation of the pit

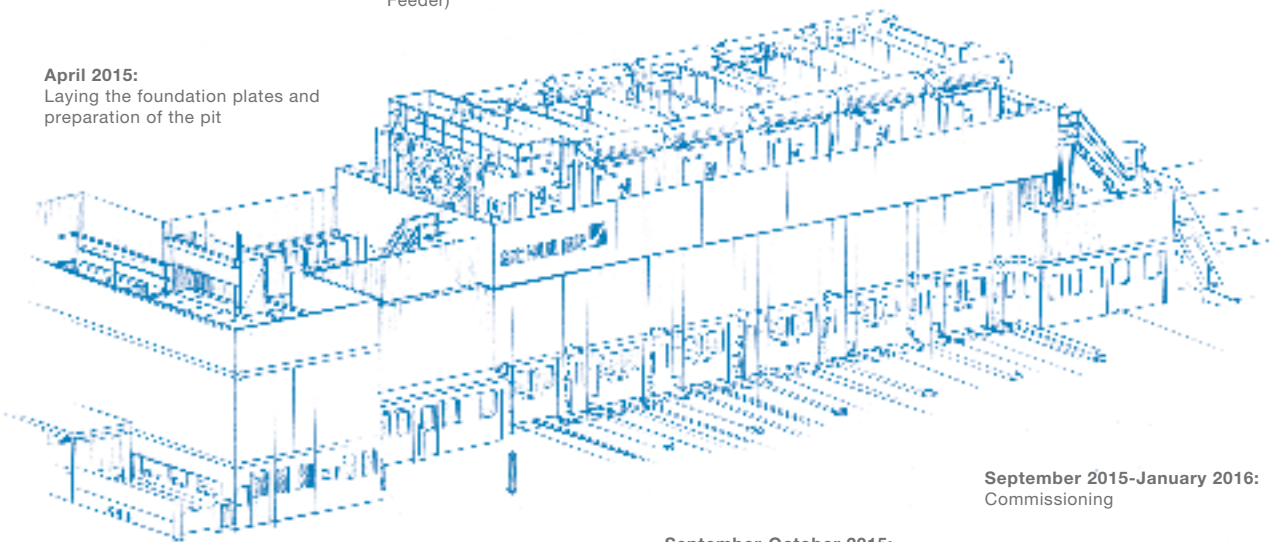
May-June 2015:
Basic assembly of the presses and automation systems for part transportation (Crossbar Feeder)

June-September 2015:
Final assembly and installation of the fluid technology and electrical engineering of presses and automation systems (Crossbar Feeder)

July-September 2015:
Assembly and installation of the fluid technology and electrical engineering of the blank loader and end-of-line system

September-October 2015:
Installation of sound-proofing (housing)

September 2015-January 2016:
Commissioning





Nowhere in the world are there more cars built and sold than in China. Nearly 24 million vehicles are produced in China every year; twice as many as in the US and four times as many as in Germany. By 2025, the number could grow to 40 million. By 2050, market experts expect to see up to 500 million cars on China's roads, which is about 10 times the size of the current car fleet in Germany.

factory without a hitch for many years now. Right now, the machine is producing doors for the VW Jetta. At the front, a robot loads a thin metal sheet only 0.8 millimeters thick, the so-called blank, into the first press. The blank is formed and cut with a stamping force of up to 25,000 kilonewtons. Then another robot picks up the part using suction arms and loads it into the next press. This happens six times, and after just a few seconds, the door is finished and can be picked up in the back of the machine. Now the metal is checked for flaws. Workers inspect it using a fine grinding tool – a process that reveals any irregularity.

“We are extremely rigorous,” says Alaoui Mekkaoui. “At the slightest flaw, we take the part out of produc-

tion.” At FAW-Volkswagen, this “zero tolerance” mentality, with its high demands on press manufacturers as well, is often illustrated with the following story: A while back, they tested whether even the smallest deviations from the norm would be detected by their team. To do that, they pulled a single thread from the work coat of one of their foremen, set it on a glass table and laid one of the body panels on top of it. Three hours later, the panel was taken to quality control. As always, it was lightly sanded – and the thread’s impression was detected by the trained eyes of one of the FAW-Volkswagen technicians. “It sounds unbelievable,” says Mekkaoui, “but it’s really true. We are really looking for flaws of a few thousandth of a millimeter – deviations that are almost invisible to the naked eye.”

Today, the demand in China for Volkswagen and Audi cars is so big that the Müller Weingarten presses are no longer able to provide enough metal parts for the

FAQ

How big is the market volume in the automotive industry?

By 2025, annual sales of the global automotive industry will grow an average of three percent per year according to market experts. Altogether, sales of the automotive and automotive supplying industries are expected to increase from 840 billion to 1.3 trillion euros.

Source: FAST 2025 by Oliver Wyman and VDA



assembly plants. The new Schuler servo presses will solve this problem, they are especially fast, energy-efficient, and effective.

