

METSÄ FIBRE

ANNUAL REVIEW 2017



Metsä

PROFITABLE AND SUSTAINABLE BUSINESS AT METSÄ FIBRE

Metsä Fibre is the world's leading supplier of bleached softwood market pulp following the start-up of the new Äänekoski bioproduct mill in 2017 as planned. Our production capacity increased to 3.2 million tonnes. In addition, we are a major supplier of sawn softwood timber, with an annual production of 1.9 million cubic metres. Changes in the operating environment create opportunities for Metsä Fibre to lead the way in sustainable bioeconomy.

GROWING MARKETS

Demand for pulp and sawn timber is growing worldwide. The growth rate of the demand for pulp has been two million tonnes per year, with the fastest growth taking place in Asia. Our increasing capacity for pulp production, supported by the Äänekoski bioproduct mill, will strengthen our position, especially in the Asian market.

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CONTINUOUS IMPROVEMENT


We are developing our business in accordance with the principles of continuous improvement. We have strengthened our competitiveness by investing in cutting edge technology and competence development. Our skilled personnel, our production units, which are all in good shape, and our operating models bring about growth.

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The MetsäBoard Prime FBB Bright folding boxboard used for the cover of this annual review is manufactured at Metsä Board's Äänekoski mill. The surface layers of the three-layer folding boxboard are made from chemical pulp from Metsä Fibre's Äänekoski bioproduct mill, and the high-yield pulp of the middle layer is manufactured at Metsä Board's Joutseno mill. MetsäBoard Prime FBB Bright is made from pure fresh fibre. It is a fully coated paperboard, suitable for packaging and graphical end uses. The other raw materials come from reliable suppliers who comply with Metsä Group's Supplier Code of Conduct and Sustainability Principles.

BEST IN THE INDUSTRY

Our expertise makes us a sought-after partner with services that provide the optimal value for our customers.

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THE NEXT-GENERATION BIOPRODUCT MILL

The world's first state-of-the-art bioproduct mill at Äänekoski was completed in 2017 to significantly improve our competitiveness, along with both our production and environmental efficiency.

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Metsä Fibre Oy
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The annual review is published in English, Finnish and Chinese. It is available in PDF format at www.metsafibre.com.



Metsä Group
Sustainably
from the forest



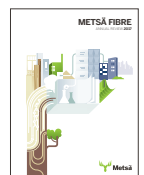
Metsä Group
Financial
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Metsä Group
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Metsä Board
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2017



Metsä Fibre
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2017

METSÄ GROUP

SALES* EUR **5.0** BILLION

PERSONNEL **9,100**

METSÄLIITTO COOPERATIVE

GROUP'S PARENT COMPANY

OWNED BY 104,000
FINNISH FOREST OWNERS

METSÄ FOREST

WOOD SUPPLY AND FOREST SERVICES

Sales **EUR 1.6 billion**
Personnel **850**

Holding
Metsäliitto Cooperative 100%

METSÄ WOOD

WOOD PRODUCTS

Sales **EUR 0.5 billion**
Personnel **1,400**

Holding
Metsäliitto Cooperative 100%

METSÄ FIBRE

PULP AND SAWN TIMBER

Sales **EUR 1.9 billion**
Personnel **1,200**

Holding
Metsäliitto Cooperative 50.1%
Itochu Corporation 25.0%
Metsä Board Oyj 24.9%

METSÄ BOARD

PAPERBOARD

Sales **EUR 1.8 billion**
Personnel **2,350**

Holding
Metsäliitto Cooperative 41.5%,
61.4% of votes

METSÄ TISSUE

TISSUE AND COOKING PAPERS

Sales **EUR 1.0 billion**
Personnel **2,800**

Holding
Metsäliitto Cooperative 100%

* internal sales eliminated

PRODUCTION OF RENEWABLE ENERGY 24 TWh

METSÄ FIBRE

KEY FIGURES	2017	2016 ¹⁾	2015	2014	2013
Sales, EUR million	1,876	1,351	1,445	1,296	1,314
Operating result, EUR million	320	230	337	228	197
Comparable operating result, EUR million	320	219	337	208	197
Return on capital employed, %	24	20	42	30	29
Equity ratio, %	48	57	67	66	71
Net gearing ratio, %	35	23	-36	-40	12
Investments, EUR million	407	548	250	26	27
Pulp production, 1,000 tonne	2,487	2,317	2,353	2,257	2,297
Sawn timber, 1,000 m ³	1,852	1,795			
Wood consumption, million m ³	16.7	13	13	12	13
Personnel, 31 December 2017	1,284	1,231	857	842	873
Lost-time accident frequency rate, per million worked hours, incl. all accidents at work leading to absenteeism	5.2	7.2	7.9	4.9	8.4
Share of certified wood, %	92	90	87	87	85
Electricity self-sufficiency rate, pulp mills, %	138	142	151	149	144

PRODUCTION	2017	2016 ¹⁾	2015	2014	2013	Capacity	ISO 9001	ISO 14001	ISO 50001	OHSAS 18001	ISO 22000	PEFC™ COC	FSC® COC/CW
Pulp mills, 1,000 tonne													
Joutseno	655	619	658	594	604	690	x	x	x	x	x	x	x
Kemi	598	604	585	552	564	610	x	x	x	x	x	x	x
Rauma	568	585	602	607	612	650	x	x	x	x	x	x	x
Äänekoski ²⁾	666	510	507	504	516	1,300 ³⁾	x	x	x	x	x	x	x
Total	2,487	2,317	2,353	2,257	2,297	3,250							
Capacity utilisation, %	91	93	96	92	95								
Sawmills, 1,000 m³													
Eskola	47	49	53	60	58	60	x	x	x	x		x	x
Kyrö	232	219	200	219	215	230	x	x	x	x		x	x
Lappeenranta	253	234	216	226	228	240	x	x	x	x		x	x
Merikarvia	223	227	205	205	202	230	x	x	x	x		x	x
Renko	310	322	259	301	298	325	x	x	x	x		x	x
Vilppula	514	481	452	418	351	500	x	x	x	x		x	x
Metsä Svir (Russia)	274	263	251	233	244	270	x	x	x	x		x	x
Total	1,852	1,795	1,636	1,662	1,596	1,855							

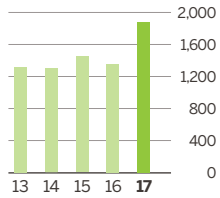
¹⁾ Metsä Group's sawmills were integrated into Metsä Fibre on 1 November 2016.

²⁾ The previous Äänekoski mill production during 1-8/2017, and the new bioproduct mill's production during 8-12/2017. This figure is the combined production at Äänekoski in 2017.

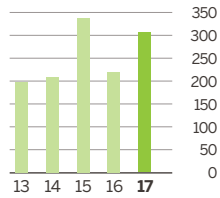
³⁾ The capacity of the previous mill at Äänekoski until 8/2017 was 530,000 tonnes per year. The annual capacity of the new bioproduct mill is 1.3 million tons.

