

Strategy

Part of Stora Enso's Annual Report 2018



THE RENEWABLE MATERIALS COMPANY



Contents

Our renewable products provide a sustainable alternative to fossil-based materials.



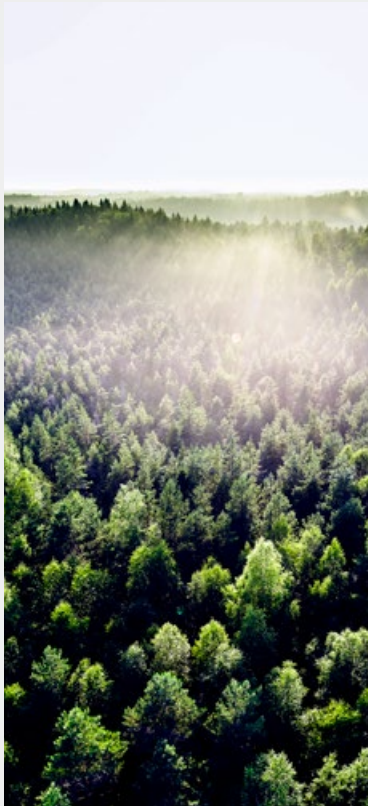
This is Stora Enso 2

Stora Enso worldwide 4

Stora Enso in 2018 5

CEO's overview 7

How we create value 10



Transformation 11



Divisions 19

Consumer Board 20

Packaging Solutions 25

Biomaterials 30

Wood Products 35

Paper 40

Group Leadership Team 45



This is Stora Enso

Part of the bioeconomy, Stora Enso is a leading global provider of renewable solutions in packaging, biomaterials, wooden constructions and paper. We employ some 26 000 people in more than 30 countries and our shares are listed on the Helsinki (STEAV, STERV) and Stockholm (STE A, STE R) stock exchanges.

Our fibre-based materials are renewable and recyclable. Our solutions provide low-carbon alternatives to products based on fossil fuels and other non-renewable materials. We believe that everything that is made from fossil-based materials today can be made from a tree tomorrow.

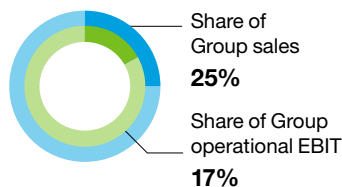


Divisions in brief



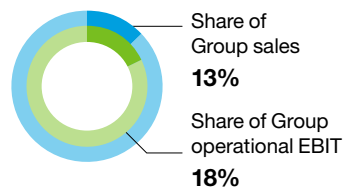
Consumer Board

The ambition of the Consumer Board division is to be the global leader in high-quality virgin fibre cartonboard. We aim to be the preferred partner of our customers, such as converters, brand owners and retailers, in premium end-use packaging and graphical segments. Our wide board and barrier coating selection is suitable for consumer packaging for liquid, food, pharmaceutical, and luxury goods.



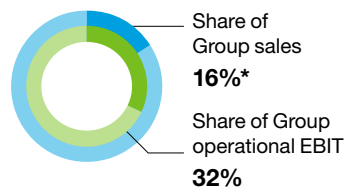
Packaging Solutions

The Packaging Solutions division provides fibre-based board materials and corrugated packaging products and services that are designed for a wide array of applications. Our renewable high-end packaging solutions serve leading converters, brand owners, and retailers – including those in e-commerce that are looking to optimise performance, drive innovation, and improve their sustainability.



Biomaterials

The Biomaterials division offers a wide variety of pulp grades to meet the demands of paper, board, tissue, textile, and hygiene product producers. We are maximising the business potential of the by-products extracted in our processes, such as tall oil and turpentine from biomass. Based on our strong innovation approach, all fractions of biomass, like sugars and lignin, hold substantial potential for use in various applications.

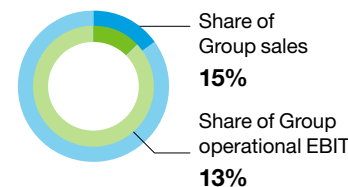


*of which internal sales 25%



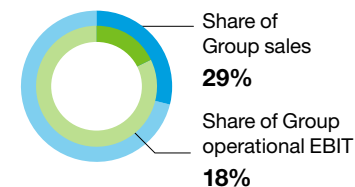
Wood Products

The Wood Products division is a leading provider of innovative wood-based solutions. The product range covers all areas of construction, including massive wooden elements and wooden components. It also includes a variety of sawn timber goods and pellets for sustainable heating. The emerging product range of Biocomposites addresses the opportunities to replace plastics in consumer goods and creates potential in various demanding exterior applications in a cost-competitive way.