All around the press lines, there are stacks of sheet blanks and dies. That is another critical issue when it comes to the efficiency of such systems: exchanging die sets. As a rule, only 1,000 to 3,000 workpieces of the same kind are needed before the next body part must be produced. Perhaps the machine must now press doors, or hoods, or fenders, or trunk lids. At 17 strokes per minute and a quantity of 2,000 pieces, it takes no more than two hours until the machine has to be stopped. At that point, all the dies at all the press stations need to be exchanged. To

The new Schuler presses like the one at FAW-Volkswagen achieve a rate of 17 strokes per minute. Between one and four car body parts, depending on their size, are pressed per stroke. This means that 17 roofs, 34 fenders, or 68 outer door skins roll off the production line per minute, depending on deployment of the line. Older presses have about a third less capacity.



accomplish this, they are preinstalled on moving bolsters. As soon as the press line stops, the bolsters carrying the old dies move out on one side while bolsters with new dies enter the press area from the opposite side in a fully automated process. Mekkaoui is satisfied: "With the new generation of presses, it takes less than three minutes until the first parts roll off the line."

In this business, speed and quality are among the most important criteria. And Schuler is ahead of the game. Twenty-six months is all it took from placing the order to starting up the new lines; 14 months for design and manufacturing, two months for transporting the heavy machinery by ship, nine months for assembling and commissioning the lines in Changchun, and another two months for optimization. All new lines will go live during the first half of 2016, at the latest. FAW-Volkswagen will then be operating the most modern press line in the world with the highest energy savings and the lowest maintenance costs – and it will be ready to take on the largest car market on the globe.

Schuler itself is also repositioning for the Chinese market. The company has been active in China since 1992 and has 400 employees in five locations. In 2015, Schuler acquired a majority stake in Yadon, one of China's leading press manufacturers for the medium and lower-price segment. "China is our fastest-growing market, and it is the biggest market for presses in the world. Our interest in Yadon gives us access to a large Chinese customer group that we have not been serving so far," says Schuler CEO Stefan Klebert.

When it comes to size, China is the new US. Everything here is a bit larger, not just the new press line at FAW-Volkswagen. In the country with the world's largest population and the world's largest automotive market, Schuler is now one of the leading players in the largest press market in the world.

In the meantime, it is 12:30 PM in the new press hall of FAW-Volkswagen in Changchun. The test run of PXL91 is completed, and it was successful. Schuler's team meets in a small blue container room to the left of one of the large press lines. Despite the high-tech outside, in here, low-tech prevails. The room contains a few simple office chairs and two old desks; a schedule for the construction of the press lines hangs on a wall. There is a pot of hot water and instant coffee. The men raise their cups. They don't talk much, but they look pleased. ■

Major trends in the automotive industry

1. The biggest driver of growth is Asia: China for mid-range and premium models, India for low-cost automobiles.
 2. The biggest drivers of technology are environmental sustainability and fuel consumption, lightweight construction, e-mobility, and vehicle networking.
 3. The market is volatile; even short-term sales fluctuations can be considerable.
 4. Due to increasing competition, both producers and suppliers are subject to increasing cost pressure.
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The new FAW-Volkswagen press hall in Changchun, China, measures almost 26,000 square meters and is 20 meters high. After all, it needs to be big enough for up to three huge Schuler press lines to manufacture various car body components.

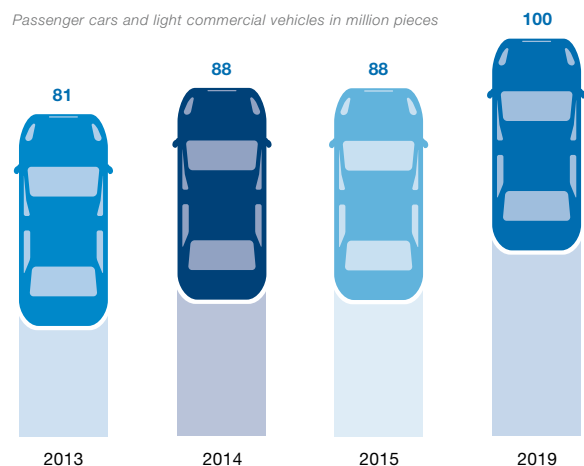
2015: Weaker momentum in the global automotive market

In 2015, growth in the global automobile market was slightly weaker than in previous years. According to market estimates, a total of around 88 million motor vehicles were produced in 2015, with the following regional split: among others, nearly 24 million in China, 21 million in Europe, 18 million in North America, and 13 million in Japan and South America. The number of cars produced in 2015 was slightly below 2014, by 400,000 motor vehicles, or 0.5 percent. Beginning in 2016, forecasts expect a return to higher growth rates. Experts predict that by 2019, for the first time, more than 100 million passenger cars and light commercial vehicles will roll off the assembly lines worldwide.