YEAR 2017

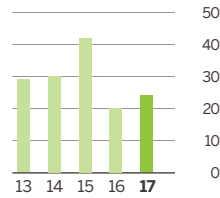
SALES
EUR MILLION



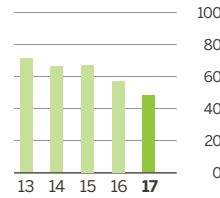
COMPARABLE OPERATING RESULT
EUR MILLION



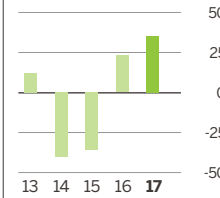
RETURN ON CAPITAL EMPLOYED
%



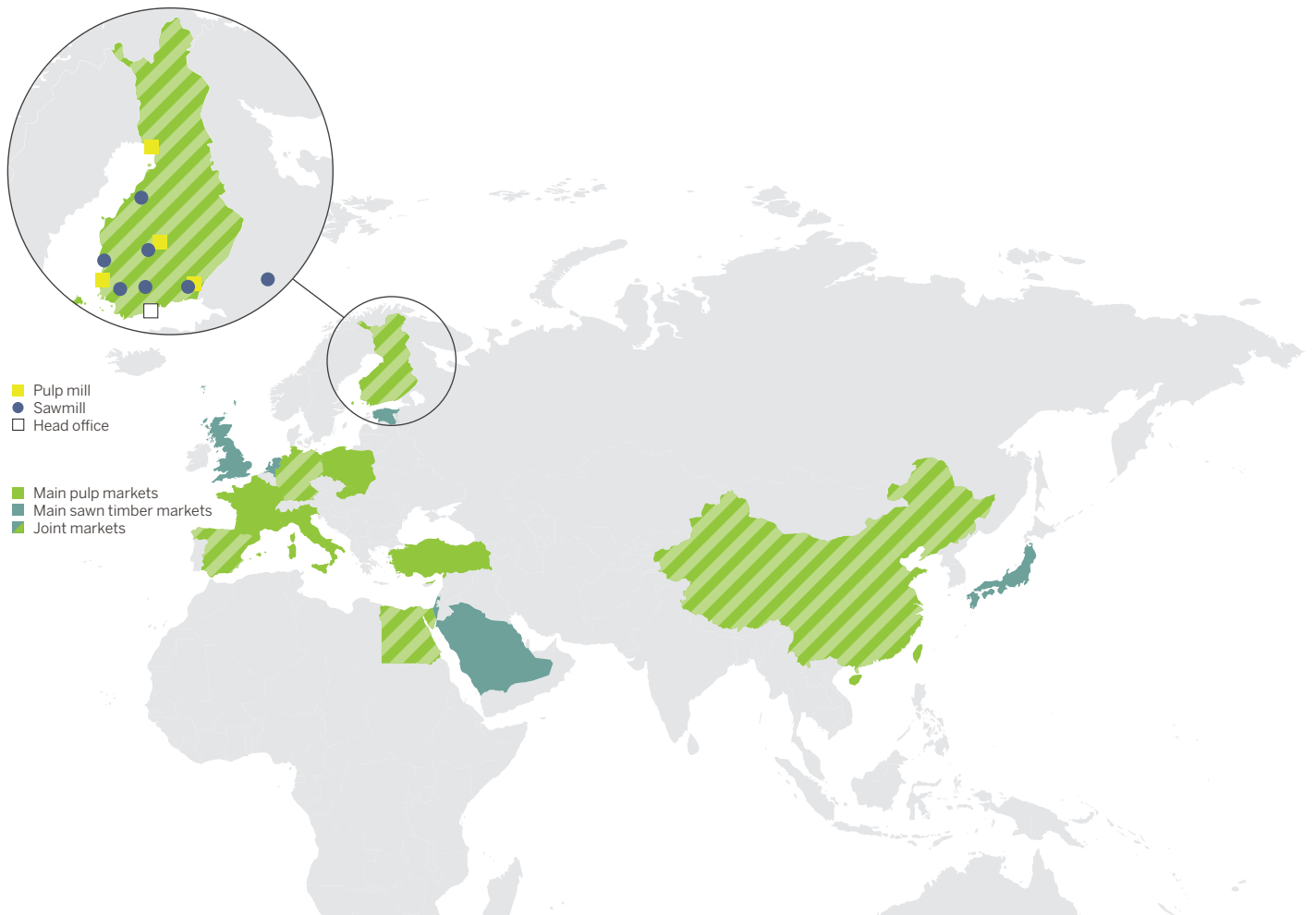
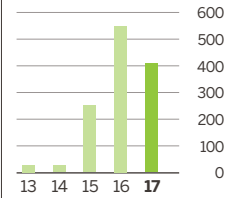
EQUITY RATIO
%



NET GEARING RATIO
%



INVESTMENTS
EUR MILLION



MILLS

JOUTSENO MILL

- 690,000 tonnes bleached softwood pulp
- 135 employees

RAUMA MILL

- 650,000 tonnes bleached softwood pulp
- 120 employees

KEMI MILL

- 610,000 tonnes bleached softwood and hardwood pulp
- 158 employees

ÄÄNEKOSKI MILL

- 1.3 million tonnes bleached softwood and hardwood pulp
- 187 employees

SAWMILLS

ESKOLA SAWMILL

- 60,000 m³ sawn timber
- 10 employees

METSÄ SVIR SAWMILL

- 270,000 m³ sawn timber
- 115 employees

KYRÖ SAWMILL

- 230,000 m³ sawn timber
- 68 employees

RENKO SAWMILL

- 325,000 m³ sawn timber
- 60 employees

LAPPEENRANTA SAWMILL

- 240,000 m³ sawn timber
- 60 employees

VILPPULA SAWMILL

- 500,000 m³ sawn timber
- 78 employees

MERIKARVIA SAWMILL

- 223,000 m³ sawn timber
- 75 employees

A FORERUNNER IN SUSTAINABLE BIOECONOMY



TOGETHER WITH OUR NEW BIOPRODUCT MILL CONCEPT, WE ARE DETERMINED TO OVERCOME ANY CHALLENGES THAT THE FUTURE HOLDS.

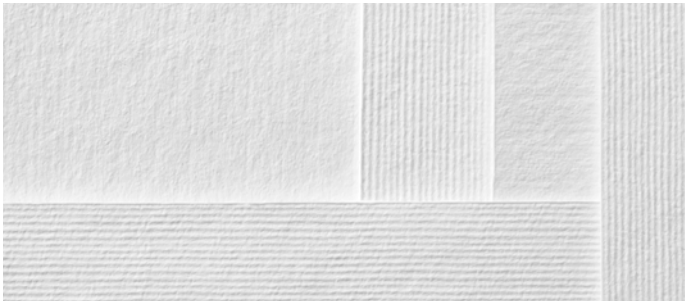
We achieved a significant milestone at Metsä Fibre in 2017. We increased our production capacity of softwood market pulp to 2.4 million tonnes with the new bioproduct mill at Äänekoski, which makes us the world's leading supplier of bleached softwood market pulp. In addition, we are a major supplier of sawn softwood timber, with an annual production of 1.9 million cubic metres. We have also increased the production of other bioproducts, such as biochemicals and bioenergy.

Global changes – including climate change, population growth, urbanisation, the rise of living standards and digitalisation – set global challenges. We are responding to these challenges with our bioeconomy-based products and the continuous development of our operations, and exploit them as sustainable business opportunities.

NEXT-GENERATION BIOPRODUCT MILL

The most important event in our company this year was the start-up of the bioproduct mill according to schedule, on 15 August. The world's first next-generation bioproduct mill is the biggest investment in the history of the Finnish forest industry.

Our investment project was completed exactly according to the defined schedule and budget. The shutdown of the old mill and the start-up of the new mill occurred according to plan. Also in line with the plan, we will reach a nominal capacity of 1.3 million tonnes at the new mill in the summer of 2018. The



investment project and the mill's start-up have served as a strong demonstration of our project and process skills, as well as the strong professional skills and cooperation of many partners and individuals.

The bioproduct mill concept allows us to strengthen the company's resource efficiency and process biomaterials, biochemicals and bio-energy in a sustainable and efficient way. We put to use all of the raw material and side streams.

We are also actively and systematically exploring new product paths, including lignin products and textile fibres. The new mill concept represents our goal-oriented response to future challenges.

The new production capacity will increase our need for wood raw material to a significant degree. We have combined the synergies of our sawmill and pulp businesses efficiently in the supply and use of wood raw material to ensure cost-effectiveness.

FOCUS ON CUSTOMER COOPERATION

Our company aims to be the preferred supplier of premium bioproducts and services that support our customers' operations. Customer-orientation is the cornerstone of our operational development. We have continued our active dialogue with our customers on their current and future needs.

We want our customers to see our values – reliability, cooperation, renewal and responsible profitability – being implemented in an increasingly clear way in everything we do.

Our growing capacity for softwood market pulp will strengthen our position, particularly in the Asian markets. A bigger proportion of our sawn timber production than before also ended up in the growing Asian markets in 2017. Continuous improvement in the quality of our products, solid technical customer service and delivery reliability are our strengths. Our strategic objective is to maintain the modernity of our mills and sawmills and thereby to keep their operating reliability at a high level. This allows us to provide our customers with a high degree of delivery reliability in terms of our products.

OPERATIONS BASED ON SUSTAINABILITY

In 2017, we continued our long-term work to improve safety at work. In respect of the accident frequency of our personnel, we achieved the rate 5.2 (LTA1), which translates into an improvement of over 25 per cent.

Our environmental performance also improved during the year. Now that the new bioproduct mill has started up, we will continue to reduce the wastewater emission levels of our mills even further and strengthen our trailblazing position in the improvement of the pulp industry's environmental performance.

The bioproduct mill is also a major producer of biopower. A high level of efficiency in energy production and the energy-efficient process significantly increase the amount of bioelectricity available for sale. Our bioproduct mill alone accounts for 2.5 per cent of Finland's total electricity production. Nor do we use fossil fuels at our new mill.

THE GROWING IMPORTANCE OF COMPETENCE AND CONTINUOUS IMPROVEMENT

The competence of our personnel and its continuous development are becoming an increasingly solid foundation for our future competitiveness. During the year, we invested particularly in high-quality and coaching-type supervisory work as well as in involving our personnel in the company's development.

Metsä Fibre has a strong foundation. The markets for our products are growing and we are using them to build a sustainable bioeconomy. The systematic, continuous development of our company is based on reliability, cooperation and renewal in cooperation with our customers, personnel and other stakeholders. I want to thank everyone for our long-term profitable cooperation.

We continue the purposeful development of our operations. We are a forerunner in sustainable bioeconomy.

Ismo Nousiainen

CEO
Metsä Fibre

WE ARE BUILDING EXCELLENCE BASED ON OUR STRENGTHS

Metsä Fibre's strategic vision is to be the first-choice supplier of premium-quality bioproducts and services that support its customers' operations. Our success is founded on customer focus, high-quality products and reliable deliveries.

We are the most professional and skilled player in the pulp and sawmill business, and the most efficient operator in the industry. We continuously develop our competitiveness in efficient industrial production. We are the leading operator in the global market for softwood fibre and a major operator in the production of sawn timber.