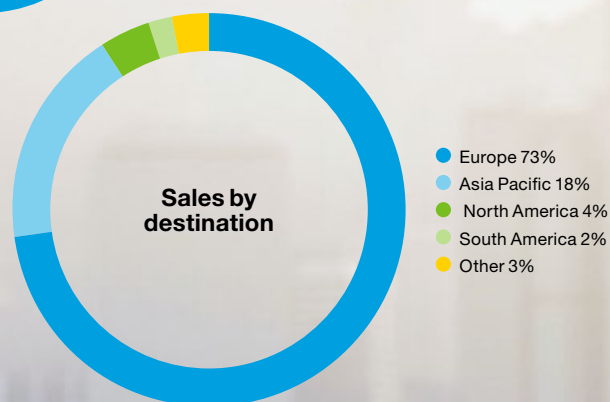
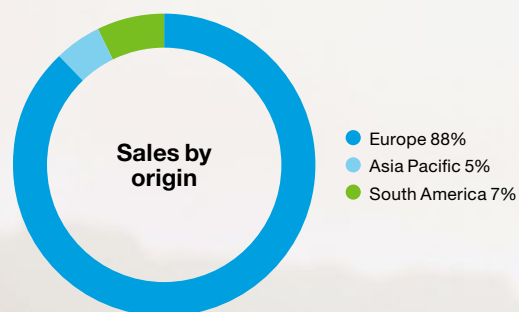
Paper

Stora Enso is the second largest paper producer in Europe with an established customer base and a wide product portfolio for print and office use. Customers benefit from Stora Enso's broad selection of papers made from recycled and virgin fibre as well as our valuable industry experience, know-how and customer support.



Serving markets around the world

Stora Enso operates worldwide and focuses on utilising expertise in renewable materials and creating value in packaging, pulp, paper, and wood. We combine global resources with local presence, service, and sustainability.



¹Excluding employees of our 50%-owned joint operations Veracel and Montes del Plata.

Europe

Stora Enso's head office is in Helsinki, Finland. Most of the Group's sales and operations take place in Europe, where we are a leading producer of packaging board and solutions, pulp, wooden products and paper.

Stora Enso has three research centres in Imatra (Finland), Karlstad (Sweden), and Mönchengladbach (Germany), and two innovation centres in Stockholm and in Helsinki. In Northern Europe, we source most of our main raw material – wood – from private forest owners and our forest associates Bergvik Skog and Tornator.

Asia

The demand for Stora Enso's products, especially consumer board, is growing fast in China. In 2018, our new consumer board mill continued to ramp up in Beihai, in the Guangxi region, where our operations also include eucalyptus plantations. In addition, Stora Enso has three packaging plants and operates one jointly owned paper mill.

North America

In the United States, Stora Enso has a pilot facility in Danville, Virginia, to develop technologies for the conversion of biomass into highly refined sugars and lignin. In 2018, the production of xylose started in our demonstration plant in Raceland, Louisiana. These new technologies will enable the development of sustainable replacements for fossil-based materials in various industries.

South America

Latin America is important for Stora Enso's strategy of obtaining low-cost pulp from tree plantations. In Brazil, we own 50% of Veracel Celulose pulp mill. Our share of the eucalyptus pulp is mostly used in our paper and board mills. Veracel also owns land, around half of which is former degraded pasture lands planted with eucalyptus. The other half is dedicated to protecting local biodiversity by restoring the natural Atlantic rainforest.

The Montes del Plata pulp mill in Uruguay is a joint operation between Stora Enso and Arauco. Stora Enso's share is sold entirely as market pulp, mainly in Europe and Asia. Montes del Plata's tree plantations are also utilised as pastures by local farmers through land rental schemes.



Stora Enso in 2018

Stora Enso is creating
a renewable future in
the bioeconomy.

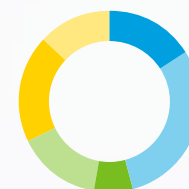
Operational ROCE

15.5%

71%

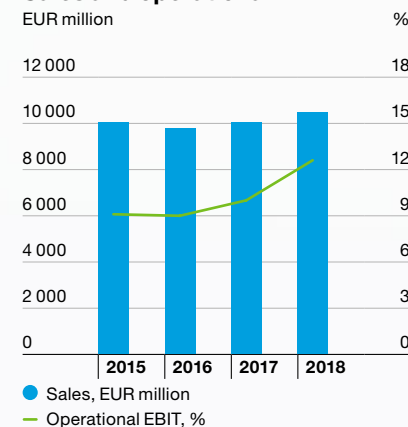
of sales from
growth businesses

Average
personnel



- Consumer Board 16%
- Packaging Solutions 30%
- Biomaterials 7%
- Wood Products 15%
- Paper 19%
- Other 13%

Sales and operational EBIT



Highlights of 2018



Award-winning Lineo

Lineo™ by Stora Enso is made from lignin, which is an abundant product as it is one of the main building blocks of trees and thus a step towards replacing fossil-based products with renewable solutions. Lineo has received an overwhelmingly positive response from stakeholders and received several awards for being a significant, innovative bio-based product.

Strategic LVL investment ramped up

The ramp-up of laminated veneer lumber (LVL) production in Varkaus was completed during the year. It reached the EBITDA break-even already during the first quarter.



Sustainable profitable growth continues

8

consecutive quarters of sales growth



Startup collaboration accelerates growth

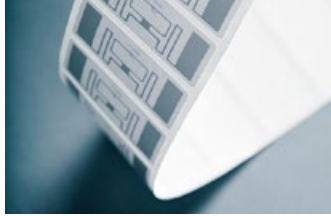
Stora Enso was recognised as Finland's most startup friendly company. One reason for the award is the collaboration with the startup company Sulapac, with whom Stora Enso will begin the development of biodegradable straws as well as fully renewable caps and closures for liquid packages. Plus, in cooperation with another startup, Trä Group, Stora Enso will increase digitalisation in the wooden construction value chain by providing services for healthy and affordable living.