Source: IHS Automotive

Vehicles produced globally per year

Passenger cars and light commercial vehicles in million pieces

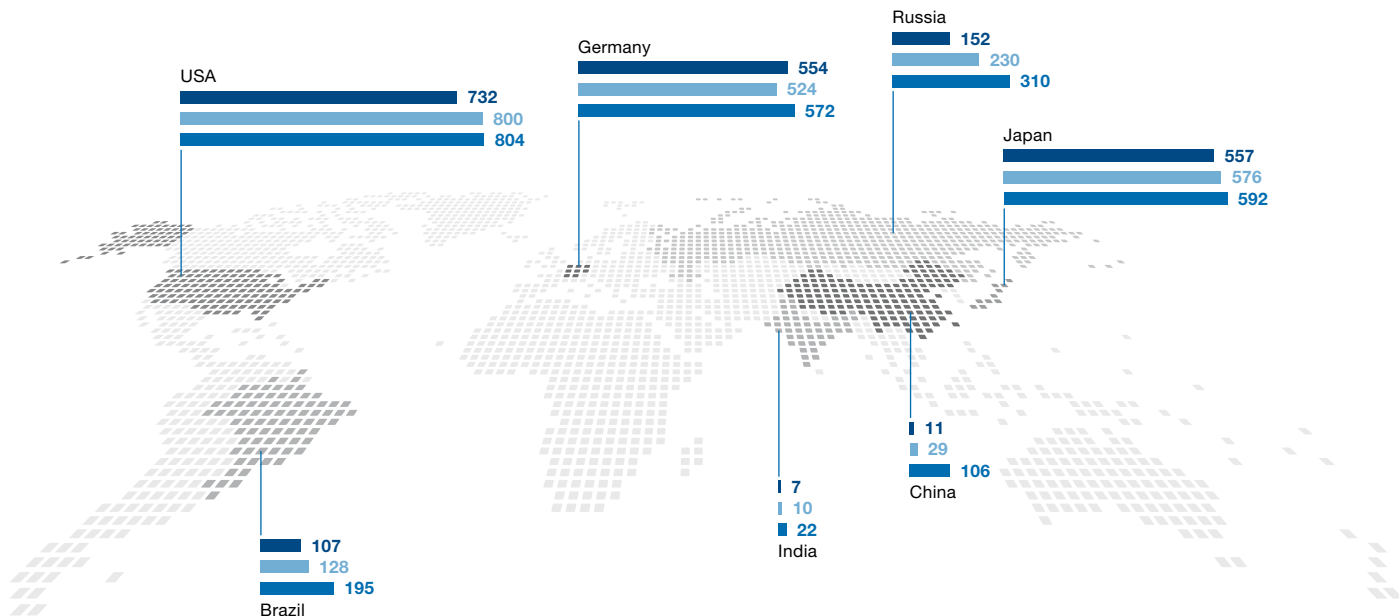


A steadily growing demand in emerging markets

In the US in 2014, there were 804 passenger cars and light commercial vehicles per 1,000 inhabitants. In the BRIC countries (Brazil, Russia, India, and China), the average number was only 158. India comes in last: For every 1,000 Indians, there were only 22 passenger cars and light commercial vehicles.

Passenger cars and light commercial vehicles per 1,000 inhabitants from 2000 to 2014

■ 2000 ■ 2007 ■ 2014

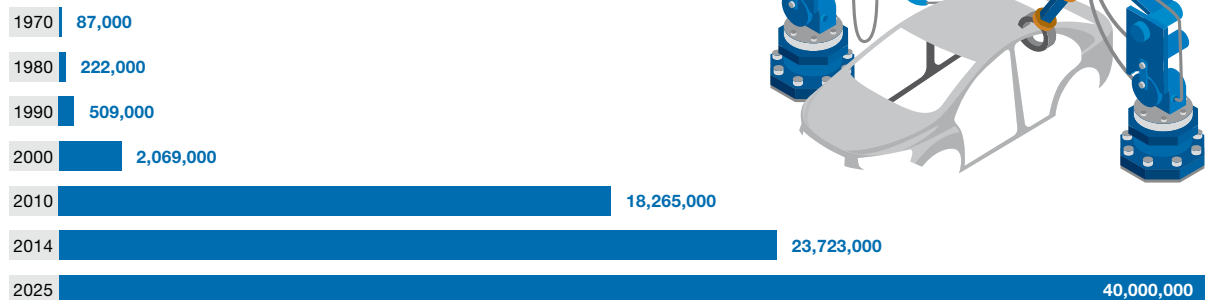


Source: IHS Automotive

China steps on the gas

Since 1970, China's automobile production has risen sharply. Currently, around a quarter of all cars produced worldwide are manufactured there. A growing trend: Experts estimate that by 2025, China's automobile production will be almost double what it is now. The average annual growth rate amounts to 12 percent.

Number of passenger cars and commercial vehicles produced in China:



Sources: Organisation Internationale des Constructeurs d'Automobiles, FAST 2025 by Oliver Wyman, and VDA



Five questions for Stefan Klebert, CEO of the Schuler Group, which has been part of ANDRITZ since 2013

Why is the German company Schuler acquiring a stake in the Chinese company Yadon?

China is one of the most important growth markets for presses worldwide. Schuler is currently well represented in the Chinese premium segment, but we don't offer any presses for the lower and mid-market segments. Yadon is one of the leading manufacturers in China for the lower market segment. Together with Yadon, we want to enter the mid-market segment. We expect this segment to experience the strongest growth worldwide in the next ten years. For that reason, we decided to acquire a majority stake in Yadon.

How will Schuler continue to grow?

Yadon gives us access to a large Chinese customer group that we have not been serving so far. In addition, we have repositioned Schuler on the Chinese market. We used to build all our presses in Germany and export them. But

Stefan Klebert: "We have repositioned Schuler on the Chinese market."



in the long term, this business model is unsustainable in terms of growth and competitiveness. China is the largest market for presses in the world, and it has the best prospects for growth. In order to tap the full potential of this market in the longterm, we need to be right there on the ground. Not only because China is adding new restrictions for importers every year, but also because we need to be intimately acquainted with this market and its needs, and able to react quickly to changes. Despite the current economic slowdown, we expect to see a growing demand for presses, especially in China, over the next few years.

Does this strategy mean fewer jobs in Germany and more jobs in China?

Jobs will be created both in Germany and in China – to which extent will depend on how successful we are in developing the Chinese market and whether we are able to maintain and expand our global market position.

Is Schuler too dependent on the volatile automotive industry?