Our operations are based on openness, and we pay special attention to sustainable development in our operations. We ensure our environmental efficiency and cost-effectiveness and the high quality of our products through efficient production and continuous improvement.

Global megatrends – such as population growth, urbanisation, the rise of living standards and the scarcity of non-renewable raw materials – are creating many opportunities, to which we are responding through sustainable bioeconomy.

HIGH-QUALITY PRODUCTS AND ADDED VALUE FOR CUSTOMERS

We cooperate with our customers to improve their business operations and profitability over the long term. We are proven to be a reliable partner for our customers.

We lead the way in the market, and we have the technical competence to provide customers with high-quality products that meet their needs and with services that create added value. Our consistency and predictability allow us to keep our promise of reliability.

Effective maintenance and timely investments ensure that our production plants are well-managed. This guarantees their good condition, high utilisation rate and delivery reliability. Effective logistics is one of the cornerstones of our operations.

We invest in knowledge and skills and the development of our employees and organisation, and in partnerships. We shape our operations consistently over the long term. Metsä Fibre's operations aim for excellence.

NEW BIOPRODUCTS THROUGH PARTNERSHIPS

New bioproducts will offer significant opportunities in the future. We are studying new processes and product paths, which will be implemented in phases. Our networks and partners play a significant role.

Metsä Fibre focuses on its core operations: the production of pulp, sawn timber, biochemicals and bioenergy. We are examining new product options in cooperation with our partners.

Our bioproduct concept has reached the production phase according to plan. Our new mill in Äänekoski is already using bark to produce product gas, odorous gases to produce sulphuric acid for the mill, and sludge from pulp production to produce biogas. Metsä Fibre's mill in Rauma is using its pulp production side streams to produce a biocomposite.

The bioproduct mill is an excellent example of the results of our strategy. It enables us to meet the demand in the growing pulp market and to take our environmental performance to a new level. We are achieving results sustainably by improving production efficiency and developing our expertise. The bioproduct mill is environmentally efficient, as it uses no fossil fuels.

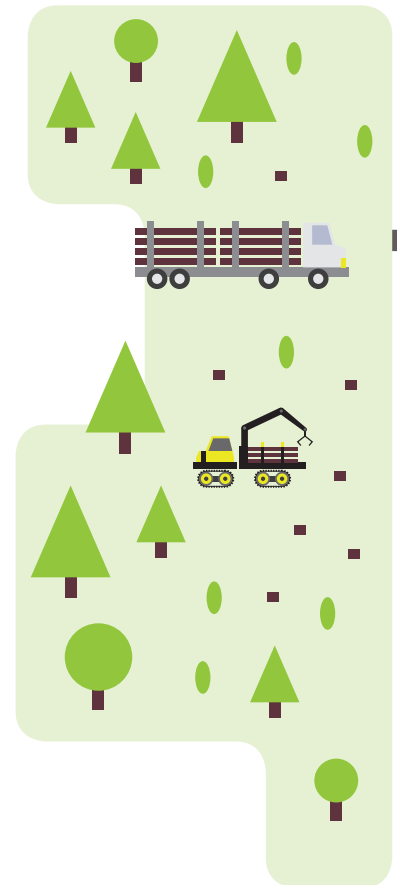
It reflects our values, which we want to be visible to our customers in all of our operations: cooperation, renewal, reliability and responsible profitability.

VISION

The customers value Metsä Fibre as their preferred supplier for high-quality bioproducts and services that create value to their business

MISSION

The most professional and efficient company in the pulp and sawn timber industry



VALUES

COOPERATION

We develop our operations in cooperation with our customers and share information and best practices with each other. We operate as one group of companies, utilising mutual synergies and relying on common benefits.

RELIABILITY

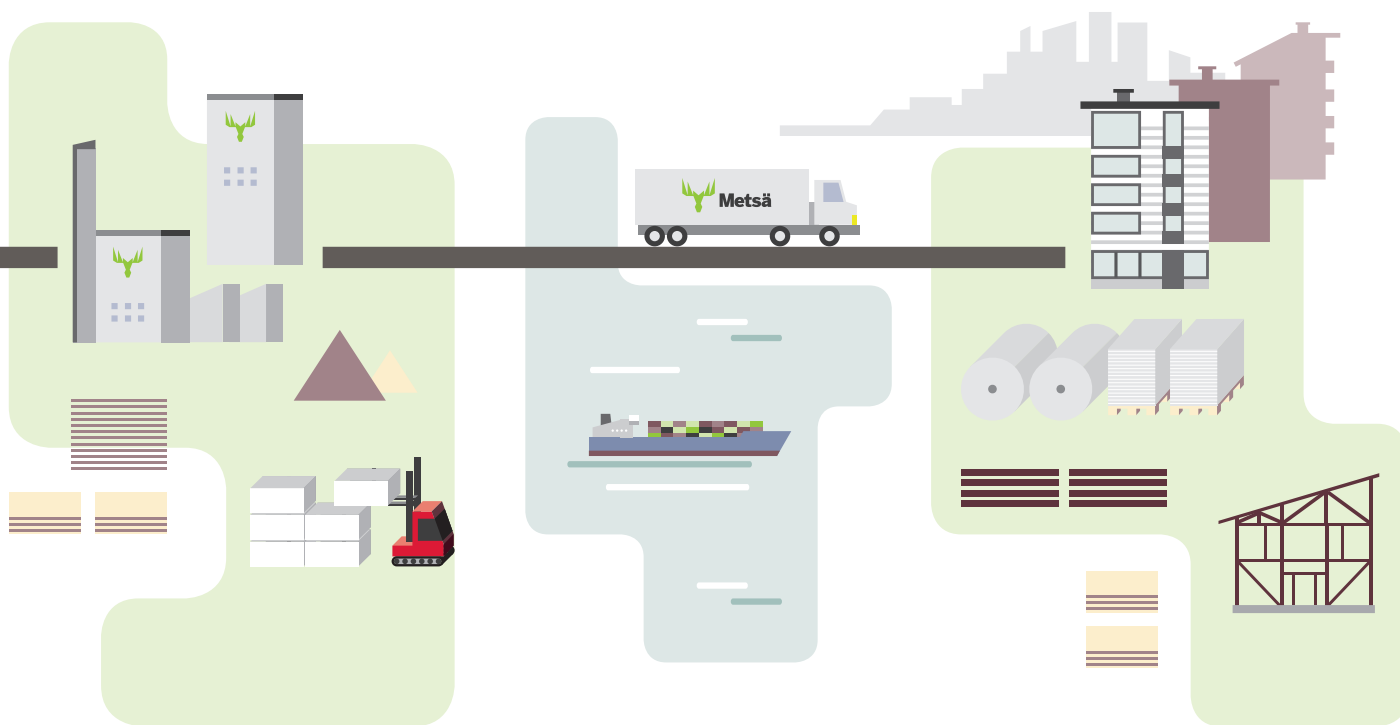
Our success is based on long-term cooperation with our stakeholders. We appreciate the work and competence of each other and strengthen the confidence of our various stakeholders by acting in a consistent and predictable way.

RENEWAL

We are aware of future challenges and have the courage to question old practices in order to provide better products and services to our customers in support of their business operations.

RESPONSIBLE PROFITABILITY

We bear responsibility for the environment, our partners and each other to ensure successful business activities and forestry. Profitability is an absolute prerequisite for the continuous development of operations.



COMPANY KEY TARGETS

OWNER

We create added value to our owners

CUSTOMER

We are the most reliable partner

INTERNAL EFFICIENCY

We make a profit responsibly

COMPETENCE

We continuously challenge ourselves

CUSTOMER PROMISE

- High-quality bioproducts
- Technical customer service
- Efficient logistics
- Sustainability
- Partners in business

THE KEYS TO SUSTAINABLE GROWTH

We have strengthened our competitiveness by investing in cutting edge technology and competence. The successful start-up of the bioproduct mill continues to improve our production and environmental efficiency. The synergy benefits of the integration of the pulp and sawmill businesses will make us an even stronger operator in the global market.

The most long-awaited event in 2017 was the completion of the Äänekoski bioproduct mill according to its schedule and budget, in August 2017. The start-up of the new mill and the shutdown of the old mill progressed in an exemplary way, with no significant breaks in production. The bioproduct mill will achieve its nominal capacity of 1.3 million tonnes of pulp in the summer of 2018. In terms of the growing demand for pulp, the start-up of the bioproduct mill was extremely well-timed.

The bioproduct mill improves our productivity – i.e. production and environmental efficiency – to a significant degree. The adoption of new technologies in the production of product gas and sulphuric acid has proceeded successfully as part of the concept of the bioproduct mill.

SYNERGY FROM THE INTEGRATION OF THE TWO OPERATIONS

The past year was the first full year during which Metsä Group's sawmill business operated as part of Metsä Fibre. We have worked hard to integrate the pulp and sawmill business processes and achieved the synergy benefits we pursued in the supply of wood raw material and product logistics.

The work to develop shared ways of working continues unabated. The growing demand for sawn timber and pulp in China, for example, creates new opportunities around product logistics.