Combating global warming

-18%

less CO₂e per tonne compared to the 2010 base-year level



Sustainable solutions for packaging authentication

ECO™ by Stora Enso is a new sustainable RFID tag technology that is designed for intelligent packaging functionalities in supply chain, retail and e-commerce applications. The technology enables paper-based RFID tags, providing a plastic-free and recyclable solution for packaging authentication. To further develop the intelligent packaging business, Stora Enso established a new intelligent packaging unit.



Sustainable forestry

96%

of the lands we own or manage were covered by forest certification schemes



Stora Enso and Orthex brought to the market a new range of kitchen utensils made from DuraSense™ biocomposites.

Introducing biocomposites to reduce the consumption of plastic

DuraSense™ by Stora Enso biocomposites enables the use of renewable wood-based fibres, which can be used as substitutes for fossil-based plastic. It offers customers a wood fibre-based alternative which improves sustainability performance and, depending on the product, significantly reduces the carbon footprint. Stora Enso is building a new Biocomposites Competence Centre at its Hylte Mill in Sweden to speed up market access.



The power of trees

Stora Enso's raw material is renewable, recyclable and fossil-free. This provides us with a great advantage in addressing the global megatrends and in leading business and industry towards the bioeconomy. Across markets and in businesses, there are calls for change because consumers are increasingly turning to eco-friendly products and solutions. Stora Enso's promise for a renewable future is based on sustainability, innovation and having the technological capabilities to meet the demands for a greener world. We believe that everything that is made from fossil-based materials today can be made from a tree tomorrow.

Accelerated pace of innovation

By building on a strong portfolio that is based on wood fibres, we aim to leverage our raw material, market-leading expertise and market insight to ever greater extents. We are investing more in innovation and R&D and increasing sales in new applications, products and services. The share of sales of new products and services has risen from 1.5% in 2015 to 9%. Our target is 15%, which would mean that we effectively renew our product portfolio every ten years.

In 2018, we introduced: Lineo™ by Stora Enso, biocomposites DuraSense™ by Stora Enso and the sustainable ECO™ RFID tag for intelligent packaging. We initiated partnerships with the startups Sulapac and Trä Group, and launched our second Accelerator programme to intensify our work with new startups. We also joined TreeToTextile, a textile fibre joint venture with H&M group and Inter IKEA group, and took full ownership of the cellulose technology company Cellutech.



**Dividend proposal
per share**

EUR 0.50

**Earnings
per share**

EUR 1.28

Close to 9%

of sales came from new products and services.

We will continue to invest selectively in mergers and acquisitions to strengthen our market share in our core business areas. Alongside innovation, we will continue to capitalise on developments in digitalisation, particularly in the areas of customer engagement, industrial digitalisation in operations and supply chain and the smart back office.

Profit improvement of 32%

The strength of our strategy and progress shows in our figures for 2018, as we continued on our path of sustainable growth. We have had already eight consecutive quarters of sales growth, and our sales are again well above 10 billion euros with an increase of 4.4% from 2017. This was achieved mainly due to higher sales prices and active mix management in all our divisions. We reached a substantially improved profitability with an operational EBIT that was 32% higher than last year. Our operational ROCE was close to 16%, well above the strategic target of 13%. I am also very



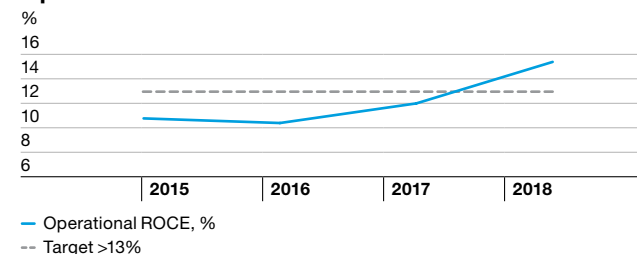
pleased with the quite significant increase in full year EPS of 62.5%. We continue to strengthen our balance sheet and net debt/EBITDA amounted to 1.1.

Three of our five divisions reached their strategic profitability targets in 2018. Our fixed costs to sales ratio is still above our strategic target of 25%, and we forecast that our costs increase in 2019. We will therefore implement measures to mitigate these increases and the increased uncertainties in the markets and the economy. Therefore, we launched a new profit protection programme aiming at reduction of costs.

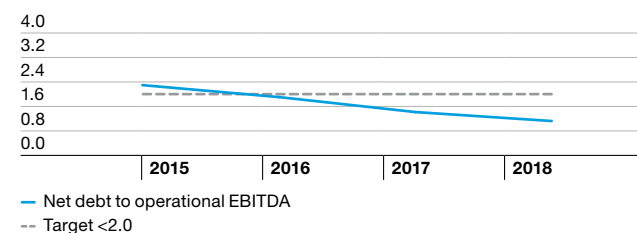
Supported by investments

During 2018, the ramp-up of strategic investments in Beihai, Varkaus and Murów continued. The production of wooden building components (LVL) is well underway at Varkaus and the new fluff pulp line at Skutskär Mill is up and running. We began production

Operational ROCE



Net debt to operational EBITDA



of biocomposite granules at our Hylte Mill and are moving closer to the completion of the cross-laminated timber unit at Gruvön. In another potential step in our transformation journey, we also initiated a feasibility study to evaluate the potential conversion of Oulu paper mill into packaging board production.

Among our investments, we signed an agreement to acquire forest assets in Bergvik Skog. This is a natural step for Stora Enso as we aim to secure competitive raw material supply and further develop long-term sustainable forest management.