The automotive industry is indeed one of our most important customers, and that's good because it is an industry that is growing worldwide in the long term. At the same time, our business at Schuler is independent of changes in future drive technology. Moreover, the automotive industry is very demanding, which forces us to do excellent work – not only when it comes to our products, but also in all of our processes and interactions with these clients. However, we have a broad industrial customer base far beyond the automotive sector. Our strategic goal is to develop new growth areas while developing our value chain. For instance, we've successfully entered the markets for machinery for large diameter pipe manufacturers and production of railway wheels.

Is Schuler still a global leader when it comes to press technology?

Yes, I think we can say that quite confidently. We are also the only manufacturer worldwide that offers the entire process chain for all aspects of metalforming – in addition to solutions for all the important processes in lightweight construction, be it with regard to high-strength steel, aluminum, or carbon. Our servo presses with torque motors are the best and most efficient presses on the market. FAW-Volkswagen in China is about to commission three of these modern press lines. It was one of the largest orders in the 175-year history of Schuler, and it's one of our most important references for the future.

Highlights 2015

Important orders

A US car manufacturer that is establishing new production plants for hot-stamped parts ordered four press lines from Schuler. Two lines, each including hydraulic presses, automation equipment, roller hearth furnaces, and tools, will be supplied over the next three years to plants in Germany and the USA. Schuler was also awarded orders for hot-stamping systems by German, Chinese, and other American customers.

The automotive supplier Laple Automotive, Germany, ordered a transfer press with a pressing force of 2,500 tons, including draw cushion equipment, a coil line, a roll feed, and a blank loader. This highly flexible plant produces car components for well-known manufacturers.

SuperAlloy, Taiwan, the world's second-largest producer of forged rims for cars and off-road vehicles, placed an order with Schuler for three hydraulic forging presses (each with 7,000 tons of pressing force), including a line control system.

A German automotive supplier ordered a servo forging press for aluminum transverse links. The nominal pressing force of the plant amounts to 3,150 tons. This will be the largest servo forging press Schuler has ever built.

Flex-N-Gate, USA, placed an order for two fully automated mechanical Schuler transfer presses, each with

four-point suspension and 2,500 tons of pressing force, for the manufacture of automotive components. Also in the USA, E+E Manufacturing ordered a servo press in tie-rod design with a pressing force of 2,000 tons.

Hubei Tri-Ring Auto Axle, China, placed an order for a complete forging line, comprising a spindle press, three hydraulic presses, and line automation equipment with overhead-mounted robots. The plant manufactures front suspension systems for large trucks.

Schuler received an order from Hisaka, Japan, to supply a press with multicylinder technology (pressing force: 15,000 tons) for a plant in Malaysia. Hisaka is one of the leading suppliers of heat exchangers in Asia.

Schuler secured several major orders in the blanking lines sector. A car manufacturer in the premium sector ordered two blanking lines with laser cell and an automatic stacking plant for a servo-press line in a plant in southern Germany. The systems cut blanks out of the running metal strip, which are then formed into car body parts. As a fiber laser is used for cutting, no other tools are required – unlike in conventional cutting presses. A manufacturer of premium-class electric vehicles ordered a blanking line and a coil line, cut-to-length shears, stacking units, and a control system upgrade for an existing press.

Railway technologies from ANDRITZ and Schuler

Wheels are among the most stressed components in railway vehicles, carrying axle loads of 25 tons and more. Proven technologies from ANDRITZ METALS and Schuler for the production of railway wheels fulfill the highest standards for high-speed trains in terms of safety and reliability. A customer in Asia ordered a production line for railway wheels, wheel-sets, and switches from Schuler and ANDRITZ Maerz.

The line consists of two hydraulic presses (pressing force: 5,000 and 10,000 tons, respectively) and a wheel roller from Schuler. ANDRITZ Maerz will supply a rotary hearth furnace and a plant used for heat treatment of the railway wheels.



Schuler received its largest order to date in the hydraulic service area from a car manufacturer in the premium sector. The order involves the modernization of nine tryout presses used for die tryout at various locations in Germany.

Schuler is supplying 12 sets of tools used to manufacture doors and roof frames for small pick-up truck models to Gestamp, Spain.

The Tangshan Iron and Steel Group, China, selected the business area to supply two continuous furnace plants for two new hot-dip galvanizing lines. The two heat treatment lines will have a total annual capacity of 670,000 tons and are designed to produce high-strength steel grades for the automotive industry.

Rizhao Steel, China, awarded the business area an order to supply a high-performance pickling line for hot-rolled steel strip with an annual capacity of 700,000 tons and a pickling speed of up to 400 meters per minute.

Two automatic punching presses with a pressing force of 630 tons each for forming high-strength steel strip for coupling components were supplied to Schaeffler sites in China and Mexico – two more presses of this kind were ordered for a Schaeffler site in Germany. As a result, Schaeffler now has 12 identical automatic punching presses worldwide.

Lasim, Italy, placed an order with ANDRITZ Soutec to supply the first linear laser welding plant for welding Usibor steel. Usibor steel is a pre-coated steel for hot forming, which is up to 50 percent lighter than conventional cold-formed steel grades and is used for car safety components. The Baosteel Group ordered five linear laser welding plants, and Great Wall Motors, the largest manufacturer of off-road vehicles, SUVs, and pickups in China, ordered its fifth fully automatic tailored blank laser-welding plant from ANDRITZ Soutec.