HIGH OPERATIONAL RELIABILITY, EFFICIENT PRODUCTION

In 2017, we continued the active development of operational reliability at all of our pulp mills. We achieved the 98 per cent operational reliability we had set as an overall target. The high degree of operational reliability creates a basis for the continuous improvement of production levels and the products' delivery reliability. It also guarantees premium product quality, cost-effective and environmentally efficient production, and safety at work.

Our environmental performance was solid across the board, and with the Äänekoski bioproduct mill, it will rise to a new level.

RECORD PRODUCTION IN SAWMILL BUSINESS

Metsä Fibre is Finland's biggest producer of sawn timber and also a major producer on the European scale. In terms of the sawmill business, we achieved a new record in production in 2017, with a total annual

production of 1,852,000 cubic metres. General trends in wood construction and economic growth in the main market areas strengthened demand for sawn timber. The prices of sawn timber also increased slightly during 2017.

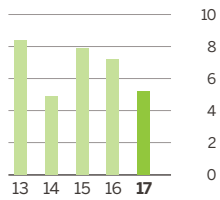
Our sawmills use the best properties of high-quality raw material and, with the help of modern production technology, are able to customise their sawn timber according to the individual wishes of each customer.

The spruce raw material we use is known for its high-quality, consistent appearance. The dense fibres and lightness, combined with an excellent grade of strength, make it an ideal material for almost any application that requires a high level of quality.

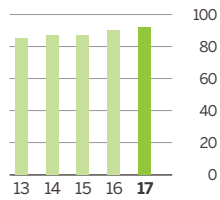
High-quality northern pine is a popular material in the furniture and woodworking industry due to its consistent look and high proportion of heartwood. The technical properties of the dense-fibred pine used in the products are excellent.

The majority of our sawn timber is exported: some 90 per cent of spruce and roughly 80 per cent of pine. The biggest export destinations are the Middle East and Africa, the UK and China, as well as European countries such as France.

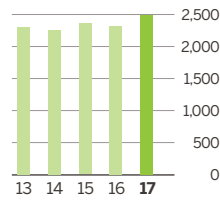
LTA1 RATE
/MILLION WORKED HOURS



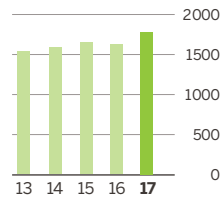
SHARE OF CERTIFIED WOOD
%



PULP PRODUCTION
1,000 TONNE



SAWN TIMBER
M³



A COMPETITIVE EDGE THROUGH COMPETENCE DEVELOPMENT

Ismo Nousiainen, who became CEO of Metsä Fibre at the beginning of 2018, emphasises how important skilled personnel is for a company's success.

“Our production units and operating models are in very good shape. By continuously investing in our personnel's competence development and well-being at work, we keep gaining competitive advantage.”

The Mills of the Future operating model developed by Metsä Fibre's personnel has proven to be a good tool in the utilisation of their diverse skills. The model is based on jointly defined goals, autonomous teams and shared leadership.

The most important indicator of success in this work is a satisfied customer, who gets added value from the cooperation.

“We want our customers to always see us working according to highest quality standards, in a concrete way,” Nousiainen says.



TOWARDS BETTER BUSINESS THROUGH STRATEGIC PARTNERSHIPS

Metsä Fibre is the world's biggest producer of bleached softwood market pulp and Finland's biggest producer of sawn timber. Our portfolio of bioproducts also includes biochemicals and renewable energy. The objective behind all our operations is to be the preferred supplier of premium bioproducts and services that support our customer's business operations.

Metsä Fibre's high-quality bleached softwood and hardwood pulp are the best raw material for premium printing papers, tissue paper, paperboard and specialty products. We delivered 2.5 million tonnes of pulp in 2017. With our new bioproduct mill, we are responding to the growing global demand for pulp as a responsible forerunner by delivering 0.8 million tonnes of more pulp to the market.

Approximately 57 per cent of the pulp we produced was delivered to customers in Europe, while roughly 35 per cent to customers in Asia. The demand for pulp has experienced the fastest growth in Asia, particularly in China.

We work in close cooperation with our customers so that our products and services will meet their needs now and in the future.

Most of our spruce and pine sawn timber are used as materials in the planing industry,

woodworking industry, construction and packaging industries. In 2017, our sawmills set a new production record, delivering a total of 1,852,000 cubic metres of sawn timber to the markets.

Metsä Fibre is one of the largest manufacturers of biochemicals in the world. Our customers convert the raw tall oil and raw turpentine generated in pulp production into raw material for biofuels, adhesives, rubbers, inks and odourisers, among others things.

Our production of renewable energy exceeds our own needs. The bioproduct mill will raise Metsä Fibre's self-sufficiency in electricity to a new level.

ADDED VALUE COMES FROM COMPETENCE

Close cooperation and continuous development work generate added value for

our customers. We can offer our customers products that improve their cost-effectiveness and ensure the quality of their products. Our fibre excellence is part of the strong Botnia brand. We understand our customers' businesses and needs.

The technical services offered by our experts help fine-tune a customer's production process. At its deepest level, the partnership evolves into innovation in cooperation with a customer.

We develop our operations continuously on the basis of the feedback. According to the feedback we have received from customers, we are a reliable partner. We are working to ensure that our customers can continue to trust us in the future as well.



THE IDEABOOSTER ENHANCES INNOVATION

Metsä Fibre's Botnia IdeaBooster is an online service that enables the collection of ideas and development needs from customers, regardless of time and place. The tool allows for including a vastly greater number of participants in the innovation process than what would be possible in the context of a traditional brainstorming session. The fact that the participants can comment on each other's ideas and advance them together has proven particularly useful.

According to **Tuomo Niemi**, Technical Customer Service Manager at Metsä Fibre, the IdeaBooster has been used with the company's key customers, primarily as an aid to development. The proposed ideas can,

for example, help Metsä Fibre to increase the customer's efficiency and number of product innovations or to exploit the themes of sustainability. We have also achieved practical results:

"With one customer, we were able to collect nearly 70 cooperation ideas through IdeaBooster, these ideas garnering nearly 100 comments. We then selected the four themes deemed as most important and implemented concrete projects focused on them. The outcome was that we successfully increased the efficiency of the customer's production process and improved the performance of the end-product," Niemi says.

SALES VOLUMES BY PULP MARKET AREAS 2017
%



■ Finland.....	35
■ Europe, excl. Finland.....	22
■ Middle East and North Africa, Turkey.....	8
■ Asia.....	35

END USE OF BOTNIA NORDIC PULPS 2017
%



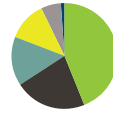
■ Board.....	35
■ Tissue paper.....	34
■ Printing paper.....	22
■ Speciality papers.....	8
■ Others.....	1