Sustainability at the heart

With rising consumption and global warming, it is increasingly clear that an economy based on fossil-based fuels and other non-renewable materials is not viable. Stora Enso is contributing to the transition to a circular bioeconomy by providing bio-based solutions that are renewable, recyclable and low-carbon.

Our promise for a renewable future is based on sustainability, innovation, and the technological capabilities to meet the growing demands for a greener world.



Reaching key financial targets

EUR million	2018	2017	2016	Target	Performance against target
Payout ratio ¹ , %	39%	52%	63%	See below ²	●
Operational ROCE, %	15.5%	11.9%	10.2%	>13%	●
Debt/equity ratio	0.31	0.38	0.47	<0.60	●
Net sales growth ³ , %	5.9%	8.5%	3.1%		
Net debt/last 12 months' operational EBITDA	1.1	1.4	1.9	<2.0x	●
Fixed costs/sales	23.6%	25.1%	25.3%	<20%	●

¹ Dividend per share / EPS.

² To distribute 50% of EPS over the cycle.

³ Excluding the paper business and the divested businesses.

● Achieved
● Not achieved

The United Nations have defined a set of 17 Sustainable Development Goals (SDGs) that address social and economic development issues on a global scale, each with their own set of related targets. Stora Enso supports all 17 SDGs, and we have identified three strategic goals that our business has the most impact on. These are SDG 12 on Responsible Consumption and Production, SDG 13 concerning Climate Action and SDG 15 regarding Life on Land.

We have set tough science-based targets regarding the reduction of carbon emissions and will continue our drive to improve energy efficiency and lower our use of fossil fuels. We have a raw material that is renewable because trees grow back. Furthermore, living trees also absorb CO₂ and together with wood-based products act as carbon sinks. We promote sustainable forest management and work to ensure that forests are renewed after harvesting. Our business – and society – depend on this.

People lead the way

Sustainability, our purpose and values, safety and business ethics form the base for everything we do. We are committed to the UN Global Compact's ten principles and the UN's Guiding Principles on Business and Human Rights. We recognise the importance of diversity and equality as prerequisites for building a culture characterised by innovation and sustainability.

To ensure we have the capabilities and motivation to deliver on our strategy, create new products and services faster than our competitors and best support our customers, we promote systematic leadership development, employee engagement, and open communication. I am very pleased that Your Voice, our annual global survey of all employees, continues to show a positive development regarding strong leadership and engaged employees as well as a high level of team efficiency.

Rising from our roots

For us, profitable growth needs to be sustainable on all dimensions – for our stakeholders, the planet, and society as a whole. This is the power of trees – they allow us to meet rising demand for eco-friendly products, support sustainable forestry, promote efficiency in the value chain, serve our markets responsibly, and develop new and better sustainable solutions together with our customers.

As always, I thank all our partners, suppliers, and employees for their contributions throughout 2018, and our customers and investors for their valued trust.

Karl-Henrik Sundström
Stora Enso's CEO

How we create value as a renewable materials company

Key inputs

- Investments in Human Rights Due Diligence programme



Social

- 26 000 direct employees in more than 30 countries
- OHS and well-being
- Employee and leadership development
- Partnerships with communities and universities
- EUR 2.7 million voluntary community investments
- Business ethics and compliance



Environmental

- 933 000 hectares of lands under management
- 38.7 million m³ of wood used
- EUR 46 million environmental investments
- 2.5 million tonnes of Paper for Recycling (PFR)
- 2.5 million tonnes of pigments, fillers and other chemicals
- 587 million m³ water withdrawal
- 159 PJ fuels of which 81% biomass
- 7.7 TWh externally sourced electricity



Economic

- EUR 8 824 million capital employed
- EUR 149 million R&D investments
- 20 000 suppliers and 23 000 private forest owners
- 94 000 shareholders

Our fibre-based materials are renewable and recyclable.



Our solutions provide low-carbon alternatives to products based on fossil fuels and other non-renewable materials.

Key outputs

- Eight highest priority human rights defined during 2018

- Personnel turnover 15.0%
- 6.1 TRI rate
- Illness related absenteeism 3.0%
- 22 hours of training per employee
- Leadership index 83/100
- 453 voluntary community investment projects
- Code of Conduct index 85/100

- 10.3 million tonnes of board, market pulp, and paper,
- 6 million m³ of wood products
- Certification coverage 96% for lands in wood production and harvesting and 76% for sourced wood
- 26% utilisation rate for Paper for Recycling
- 98% utilisation rate for process residuals and waste
- 96% of water withdrawal returned back to the environment incl. 291 million m³ process water discharges
- 3.55 million tonnes fossil CO₂e emissions from generated and purchased energy
- 1.2 TWh externally delivered electricity/heat/steam

- Customer satisfaction: Net Promoter Score 51%
- 56 patent applications and over 324 patents granted
- 95% of supplier spend covered by Supplier Code of Conduct
- 52 third-party supplier audits
- EUR 8.1 billion market capitalisation

Key impacts

- Respect for Human Rights in all operations

- EUR 1 330 million salaries and benefits
- Impacts of injuries, illness, and well-being
- Engaged and motivated employees and a capable organisation
- EUR 1 276 million value through taxes borne and collected
- Value creation with local communities
- Value through ethical operations in the market place

- CO₂ reduced with our renewable products and carbon neutral energy
- Trees absorb CO₂ and products store carbon
- Environmental impacts of operations and along the value chain
- Forests work as carbon sinks and provide ecosystem services

- EUR 10.5 billion sales of products and services
- 9% of sales from new products
- EUR 7.1 billion paid to suppliers
- EUR 574 million capital expenditure
- EUR 323 million dividends for shareholders
- EUR 133 million interests for creditors

Trees absorb CO₂ and store carbon together with wood-based products, which can then be recycled as raw material or used for energy generation.