Turkish steel producer Erdemir placed an order with ANDRITZ METALS to supply a continuous furnace plant for a new hot-dip galvanizing line with an annual capacity of 350,000 tons. The plant was designed to produce high-strength steel grades for the automotive industry.

ArcelorMittal Indiana Harbor, USA, selected the business area to rebuild and modernize two walking beam

furnaces. The scope of supply also includes a specially developed skid pipe insulation system that is already being used successfully by ArcelorMittal in several other locations worldwide.

A conventionally fired rotary hearth furnace is being converted into a new regenerative heating system for Vallourec, Germany, to reduce energy consumption and increase plant safety.

As part of the modernization of a continuous annealing line for the production of carbon steel currently being undertaken by ANDRITZ, ThyssenKrupp Rasselstein, Germany, also awarded the business area an order to develop and install a new model-based control unit for a vertical annealing furnace. ThyssenKrupp Rasselstein operates the world's largest production site for packaging steel.

Fast, compact, flexible, and economical

Schuler press lines with ServoDirect technology are fast, compact, and flexible. Equipped with a blank loader, crossbar feeder (automation systems), and end-of-line system, the press lines are characterized by high productivity and quality at the same time as short die and tooling change times. With this combination, Schuler is making a decisive contribution to lowering the unit costs of parts, and thus the economic efficiency of press shops. A US car manufacturer ordered two servo-press lines in the reporting period. Another two press lines with ServoDirect technology and two servo presses for die tryout were ordered by premium car manufacturers in China.



Following the order awarded in 2014 for engineering work on rebuild of the pickling line at the global technology leader in the production of stainless steel, Outokumpu Nirosta Krefeld, Germany, an order was awarded during the reporting period to supply the related systems and equipment.

Bilstein Cold Rolled Steel, USA, ordered a reversible cold rolling mill. The scope of supply includes both the mechanical equipment and the automation system and instrumentation for the plant.

Acerinox, the world's largest producer of stainless steel, awarded an order to supply a turnkey cold strip annealing and pickling line, including a skin pass mill and leveler, for the Acerinox plant in Los Barrios, Spain. The scope of supply also includes the automation equipment, instrumentation, and electrical system for the entire plant.

Important orders for coin minting presses

Schuler will supply 31 coin minting presses to the Moscow Mint, Russia. This equipment will be used to mint kopeks, rubles, and commemorative coins. Three coin minting presses, each with a pressing force of 150 tons and a production rate of 750 coins per minute, will be supplied to the Royal Dutch Mint. With these presses, the state-owned mint with headquarters in Utrecht will mint coins intended for circulation on behalf of other countries.





Who feeds 700 million babies?



Almost one in ten of the more than seven billion inhabitants of our world is a baby or toddler. 140 million children are born each year – 20 million of them in China alone. Middle Kingdom is not only the most important commercial market for baby food production, it also sets new global standards when it comes to hygiene.

It is not easy to get a glimpse of the brand-new drum dryers that were manufactured by ANDRITZ SEPARATION and are now operating at one of Heinz Babyfood's facilities in China. If you come from Guangzhou Airport, you must first find your way through a maze of multilane highways and cut straight across the Pearl River Delta until you get to Foshan, an industrial city with approximately ten million inhabitants. Then you have to make your way to a new industrial park on the edge of the city. Some of the roads have not yet been finished. Eventually, you will come upon the dirt road that leads to the factory gates. In giant letters, the word "Heinz" is emblazoned on the facade of the 80,000-square-meter hall. Most people think of ketchup when they hear the Heinz brand name, but Heinz is an international food company with a wide range of products. Here in southern China, Heinz produces rice cereals for China's booming baby food market.

It is almost 40 degrees Celsius outside. At the gate to the production hall, every employee and visitor is greeted by an artificial cyclone that removes dust from one's clothes and prevents insects from entering the hall. In this subtropical climate, hygiene is an absolute priority. There is an initial visual check: Are all fingernails clean and short? No jewelry, rings, or band-aids? Next, we enter the blue zone: plastic covers for our shoes; hairnets and face masks; a smock. In the washing zone, our hands are washed, dried, and disinfected; lint rollers are used to clean our smocks. Five steps further, and we enter the yellow high security zone: another plastic cover for the shoes, another fresh smock. The hairnet can stay, but we receive a hard hat to go on top of it. Again, hands have to be washed and disinfected; again, the lint rollers are applied.

Heinz is one of the largest producers of baby food worldwide and has been the market leader in China for the past 30 years. About 50 percent of all children in China eat Heinz products. The food company operates a total of seven plants in China. The newest one is the plant in Foshan. Every year, it produces 7,000 tons of rice flakes for baby rice cereal in 26 different flavors, from natural to apple-mango. The annual growth rates of production are targeted at 10 to 15 percent.

The Chinese market is large, but it is also difficult. Because of the former one-child policy, parents in China pay extraordinarily close attention to the food their children eat – and even the proposed two-child policy will probably not change that. Allergens in food are an especially sensitive topic. That is why the new Heinz factory in Foshan is completely free of allergens. From the raw

materials through the production stage and all the way to the finished product, allergenic substances don't stand a chance. "This factory will serve as a global benchmark," explains Lucas Braga, the Brazilian Plant Manager at Heinz. "We want to lead the way for the entire baby food industry."