SAWN TIMBER SALES VOLUMES BY MARKET AREAS 2017
%

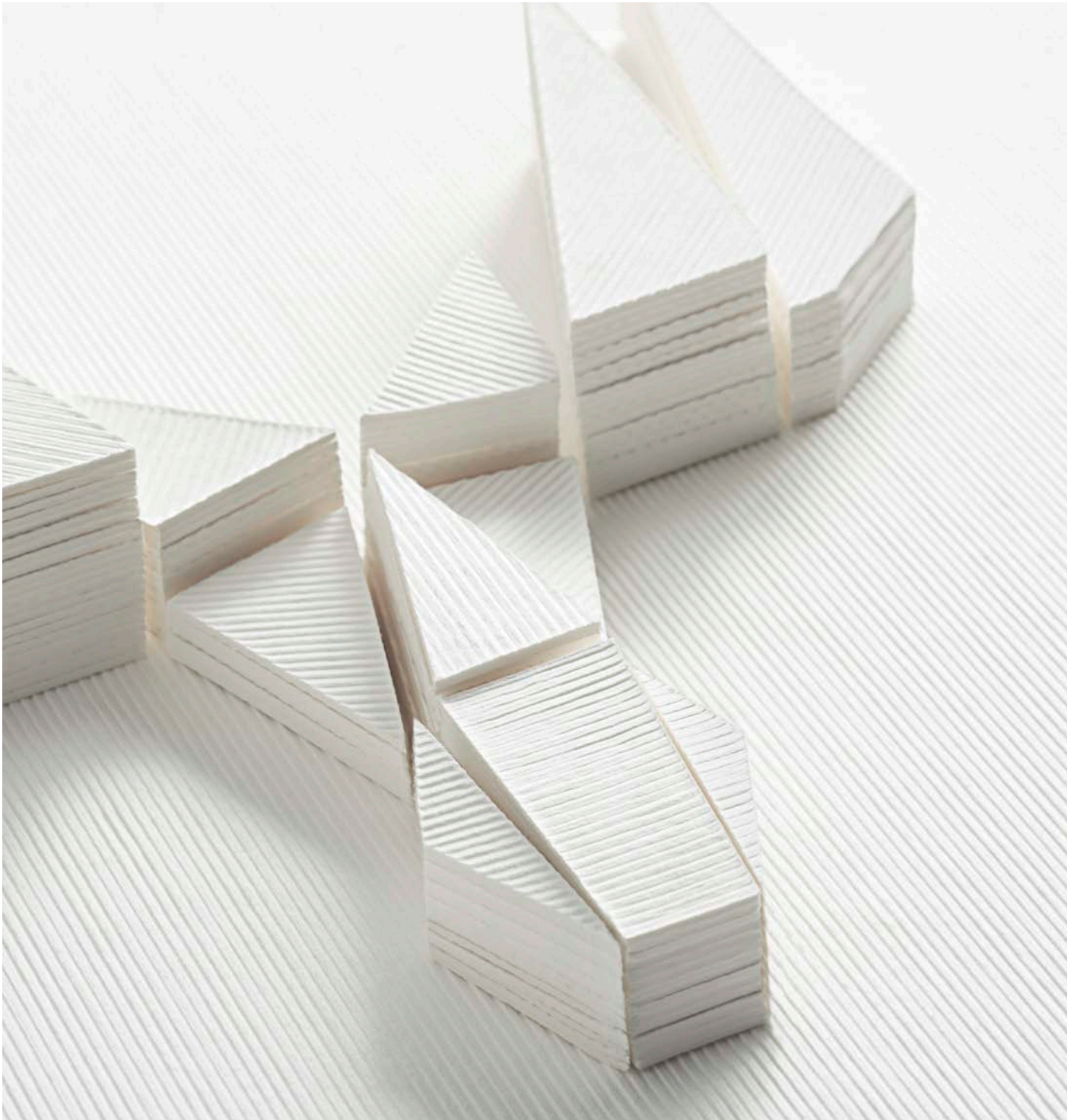


■ Finland.....	12
■ Europe, excl. Finland.....	38
■ Middle East and North Africa, Turkey.....	25
■ Asia.....	24

END USE OF SAWN TIMBER 2017
%



■ Distribution.....	44
■ Planing industry.....	22
■ Other industries.....	15
■ Woodworking industry.....	12
■ Internal deliveries.....	6
■ Construction industry.....	1



THE BIOPRODUCT MILL TAKES RESOURCE EFFICIENCY TO A NEW LEVEL

The next-generation bioproduct mill built by Metsä Fibre at Äänekoski started up according to plan on 15 August 2017. The EUR 1.2 billion investment was completed exactly according to its schedule and budget.

Metsä Fibre's new bioproduct mill at Äänekoski is the biggest forest industry investment in the history of Finland. The mill replaced the pulp mill which had operated in the area since 1985 and the demolition of which is currently underway.

In 2017, work at the bioproduct mill focused on installations, testing and commissioning, as well as the start-up.

The construction of the bioproduct mill was carried out through client-driven subcontracts. A total of approximately 1,500 companies and more than 13,500 people worked on the site during the project. Finns accounted for 64 per cent of the workforce for the entire project. The bioproduct mill project's degree of Finnish content was more than 70 per cent.

The bioproduct mill was built safely. There were no accidents during the construction that would have resulted in a permanent loss of working capacity. The accident frequency

during the project was 14 accidents per million hours worked.

RESOURCE EFFICIENCY HONED TO PERFECTION

The bioproduct mill is the largest wood-processing facility in the northern hemisphere. It uses 6.5 million cubic metres of wood a year and produces 1.3 million tonnes of pulp.

The bioproduct mill utilises 100 per cent of its wood raw material and production side streams. Bioproducts derived from the side stream already account for 20 per cent of the mill's sales, and the proportion will continue to grow in phases.

The bioproduct mill is also a major producer of bioelectricity. It will increase the share of renewable energy in Finland by more than two percentage points.

The cutting edge technology solutions we developed with our partners guarantee the mill's delivery reliability, cost-effectiveness and environmental efficiency.

FOCUS ON SAFETY, THE ENVIRONMENT AND PRODUCTION

The start-up of the bioproduct mill progressed according to the planned start-up curve in terms of the production volume and quality. Pulp deliveries began in September 2017.

The bioproduct mill will achieve its full nominal capacity a year from its start-up, in the summer of 2018.

Since its start-up, it has operated within the applicable environmental permit conditions. The new mill takes environmental efficiency to a new level. Although the production will nearly triple in comparison to the old mill at Äänekoski, the bioproduct mill is able to operate within the limits of the old mill's permit conditions.

No occupational accidents that would have resulted in absences took place at the mill in 2017 following its start-up.

PERSONNEL IN A KEY ROLE

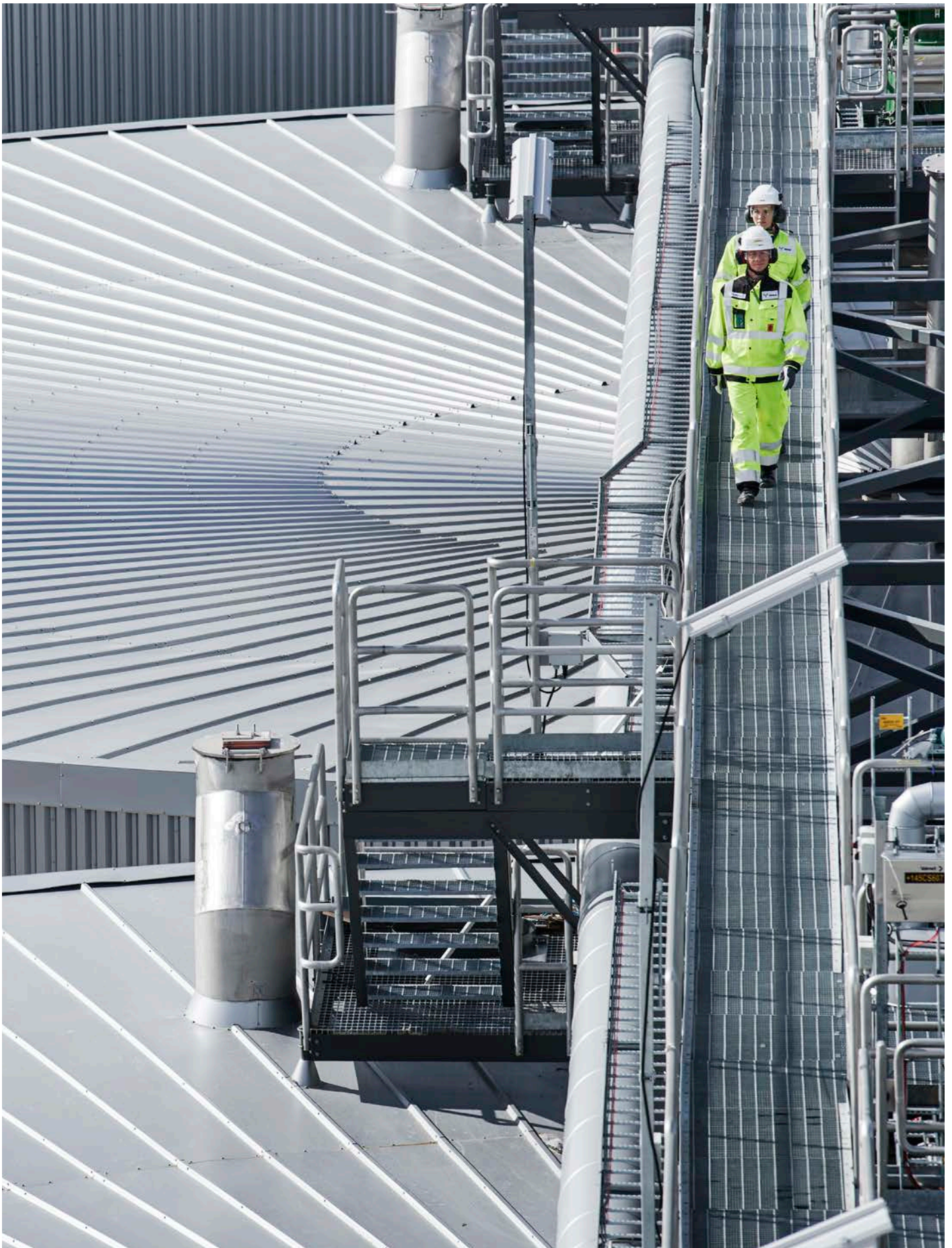
Metsä Fibre's professional and strongly committed personnel played a key role in the bioproduct mill's start-up.

"This has required flexibility from the entire organisation. Together we were able to rise to the challenge and deliver an impeccable performance," says **Camilla Wikström**, SVP, Production, at Metsä Fibre's pulp business.

Numerous staff members from Metsä Fibre's other mills also worked at Äänekoski during the bioproduct mill's testing and start-up phase. Wikström worked as the Manager of the bioproduct mill until the end of 2017.

"The cooperation has worked smoothly and the project has increased the competence of our personnel on a wide scale. The bioproduct mill was a project that involved Metsä Fibre in its entirety," she says.





THE BIOPRODUCT MILL AT THE CORE OF INDUSTRIAL ECOSYSTEM

Metsä Fibre's next-generation bioproduct mill at Äänekoski functions as the core of a diverse industrial ecosystem. The developing network of companies strengthens the already operational enterprises, converting pulp and the side streams generated in its production into bioproducts with an increasingly high degree of processing. Material, resource and environmental efficiency are at the very centre of the operations.