The world needs a new approach to materials

Global warming is one of the biggest challenges of our time. There is an increasing demand for raw material that is renewable, recyclable and fossil-free. By replacing fossil-based materials with Stora Enso's renewable solutions, we will help drive the transition from a fossil fuel consuming world to a sustainable future based on bioeconomy.

The demand for food, clothing, housing, energy, infrastructure and consumer products continues to increase, driven by global megatrends, such as population growth, urbanisation, rising incomes, and changing lifestyles. More people and more consumption mean that the planet's resources are being stretched even further. Our customers are looking for solutions that can help to replace non-renewable materials in packaging, construction and chemical intermediates with renewable materials.

**Everything that's
made from fossil-
based materials today
can be made from
a tree tomorrow.**



Stora Enso's business is based on supporting our customers in meeting consumers' demand for renewable products. We aim to be a leader in our field, preferred partner, and a respected member in the societies where we work. Responding to today's challenges and demands for a greener planet, we bring value to our customers, employees, investors, suppliers, and other stakeholders.

Our purpose:

Do good for people and the planet. Replace fossil-based materials with renewable solutions.

Our values:

**Lead.
Do What's Right.**

Our products contribute to a greener planet



Renewable

Wood-based products are renewable because trees – our raw material – grow back in sustainably managed forests.



Recyclable

Our products are recyclable. Fibres can be recycled 5–7 times.



Biodegradable

Many renewable materials biodegrade in weeks, unlike plastics, aluminium and glass which take hundreds of years to degrade.



Every tree is traced

We know the origin of all the wood we use through traceability systems.



Material is used efficiently

We make the most out of every tree we use. Over the years, for example, we have doubled the amount of carton produced from the same amount of wood.



Produced sustainably

In 2018, our fossil CO₂e emissions per saleable tonne of board, pulp and paper were 18% lower than the 2010 benchmark level.



Store carbon

Renewable materials help combat global warming – our products store carbon.

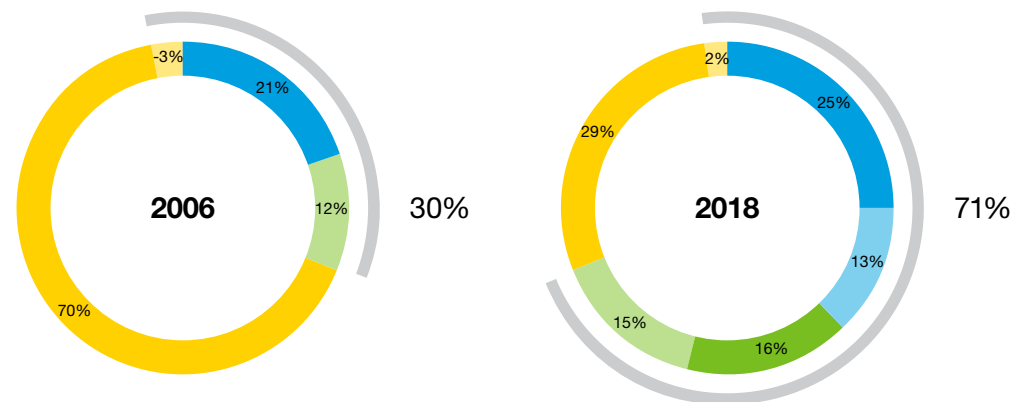


Creating value in the bioeconomy

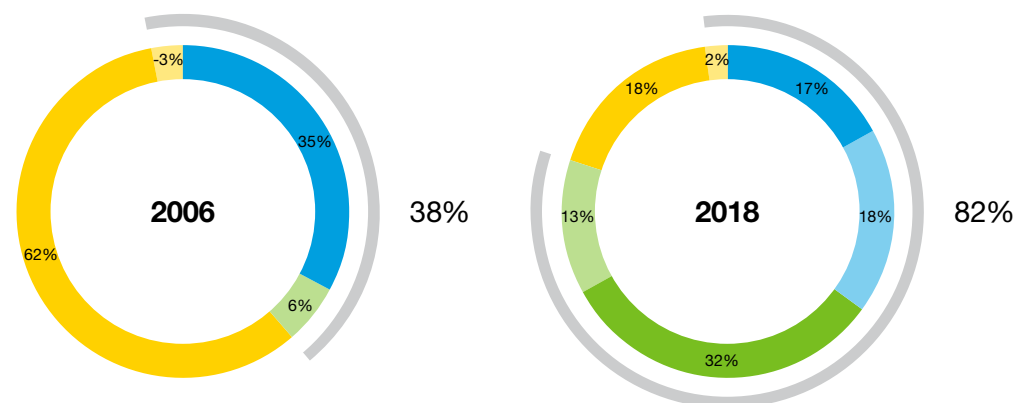
Stora Enso's transformation into a renewable materials company ensures that we can continue to deliver sustainable profitable growth of 4–6% annually, excluding Paper, and generate superior return on capital employed (ROCE). Our strategy is based on innovation and customer insights, supported by structured processes and motivated employees.