Partly because of these targets, the quality of the machines that are used to produce the baby food is extremely important. Drum dryers, mills, transportation and packaging systems – all the machinery must comply with the highest standards of quality and far exceed international norms. For this reason, Heinz experts approached ANDRITZ SEPARATION as early as November 2010 to talk about a possible collaboration. ANDRITZ Gouda, one of the world's leading manufacturers of such systems, had already supplied seven drum dryers to the factory that was here before. "We delivered the first one in 1976 and the last one in 2001," Menno Maingay, Sales Manager at ANDRITZ Gouda in the Netherlands, explains. "All seven are in such good shape that Heinz originally considered installing them in their new factory as well. Retrofitting the old drums to comply with the new, extreme quality requirements would have been quite expensive, however. That is why Heinz decided to keep using only one of the existing drums and to order four of the latest-generation model of ANDRITZ drum dryers." Lucas Braga confirms: "We chose ANDRITZ because of our previous great experiences with ANDRITZ around the globe. And of course, we also wanted to have the best available machines worldwide when it comes to production capacity, efficiency, safety, and hygiene. We were not going to compromise on that."

At the heart of the Heinz production line are the large drum dryers: Each of them weighs 27 tons and is four meters long, with a diameter of 1.5 meters. At the beginning of 2015, the first dryer started production, and now, three of the five machines are running, right on

Lucas Braga, Plant Manager at Heinz, says: "This factory will serve as a global benchmark. We want to lead the way for the entire baby food industry."



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schedule. At present, three ANDRITZ specialists from the Netherlands are on site: Jeroen Poldervaart, Research and Development Engineer; Tim Brand, Service Engineer; and Robert Krapels, Senior Automation Engineer. They will start up the remaining machines, make adjustments, and implement a new cleaning system.

In here, everyone looks the same – everybody wears protective clothing, face masks, and safety goggles. Everyone is sweating; it is very hot in the production hall. The drum dryers are heated with steam until they reach 170 degrees Celsius. Then nozzles spray rice cereal slurry with a temperature of about 100 degrees Celsius onto the drums. Cooled applicator rolls spread the product into a thin layer about 0.2 millimeters thick, and after just half a turn, copper scrapers recover the product from the dryers. That's it. At that point, residual moisture is only five



Market drivers for baby food

Even though the number of births in China has been falling for years, the demand for baby food is rising constantly because the middle class, which can afford to buy baby food, is expanding. Fewer and fewer women breast-feed and for a shorter amount of time, and families are less likely to cook at home. And it is not just China – these have been worldwide trends for some time.

- Today, more than half the world's population lives in cities, where food is no longer grown, but bought.
- In many cases, both parents work to improve their family's life or to find professional satisfaction. That doesn't leave much time to cook.
- Increasing prosperity in population-rich countries such as China, Brazil, India, or Indonesia means that more people are both willing and able to spend more on baby food.
- The demand for higher-quality products is growing.
- Baby food producers are more likely to invest in safety measures, for example, to prevent contamination or to make their products allergen-free.

China is a good example. Lucas Braga, Plant Manager at Heinz, speaks to the cultural transformation that has taken place there and about the large effect it has had on the market for baby food. "So far, China is still dominated by small-scale farming. The yields are small, and China is importing food – even rice. But the more people move to the cities, the more land is available that can be farmed by individual farmers," Braga explains. To increase yields, industrial food production will be necessary. Industrial processing of food will become more important – Heinz expects annual sales increases in the double digits.

percent. The rice slurry has turned into a paper-thin film. All that is left to do is to grind and package it. Then the finished cereal can be taken to the other side of the hall to be shipped.

Today's work is all about finishing up the details. The ventilation system and the vapor hoods over the dryer drums, for example, need to be readjusted to prevent the vapors from swirling and to make sure suction results are optimal. In addition, they are presenting a new and more hygienic method of cleaning. That is why Tim Brand is currently perched on top of one of the drum dryers, which

unless you work with very harsh detergents. But that's not what we want. Therefore, we recommend dry cleaning."

Dry cleaning is done with spatulas, brushes, and suction devices, and it is an arduous task. The Heinz employees, and even the plant manager, are watching Tim Brand's demonstration very closely. At first, they are skeptical. The results don't look as good as after a high-pressure cleaning. Some residue is left on the drum. "All of that will automatically be cleared away when the machine starts up," explains Brand. "Once the actual production process starts, it will be long gone. We have tested this very care-



was temporarily stopped. In most applications, the drums would run around the clock for about a week before a 16-hour cleaning process is initiated. But Heinz has decided to let the drums run for no more than 60 hours at a time before workers clean off any sticky or dried remainders of the rice with high pressure cleaners. "Because we are extremely strict when it comes to hygiene, we decided to shorten the production cycle quite a bit," Lucas Braga explains.

Tim Brand, the ANDRITZ Service Engineer, shows the Heinz employees how to clean the drum in a way that is more environmentally friendly and more hygienic. "If you use a pressure washer and splash water everywhere, the drum will look squeaky clean," he says. "But don't be fooled! Together with the water droplets, you will distribute microscopic particles all over the drying hall. In the moist heat, these particles are a breeding ground for microbes,

For the production of baby food, undisputed quality is of paramount importance – parents are the most critical buyers imaginable.