Global megatrends increase the demand for Metsä Fibre's most important bioproduct, pulp, particularly in China. The pulp, produced in an environmentally efficient manner without any fossil fuels and the new bioproducts processed from the side streams of its production meet our customers' expectations and the big challenges of the operating environment, such as population growth and resource scarcity.

A CONCEPT BUILT AROUND BIOPRODUCTS

The bioproduct mill's business model is based on an efficient partnership network in which the processing of new products takes place in cooperation between the different professionals in the value chain.

At the moment, the products manufactured at the mill include product gas made from bark, and sulphuric acid made from the mill's odorous gases, both of which for the mill's own use. EcoEnergy SF Oy processes the sludge of the wastewater treatment plant into biogas that can be used as fuel for vehicles and into biofuel pellets.

Once the demolition work of the old Äänekoski pulp mill is completed, the area will have more space available for the production of bioproducts.

PROMISING PATHS OF DEVELOPMENT

Together with our partners, we are actively researching new bioproduct innovations and concepts. The development paths that show

most promise involve textile fibres and a biocomposite made from pulp.

The biocomposite plant owned by our partner Aqvacom Oy started up in our Rauma mill area in the autumn of 2017. The operating conditions for a similar plant to be located next to the Äänekoski bioproduct mill are being investigated, and the investment is possible in the near future.

ADDED VALUE FOR THE ECONOMY

The bioproduct mill has a significant impact on the Finnish economy. It increases the value of the country's exports by some EUR 0.5 billion and creates 1,500 new jobs. The mill's effect on employment within its direct value chain is roughly 2,500 jobs.



THE SULPHURIC ACID PLANT IMPROVES ENVIRONMENTAL PERFORMANCE

The sulphuric acid plant we built in the area of the Äänekoski bioproduct mill makes sulphuric acid from the sulphuric compounds of the mill's odorous gases. Sulphuric acid is used in the production of tall oil.

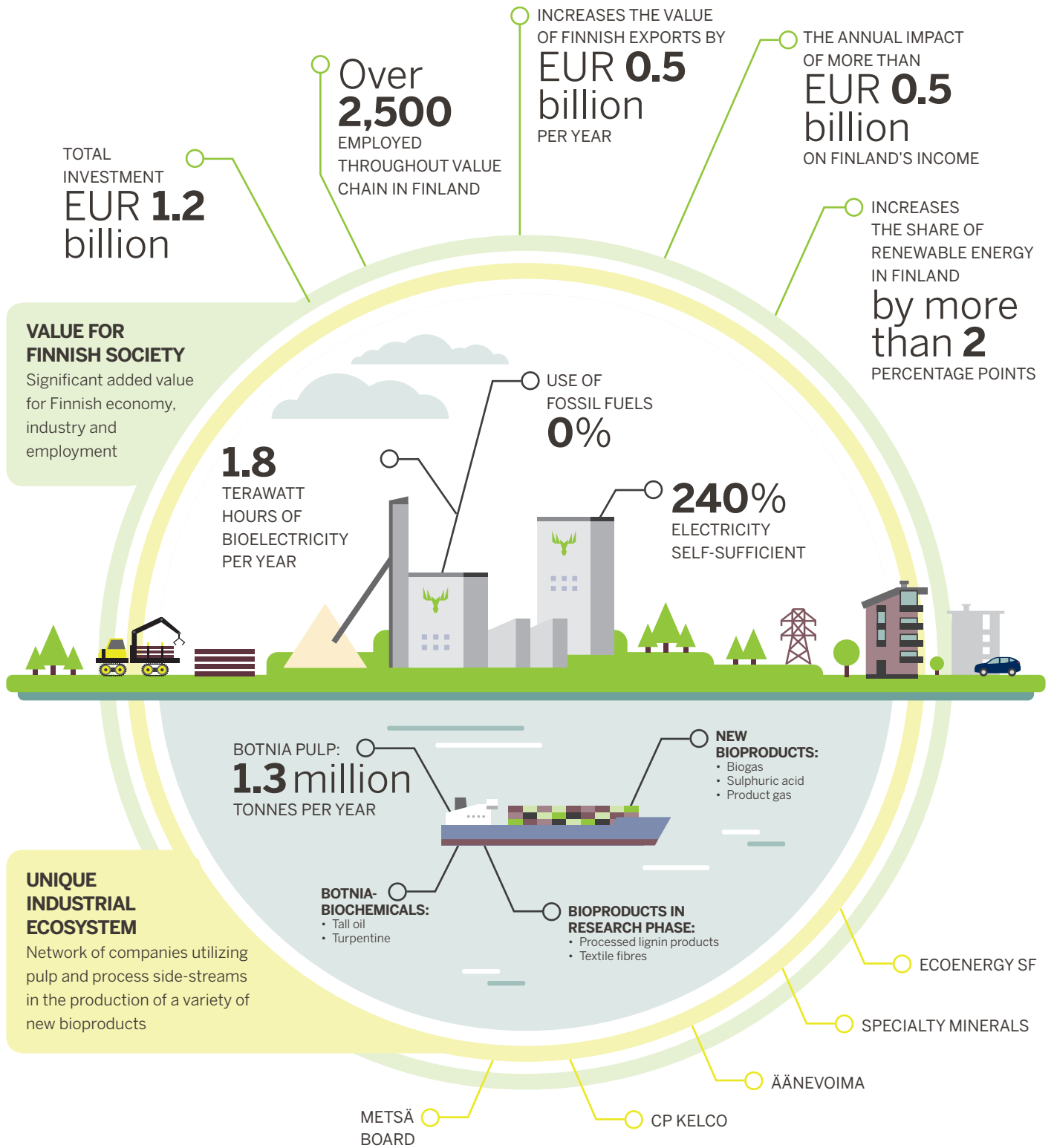
Our sulphuric acid plant is the first of its kind in a forest industry environment in the whole world. The plant represents an important step towards a closed chemical cycle, and it effectively minimises sulphate emissions to the waterways.

The 50-tonne production capacity of the sulphuric acid plant has been dimensioned

to allow the bioproduct mill to become self-sufficient in terms of sulphuric acid in the future. The internal recycling of sulphuric acid will also reduce the bioproduct mill's chemical transportation by about 360 truckloads a year.

In the future, sulphuric acid can be used in the production of chlorine dioxide and in separating lignin from black liquor.

THE INDUSTRIAL ECOSYSTEM OF THE BIOPRODUCT MILL



OUR SUSTAINABILITY THEMES

Sustainability is a part of everything we do. The foundation of our sustainability work consists of four themes covering all our operations and eight concrete targets that guide our everyday work. Our sustainability work supports reaching the global Sustainable Development Goals (SDGs) set by the United Nations.



Read more
The targets represented in this graphic are common for and the performance figures are for Metsä Fibre.

Read more about Metsä Group's targets: Sustainability Report 2017

ETHICAL BUSINESS

Coverage of code of conduct training:

TARGET	PERFORMANCE 2017
100%	97%

SAFETY AT WORK

Lost-time accidents frequency annually (LTA1: 5.2):

TARGET	PERFORMANCE 2017
-10%	-28%

WELL-BEING

Sickness absenteeism:

TARGET	PERFORMANCE 2017
<3%	3.7%



WE OFFER SUSTAINABLE CHOICES

PRODUCTS AND SERVICES

- Sustainable, safe and recyclable products from renewable wood
- Customer-focused services and solutions
- Innovations and renewal



WE CREATE WELL-BEING

STAKEHOLDERS AND SOCIAL IMPACTS

- Ethical business practices
- Responsible employer
- Safety at work
- Partnerships and industrial ecosystems
- Value creation in society





WE BRING THE FOREST TO YOU

RAW MATERIALS AND SUPPLY CHAIN

- Sustainable forest management, biodiversity, multiple use of forests
- Traceability of raw materials
- Sustainable supply chain



WE WORK FOR A BETTER CLIMATE AND ENVIRONMENT

RESOURCE EFFICIENCY AND ENVIRONMENTAL IMPACTS

- Efficient use of raw materials, energy and water
- Valuable side streams
- Renewable energy
- Emissions to water and air

WOOD

Maintain the share of certified wood:

TARGET

>80%

PERFORMANCE 2017

92%

LOGISTICS

Ensure sustainability of the main logistics flows:

TARGET

100%

STATUS 2017

In the end of 2017, all main 481 logistics partners included in the sustainability survey fulfilled Metsä Group's sustainability criteria.

CLIMATE

Fossil CO₂ emissions per product tonne 2009–2020:

TARGET

-30%

PERFORMANCE 2017

-36%

ENERGY

Energy efficiency improvement 2009–2020:

TARGET

12%

PERFORMANCE 2017

2.5%

RESOURCE EFFICIENCY

Process water use per product tonne 2010–2020:

TARGET

-17%

PERFORMANCE 2017

-13%

COMMITTED TO HIGH ENVIRONMENTAL PERFORMANCE

Metsä Fibre represents top-class level in environmental performance within its industry. This guarantees minimal environmental impact throughout the value chain and gives a competitive edge to our customers as well. The integration of the operating methods of the sawmill and pulp businesses began in 2017.