Four of our divisions are growing while the Paper division is focused on cash generation. We will continue to invest in attractive segments and concentrate on offering innovative products and services to our customers. With renewable, recyclable, and fossil-free wood fibres as our foundation, we have an important role to play in the bioeconomy.

Sales by business



Operational EBIT by business



- Consumer Board
- Packaging Solutions¹
- Biomaterials
- Wood Products
- Paper²
- Other and eliminations

● from growth businesses

¹ In 2006 in Consumer Board

² In 2006 includes merchants

Stora Enso is transforming from a traditional paper and board producer to a renewable materials growth company. The capital expenditure for 2012–2018 amounted to 5.5 billion, of which 3.2 billion was strategic capex. As part of the transformation, Stora Enso has closed 4.9 million tonnes of capacity since 2006.

We need speed to make an impact and to be the first out with new products and services. We offer fast support to our customers as they respond to changing consumer trends, thus helping lessen dependence on fossil-based materials and decreasing the burden on the environment. Therefore, we invest more in innovation and R&D, which is accelerating our profitable growth. Our capital expenditure for the next five years is expected to be around EUR 3 billion.

In 2018

9%

of our sales came from new products and services.

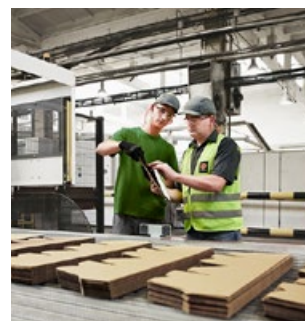
Long-term target

15%

of our sales is expected to come from new products and services.



High-quality containerboards



Value added services in corrugated packaging



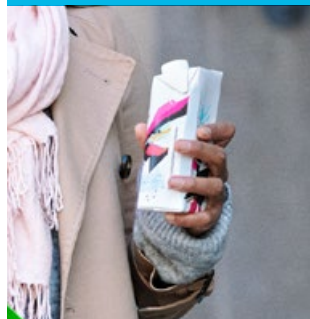
Intelligent packaging



Biocomposites

Our drivers for accelerating growth

Next generation liquid and food packaging



Building components and systems



Bio-barriers



Future bio-based chemical intermediates



Capital expenditure

- Stora Enso aims to keep investments at or below the level of depreciation and the operational decrease in the value of biological assets over the business cycle.
- We allocate approximately EUR 250 million annually to continue and accelerate growth.
- Stora Enso's capital expenditure in 2018 was EUR 574 million, while depreciation and the operational decrease in the value of biological assets totalled EUR 545 million.

Shareholder return

- Stora Enso's dividend policy is to distribute 50% of earnings per share (EPS) over a business cycle to shareholders as dividend.

Sustainable profitable growth starts from the forest



Access to wood is a critical advantage in the bioeconomy. Stora Enso is one of the largest private forest owners globally and controls about 30% of its wood raw material. We are committed to forest certification and wood traceability; we always ensure that the wood and externally purchased pulp we use come from sustainably managed sources. Overall, sustainable forest management is the cornerstone of a successful bioeconomy.



At Stora Enso we have set ambitious Science Based Targets for reducing greenhouse gas (GHG) emissions throughout our value chain. We commit to reducing GHG emissions from operations by 31% per tonne of pulp, paper and board produced by 2030 when compared to the 2010 baseline. To reduce emissions in the value chain, Stora Enso commits to having 70% of its non-fibre raw material suppliers and downstream transportation suppliers in terms of spend set their own GHG reduction targets by 2025, towards the aim of adopting science-based GHG reduction targets by 2030. In addition, we will educate 100% of customer-facing staff on the advantages of setting science-based targets by 2020.



As a renewable materials company, Stora Enso contributes to a circular economy. This means that waste is minimised as materials are reused and recycled to maximise environmental, social and financial added value. Stora Enso is committed to continuous improvements in energy efficiency and energy self-sufficiency. We always assess opportunities to use biomass fuels or other low-carbon options in connection with energy investments. For over a decade, we have actively been reducing the energy intensity of our operations and our dependency on fossil fuels.



In addition to wood and fibre, Stora Enso sources other raw materials, products, and services from over 20 000 suppliers globally, including chemicals, fillers, energy, fuels, maintenance, logistics, and IT services. We strive to build strong relationships with suppliers who can contribute to our ability to innovate and work efficiently. We stress the importance of sustainability and safety with every supplier. Our suppliers are expected to follow Stora Enso's Supplier Code of Conduct and the applicable legal requirements.



Integral to all our work is respect for human rights. We strive to align our work with the United Nations' Guiding Principles on Business and Human Rights.

A well-defined Community Investment framework supports communities close to the sources of our fibre, mills and other units as well as our ambition to be attractive as a socially responsible employer.



Ending the era of fossil-based materials

Global megatrends are boosting the demand for renewable, recyclable, and fossil-free materials. Innovation work at Stora Enso therefore concentrates on finding renewable solutions that will replace fossil-based materials in packaging, building construction, and industrial intermediate chemicals. This means innovating bio-based solutions to replace plastics, concrete, glass, metal, and other non-renewable materials.

R&D expenditure in 2018 was

EUR 149 million

In addition to our own researchers, we work with our customers, partners, and startups as well as academic and research institutes, such as Aalto University, Chalmers University of Technology, Royal Institute of Technology, SweTree Technologies Ltd, and Wallenberg Wood Science Center R&D. We will continue developing an innovation ecosystem in the Nordics and globally. We utilise external partners and knowledge for the efficient processing of wood components into chemical intermediates, materials, and products.