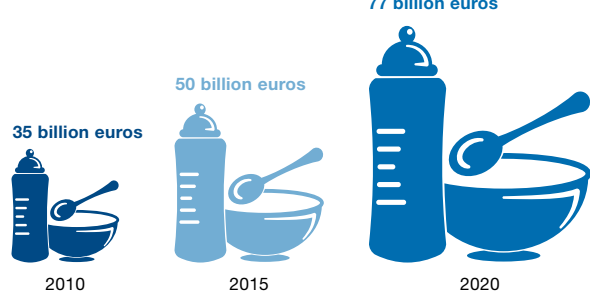
fully. Dry cleaning makes the production more efficient, more hygienic, and more environmentally friendly." Lucas Braga nods: "Okay, that makes sense." In the future, the new system will be used to clean at Heinz.

ANDRITZ manufactures these giant drums with remarkable precision. Surface roughness is never more than 0.8 μ m. One μ m is a thousandth of a millimeter. Deviations in the drums' diameters are under 0.005 millimeters. The average hair of a European or Asian is 0.05 millimeters thick. At the same time, powerful forces act on the drum dryer. The drum rotates at ten revolutions per minute, and inside, the vapor pressure reaches seven to 12 bar. "Really, these drums are just about perfect," remarks Jeroen Poldervaart with a touch of pride. And Heinz's Lucas Braga nods again. ■

The 50 billion euro market for baby food is growing rapidly

Market experts estimate that the global baby food market has reached a worldwide sales volume of nearly 50 billion euros. In the past ten years, the market grew by an average of seven percent per year. The fastest-growing regions are China, with an annual growth rate of 19 percent, and India, with 11 percent. The future looks promising: In the next five years, the market for baby food is expected to be the fastest-growing market area in the packaged food segment. Future average growth rates are expected to be even higher than the seven percent in the past, reaching up to nine percent per year.

Sales volume worldwide



Source: Zenith International, 2015



Two questions for Hidde Frankena, Head of the ANDRITZ SEPARATION business area

The baby food business is regarded as a global growth market. What is ANDRITZ's role in this market?

Sales volume in the worldwide baby food market is expected to grow to 77 billion euros by 2020 according to market experts at Zenith International, implying an average annual growth rate of nine percent. ANDRITZ has to live up to the quality standards and demands of its customers and must constantly improve the key parameters, such as production capacity, design, operator safety, energy consumption, downtime, or service requirements. The customers in this market are extremely critical and demanding, and ANDRITZ Gouda maintains good and long-standing relationships with all major players in the baby food market, with some collaborations going back almost 100 years. Regular technology discussions with our customers keep us up to date with the latest demands, enabling us to innovate accordingly and stay ahead of our competitors.

Why is the current order from Heinz Babyfood in China so significant for ANDRITZ?

The relationship between Heinz and ANDRITZ Gouda also goes back many decades. The old Heinz factory in Guangzhou was also fully equipped with seven ANDRITZ Gouda drum dryers, delivered in the early 1970s. The new technology requirements for the factory in Foshan were determined in discussions with the Heinz global infant cereal team. Heinz acknowledged ANDRITZ Gouda as the world's technology leader in the drum drying sector for baby food and infant cereals. Undisputed quality for baby food is of paramount importance – parents are the most critical buyers imaginable. Quality issues have an immediate effect on sales and on the image of the producer. As a global leader in the food industry, Heinz

has a significant market share in China, and it can and will never compromise on the quality of its products. ANDRITZ Gouda developed the entire baby food factory for Heinz in Foshan in close cooperation with the global Heinz team. The total investment for Heinz was 55 million euros. ANDRITZ Gouda supplied all the core process equipment except for the packaging machines. The Heinz site in Foshan is one of the largest baby food plants ANDRITZ has ever equipped.

Hidde Frankena: "ANDRITZ maintains good and long-standing relationships with all major players in the baby food market, with some collaborations going back almost 100 years."



FAQ

Where are the customers of tomorrow?

Over the past few years, an average of 140 million babies were born every year; 26 million of them in India alone. According to an estimate by the United Nations, the number of young customers for baby food, i.e. children from birth to the age of four, will continue to grow by eight percent to 746 million by 2025. Even in those regions where the birth rate is falling, the demand for baby food will rise continuously due to the growing middle class, which can afford to buy baby food.

North America
22
23 (+5%)

36
37 (+3%)
South America



Children aged zero to four years around the world

■ 2015 ■ 2025

in millions

Worldwide



Europe



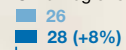
China



Asia (excluding China and India)



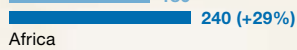
Other regions



India



Africa



Source: World Population Prospects: The 2012 Revision, United Nations Population Division



Highlights 2015

Important events

The first three of six pressure filters supplied for purifying terephthalic acid, used in the production of polyester clothing and bottles, were started up for a customer in India.

ANDRITZ SEPARATION successfully installed a dynamic cross-flow filtration system for a large Italian supplier of components for the automotive industry. The filter has a filtration area of 32 square meters and is utilized for the recovery of oil from steel particles.

The first craft beer clarifier supplied by the business area to China was successfully put into operation. Craft beer brewing is a fast-growing market in China.

The relaunch of the decanter centrifuge, Type D, was completed successfully. The decanter offers customers in the environmental sector a reduction of up to 40 percent in energy consumption, while maintaining the same throughput and dewatering efficiency.

ANDRITZ CentriTune was launched worldwide. This automation solution enhances performance and availability of new decanter centrifuges and of existing centrifuges supplied by ANDRITZ and by other suppliers. Speed, torque, and other decanter centrifuge parameters are controlled individually, achieving consistent product quality and optimized production rates.