In 2017, Metsä Fibre continued the development of operational excellence, accounting for the criteria for the new ISO 14001 environmental management standard. Metsä Fibre's operations meet the criteria for environmental management pursuant to the new ISO 14001, but in line with continuous improvement, there is always room for development as well.

Metsä Fibre's process map was updated, and accounted for integrating the sawmill business to Metsä Fibre's environmental management process. The development of uniform operating models and the adoption of best practices will be continued in 2018.

ENVIRONMENTAL PERFORMANCE DEVELOPED ON MANY FRONTS

We increased the efficiency of wastewater treatment by reviewing our ways of working and by adopting key performance indicators. The indicators serve to ensure the good performance of the wastewater treatment plant in all situations. We minimised the environmental burden on waterways by managing wastewater treatment in such a way that the conditions in the plants are standardised and that both the inbound and outbound load is minimised. When necessary, changes in the performance of a plant are reacted to before they have a significant impact on the burden on waterways.

A wastewater treatment plant with greater capacity was commissioned successfully at Äänekoski. In addition to the activated sludge plant, and as an exception to the norm, it also includes a tertiary phase. The sludge generated at the treatment plant is used as raw material at a biogas plant operated by our partner.

The cleaning of flue gases was enhanced at the Renko and Lappeenranta sawmills and at the Kemi mill to minimise particulate emissions into the air. The Rauma mill renewed the treatment of green liquor sludge by investing in a centrifuge, which will reduce the volume of green liquor sludge to a material degree.

A MODERN BIOPRODUCT MILL ACHIEVING THE PLANNED LEVEL

The new mill at Äänekoski started up according to plan, and the start-up's environmental impact remained under control. The successful commissioning of the new wastewater treatment plant is a concrete example of this. We aim to ensure that the environmental performance of the bioproduct mill achieves the planned level.

Consistent pulp production and the achievement of an annual production of 1.3 million tonnes in the summer of 2018 is a material part of the bioproduct mill's successful start-up curve. The mill's high performance level guarantees the best possible control over emissions.

The bioproduct mill's technical solutions and the limit values set for the emissions represent the strictest requirements set for the Best Available Technology (BAT).

DEVIATIONS ARE INVESTIGATED AND LEARNED FROM

The permit limit for emissions into air was exceeded three times during the year. The permit limit set for the lime kiln's short-term reduced sulphur compound emissions was exceeded at Joutseno and Rauma. At Joutseno,

this was due to sudden equipment failure, while at Rauma the cause was the contamination of the lime cycle. The permit limit set for the particulate emissions of the recovery boiler at Kemi was exceeded.

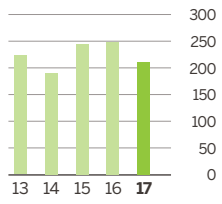
At Äänekoski, the permit limit set for the phosphorus directed into waterways was exceeded at the time when the old pulp mill was still operational. The reason for this was the exceptionally great variation in the quality and volume of waters led to the treatment plant. In other respects, the burden on waterways remained below the permit limits at all of Metsä Fibre's wastewater treatment plants.

FOLLOWING THE PRINCIPLES OF CONTINUOUS IMPROVEMENT

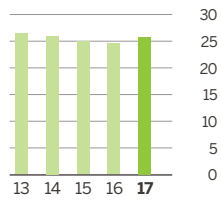
We ensure operations in line with environmental permit conditions and our objectives by developing our operating methods, making use of best practices and by making well-timed investments.

Our ways of working require us to learn from cases in which permit limits are exceeded by determining the remedial measures which allow for avoiding any similar performance deviations in the future, in accordance with the principles of continuous improvement.

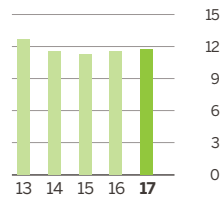
FOSSIL CO₂ EMISSIONS
1,000 TONNES



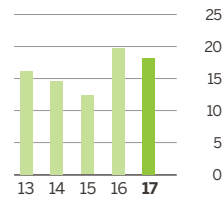
EFFLUENT FLOW
M³/PULP TONNE



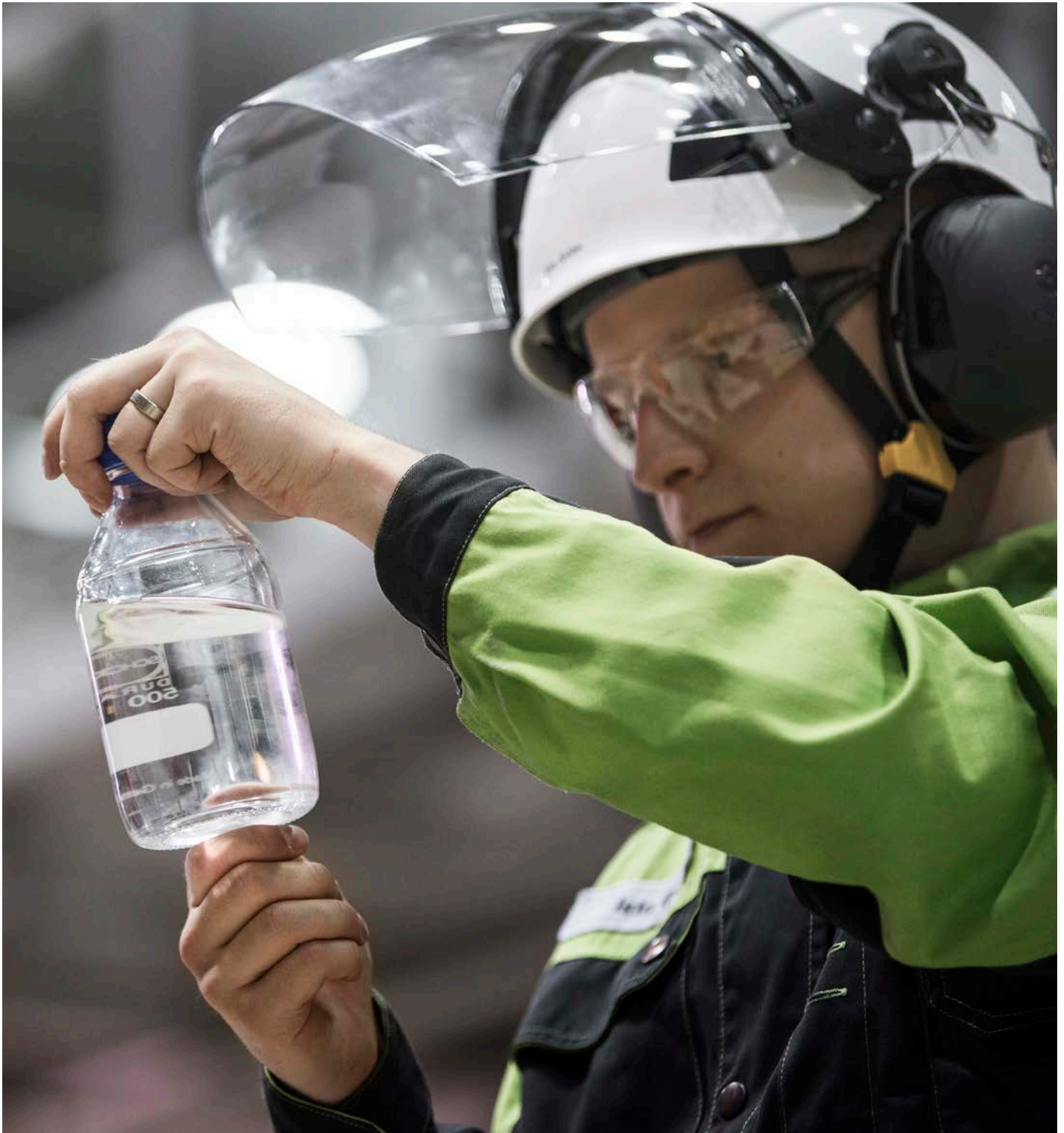
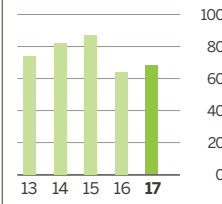
CHEMICAL OXYGEN DEMAND IN EFFLUENT (COD)
KG/PULP TONNE