In 2018, Stora Enso announced joining H&M group and Inter IKEA group in a joint venture, TreeToTextile, with the aim of developing new textile fibres in a sustainable way at attractive cost levels. Stora Enso will support the industrialisation of TreeToTextile's production process by jointly setting up a demonstration plant at one of our existing Nordic mills and contributing to the technology development.

Innovation projects with high potential impact to transformation

Bio-barriers,
MFC films



Liquid and food packaging

Native and
modified MFC



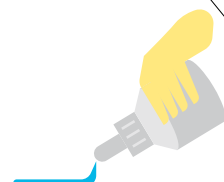
**Specialty papers,
nonwovens, personal and
home care, barrier materials**

Intelligent
packaging



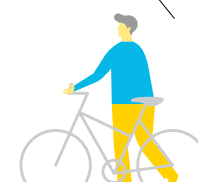
**Sophisticated
applications to brand
owners and supply chains**

Lignin for phenol
replacement



**Reduction of
fossil raw materials
in adhesives**

Carbon fibre



**Sports and leisure,
wind energy, automotive,
aviation**

Bio-based carbons
for energy storage



**Anode material for
batteries, activated carbon
for double layer capacitors**

Bio-based plastics



Chemical intermediates

Dissolving pulp
to novel cellulose
materials



Textiles and nonwovens

Biocomposites



**Replacement of
fossil-based plastics
in composites**

Innovations through the value chain

Customer insights



Forestry

End-product competitiveness starts from the right raw material



New technologies

Enabling new potential applications for wood fibre



Research and innovation centres

Finland, Sweden and Germany



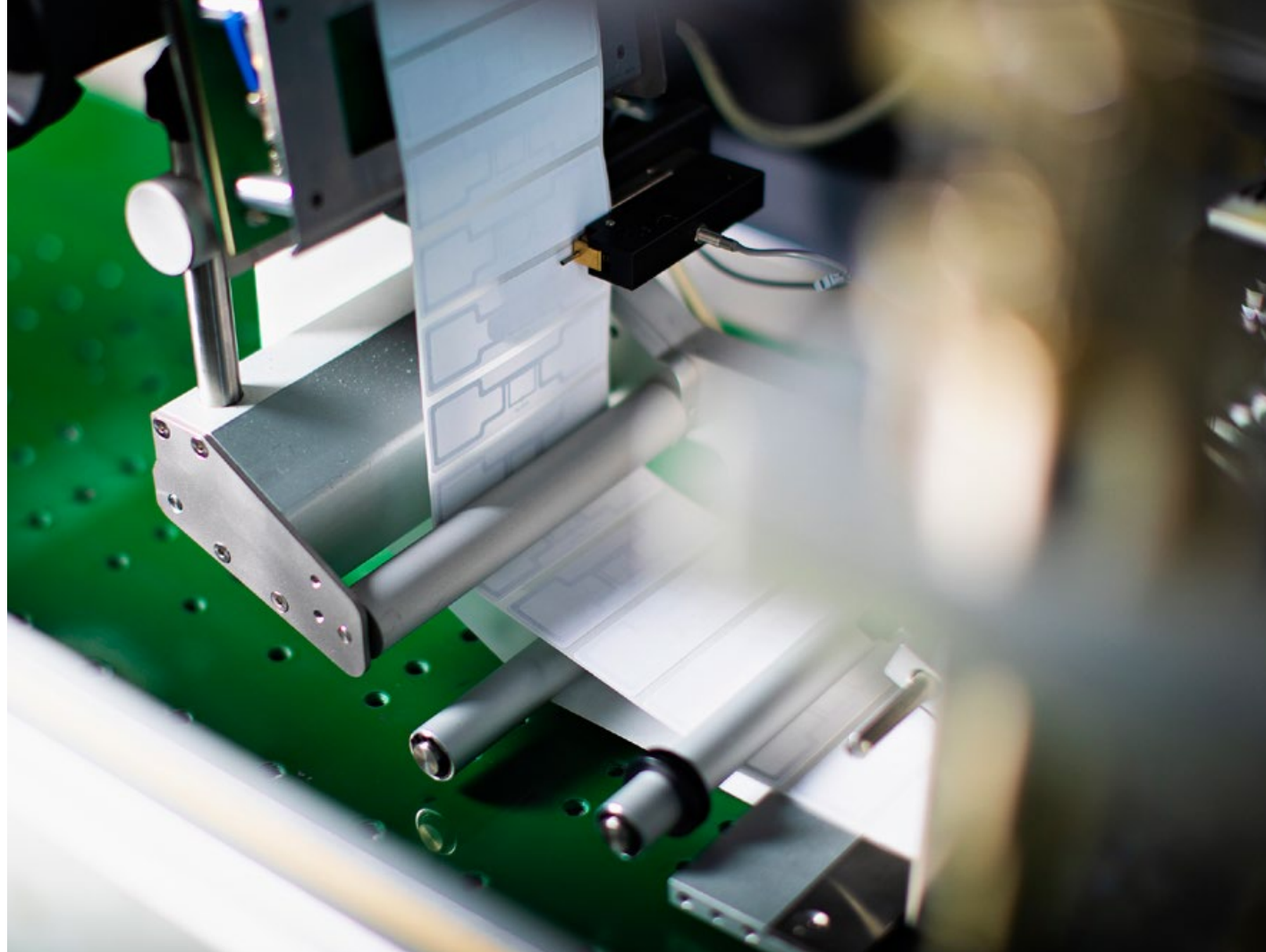
Operations

How we efficiently use assets and resources while managing the value chain



Products and applications

Renewable alternatives for fossil-based and other non-renewable materials



Robotics and 5G technology harnessed for efficiency

Digitalisation projects and new technologies support our divisions and functions to optimise raw material sourcing, production and supply chain, operational efficiency, customer experience and data and analytics. During 2018, Stora Enso progressed digitalisation in mill maintenance further by developing augmented reality (AR) and 5G technology solutions together with telecommunications company Telia. The utilisation of augmented reality was first tested at