Product development work has been completed for the world's largest peeler centrifuge. This batch-type centri-

fuge is designed for separation of ultra-fine particles especially in the food industry and the chemical industry and has a diameter of two meters and a surface area of nine square meters. The first two units were sold to a customer in the Philippines.

ANDRITZ Feed Technologies launched a new paddle mixer for feed components. The main benefit of the innovative ANDRITZ OptiMix mixer is the high speed, mixing up to 30 batches per hour, which is three times faster than the previous generation of mixers.

Important orders

The business area received an order for two large decanter centrifuges for the processing of municipal wastewater for a customer in Arizona, USA. The decanters achieve higher solids dryness compared to similar equipment and reduce disposal costs.

A major supplier of water solutions in the USA ordered four of the business area's largest decanter models for a new salt/borax processing application. The units enable high-capacity throughput at a low start-up cost. In addition, this customer ordered a heavy-duty belt press for a wastewater and brine application, which requires materials that are corrosion-resistant due to the amount of chlorides present.

A belt drying system for drying a mixture of municipal solid waste and refuse-derived fuels will be delivered to a





customer in the UK. The material is dried using waste heat from the plant.

A customer in Denmark ordered an energy-efficient thermal oil system. The system includes a burner and a thermal oil boiler and will significantly reduce natural gas consumption.

In order to lower operating costs, a German cement producer ordered two paddle dryer units. Municipal sludge will be dried in a cement kiln tower using waste heat from the chimney.

A customer in Peru selected the business area to provide a heavy-duty belt press for the dewatering of coke slurry. ANDRITZ SEPARATION is the only supplier worldwide to have reference plants for this process.

The business area received an order to supply a vacuum belt filter for a copper mining company in China. The filter will improve dewatering capacity and increase production throughput.

Numerous important orders were noted in the food sector. One of the largest dairies in Brazil ordered two large separators. The machines are integrated into the automated ANDRITZ monitoring and control system, which reduces discharge losses by up to 50 percent. The business area received an order to supply a separator for high-level purification of fish oil for a customer in South Africa. As part of the extension work to a plant in Denmark, the world's largest producer of functional proteins from pork placed an order for delivery of two individual drum drying systems. What is now the sixth individual drum dryer will be supplied to a producer of sugar and yeast products in Belgium. A French customer ordered four

New and innovative products

ANDRITZ SEPARATION launched three new products in the food industry: Lattomatic (photo page 64), an automatic milk fat standardization unit; Brillante, a newly designed olive oil separator, and CremaViva (photo left), a new separator for processing cold milk that ensures gentle treatment of milk fat globules, producing higher-quality cream at low temperature with significant energy savings.

decanter units for processing casein, a protein product derived from milk.

Numerous starch producers worldwide ordered siphon peeler centrifuges: A customer in Brazil took delivery of two peeler centrifuges and a helical dryer for the production of substances contained in pharmaceuticals. A total of 10 peeler centrifuges will be delivered to a starch tapioca plant in Thailand and additional units to plants in Indonesia, South Korea, and Egypt.

The following important orders were noted in the chemical/petrochemical sector:

Two fluidized bed dryer systems were supplied to customers in Turkey; one system is used for drying heavy sodas and sodium bicarbonates (the new system reduces the volume of exhaust air to be treated by around 40 percent compared to the previous system and thus yields significant energy savings), while the second system is to be installed as part of an expansion project in another soda plant. Two decanters to increase production of the polymer binder hydroxyethyl cellulose (HEC) will be delivered to a large chemicals producer in the USA. A customer in Saudi Arabia ordered two thickeners for water recovery in the production of phosphoric acid. A large chemicals producer in Germany is expanding production capacity and has placed an order for supply of a contact drum dryer for processing polyvinyl substances. Another large chemicals producer in Germany will take delivery of three side-bar filter presses for a new catalyst line to be built for pigment/dye applications. Two double-drum drying units have been sold to a chemicals producer in Norway for the production of soap. Filter centrifuges will be supplied to a soda ash producer in Turkey.

An Iranian customer ordered a fluidized bed dryer system with auxiliaries for a greenfield urea granulation project.

A Canadian copper mining company ordered a large package of replacement parts for a filter press unit. The largest order for filter cloths was received from a minerals mining customer in Peru.

Several orders to supply new aquatic feed and animal feed process lines were received from customers in North America, Asia, Europe, and Latin America. Orders for biomass pelleting equipment were received from numerous customers in Asia and North America.



FAQ

How many apprentices does ANDRITZ have?

At the end of 2015, ANDRITZ had almost 800 apprentices in training worldwide. 41 ANDRITZ subsidiaries within the Group offer apprenticeship training onsite at their locations – in Brazil and Mexico, among others.

FAQ

How much was paid to ANDRITZ employees in wages and salaries in the last 10 years?

During this period, personnel expenses amounted to approximately 10 billion euros (including wages and salaries; pension, severance, social security, and other expenses). ANDRITZ had 10,000 employees 10 years ago; today, there are about 24,500.



SKF Service-Handbuch

Fachkunde Metall Mechanische Technologie

Tabellenbuch Metall

Metallbautechnik Fachbildung

Handwörterbuch Der Schmied am Amboss



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In the 2015 financial report, you can find the most important information about business development, outlook, risk management, corporate risks, research and development, corporate governance, as well as the Supervisory Board report and the consolidated financial statements of the ANDRITZ GROUP. The financial report and the annual report are available for download at www.andritz.com or can be requested as printed copies free of charge by sending an e-mail to investors@andritz.com.

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