LANDFILL WASTE
KG/PULP TONNE, WET



WASTE REUSE RATE
%



METSÄ FIBRE ENVIRONMENTAL BALANCE

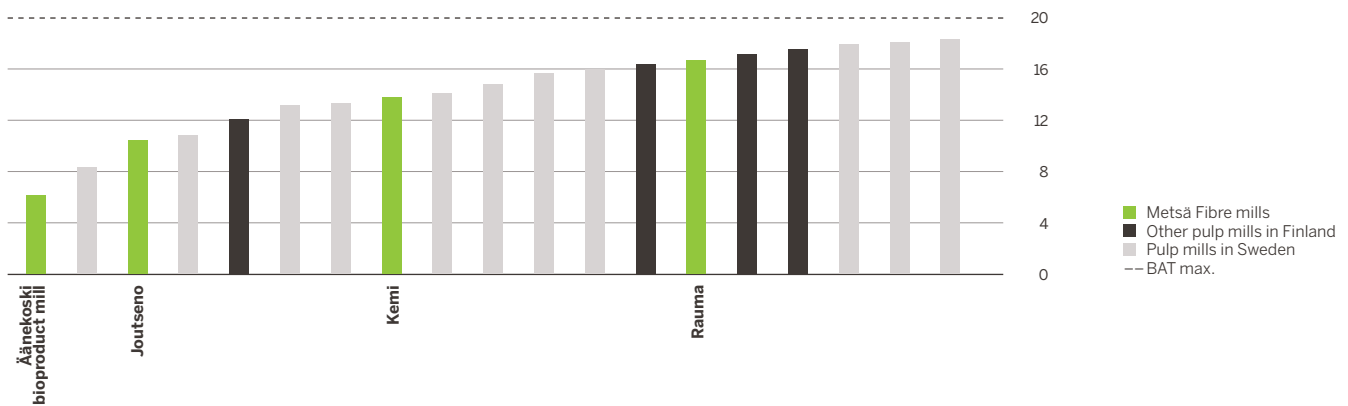
	Joutseno	Kemi	Rauma	Äänekoski 1-8/2017 ¹⁾	Äänekoski 8-12/2017 ¹⁾	Total 2017	Total 2016	Eskola	Kyrö	Lappeenranta	Merikarvia	Renko	Vilppula	Metsä Svir (Russia)	Total 2017	
Production																
Pulp, t	655,450	597,948	568,364	303,371	362,288	2,487,420	2,317,296									
Sawn timber, m ³								47,244	231,821	253,077	222,573	310,140	513,714	273,602	1,852,171	
Wood consumption																
Total wood consumption, 1,000 m ³	3,568	2,975	2,822	1,401	1,861	12,627	11,992	136	485	520	463	632	1,046	571	3,853	
Certified wood, %	89	97	89	94	94	92	90	98	95	92	96	96	95	59	89	
EFFLUENTS																
Waste water																
Process water volume, 1,000 m ³	17,503	17,134	15,917	7,529	7,215	65,298	58,618	-	7.3	1.3	13.4	4.9	41	252	321	
Total suspended solids, t	377	418	280	278	149	1,503	1,409	-	-	-	-	-	-	6.9	6.9	
Chemical oxygen demand (COD), t	6,838	8,272	9,487	2,474	2,223	29,293	26,823	-	-	-	-	-	-	16	16	
Biological oxygen demand (BOD), t	140	132	112	100	35	518	539	-	-	-	-	-	-	8.1	8.1	
Phosphorus P, t	5.7	6.0	4.7	4.1	2.4	23	22.2	-	-	-	-	-	-	0.034	0.034	
Nitrogen N, t	114	133	52	54	26	380	359	-	-	-	-	-	-	1.2	1.2	
AOX, t	101	62	70	31	32	297	310	-	-	-	-	-	-	-	-	
Air emissions																
Sulphur dioxide (as SO ₂), t	216	95	109	113	14	547	593	-	3.1	1,1700	0.038	0.100	18	0.22	23	
TRS (as S), t	4	18	7	2	2	33	53	-	-	-	-	-	-	-	-	
NO _x (as NO ₂), t	1,005	1,120	801	593	436	3,955	3,796	-	27	28	27	29	90	44	245	
CO ₂ from fossil sources, 1,000t	17	63	77	42	7	205	240	-	0.51	-	0.52	0.76	3.0	0.11	4.9	
CO ₂ from biomass, 1,000t	1,410	1,361	1,111	538	961	5,381	4,753	-	25	26	26	32	69	24	201	
Particles, t	253	91	89	212	57	702	775	-	21	18	20	10	90	4	163	
Waste																
Landfill waste, t	8,812	10,041	14,402	8,303	3,728	45,286	45,698	3.0	-	9.1	53	7.8	39	7.0	119	
Hazardous waste, t	208	137	199	93	1.9	638	305	-	13	3.1	4.4	12	33	0.47	66	
Energy																
Wood based fuel use, GWh	3,625	3,743	3,055	1,479	2,478	14,379	13,072	-	68	71	72	88	190	65	553	
Fossil fuel use, GWh	46	222	58	30	7.7	363	949	-	1.9	-	2.0	2.7	11	0.43	18	
Purchased electricity, GWh	-102	-191	-132	-40	-98	-564	-584	1.03	16	17	16	8.2	14	14	86	
Purchased heat, GWh	-52	-531	-225	-0.18	-0.14	-809	-847	-	-	-0.062	-10	-	-56	-	-66	

¹⁾ Äänekoski old pulp mill in production 1-8/2017 and the new bioproduct mill 8-12/2017.

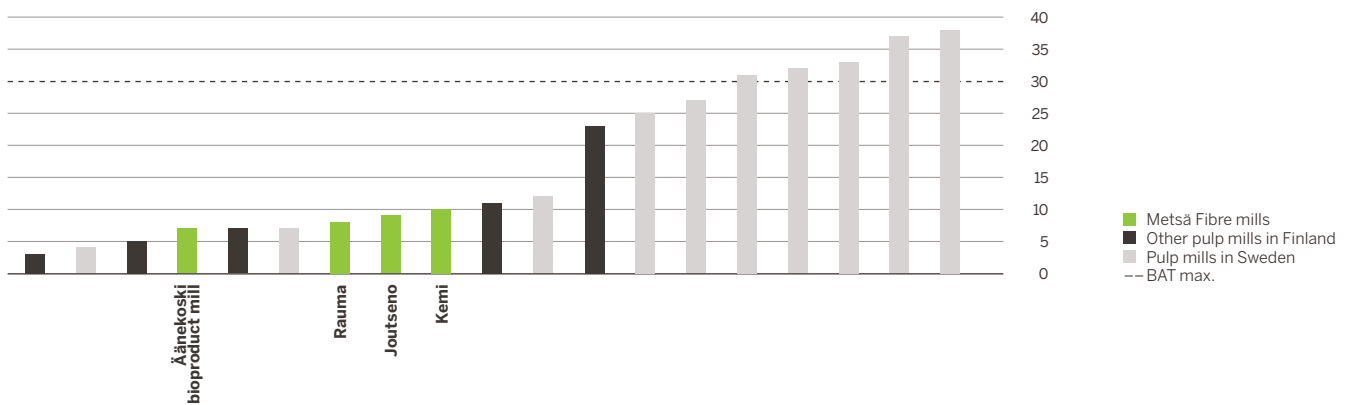
SPECIFIC EMISSIONS FROM PULP MILLS IN THE NORDIC COUNTRIES

Specific emissions from Metsä Fibre's and other Finnish and Swedish mills producing bleached sulphate pulp are compared below. Metsä Fibre's figures are from 2017. The other figures are from 2016 and based on the statistics of the Finnish Forest Industries Federation and the Swedish Forest Industries Federation.

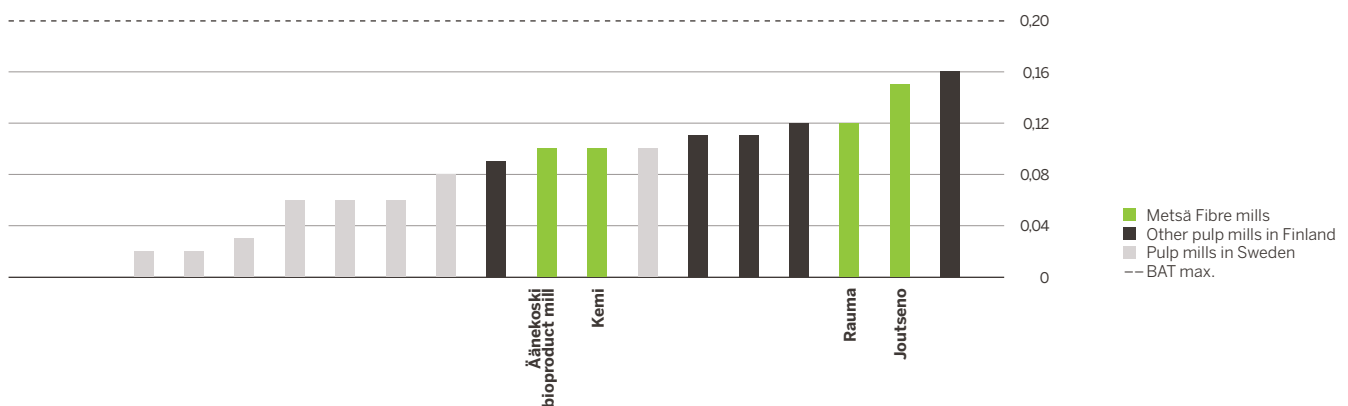
CHEMICAL OXYGEN DEMAND (COD_{CR})
KG/PULP TONNE



PHOSPHORUS (P)
G/PULP TONNE



CHLORINE AND OTHER HALOGENS BOUND TO ORGANIC MATERIAL IN EFFLUENT (AOX)
KG/PULP TONNE



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