our Oulu Mill where real-time information is being used in mill maintenance.

We also continue to look at the potential of robotics, automation and artificial intelligence (AI). In our operations and back office, a total of 33 robotic process automation processes were launched in 2018. For example, finance delivery robots, including one AI solution, have enabled us to reduce costs and save time from transactional work to analytics and strategic business support.

Across the company, emphasis has also been put on strengthening information security and harmonising processes.

Stora Enso has screened around 300 startups via the structured engagement programmes Accelerator and Combient Foundry, and established deeper collaboration with nine of them. In Finland, Stora Enso was awarded the title of the most startup-friendly company in 2018.

Building competencies in leadership, sales and innovation

Success in delivering sustainable profitable growth depends greatly on our people and culture. Leadership is a key factor in enabling Stora Enso's transformation into a renewable materials company. We continuously invest in the development of our managers with programmes such as Lead Through People, which targets all managers in the organisation. Since 2015, approximately 2 600 managers have participated in this programme.

Our Commercial Excellence Programme focuses on developing capabilities in sales and commercial acumen. We have run a common Sales Academy programme for about 200 sales leaders in 2017 and 2018 and created a competence framework for the sales organisation to be utilised for its development. Other outcomes from the Commercial Excellence Programme are harmonised sales processes and common systems like Customer Relationship Management.

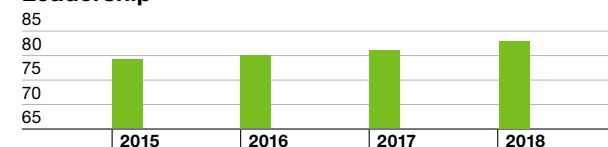
Combining work with startup companies and executive training, the Stora Enso Accelerator programme aims at further strengthening the capabilities required for our transformation. Focus has been placed on deepening competencies and skills in innovation, entrepreneurship, customer insight and change management as well as developing new business opportunities with startups.

To further promote new talent and diverse perspectives, Stora Enso runs the GROW Global Trainee Programme where young professionals are introduced to the Stora Enso organisation globally during their first 18 months of employment, enabling them to learn while participating in business projects. In 2018 we continued the programme with 28 GROW trainees.

Evidence of progress in global employee survey

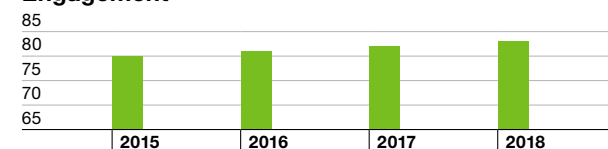
Stora Enso conducts an annual global survey (Your Voice) of all employees. In 2018, the survey was conducted for the seventh time and had a response rate of 88% (91%). The survey follows progress in areas that impact our ability to deliver on our strategic agenda, steering activities, and priorities. It also supports managers and teams as they continuously improve their work methods. All main indices in the survey continued on positive or stable trends in 2018.

Leadership



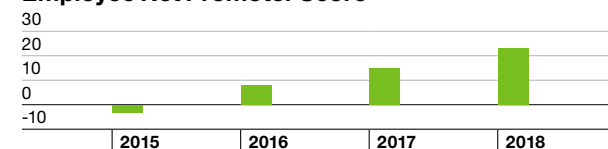
Leadership Index is measured annually in Stora Enso's Your Voice employee survey, and consists of numerical answers to 16 questions related to the respondent's view of the direct manager.

Engagement



Employee Engagement Index is measured annually in Stora Enso's Your Voice employee survey, and consists of numerical answers to seven questions related to engagement indicators including, but not limited to motivation, pride and goal orientation.

Employee Net Promoter Score



Employee Net Promoter Score is measured annually in Stora Enso's Your Voice employee survey, and consists of one question related to the likelihood of recommending Stora Enso as a workplace to a friend. A positive score indicates that there are more promoters than detractors, while a negative score indicates the opposite.



Divisions

- › Consumer Board 20
- › Packaging Solutions 25
- › Biomaterials 30
- › Wood Products 35
- › Paper 40



Consumer Board

The ambition of the Consumer Board division is to be the global leader in high-quality virgin fibre cartonboard. We aim to be the preferred partner of customers and brand owners in premium end-use packaging and graphical segments. Our wide board and barrier coating selection is suitable for consumer packaging for liquid, food, pharmaceutical, and luxury goods.



“Powerful megatrends transform our society and change the role of packaging. We are therefore constantly commercialising new renewable solutions in close collaboration with our customers. Together we drive innovation to create the packaging of the future, meeting the highest quality and safety standards to stay competitive and do business in an even more sustainable way.”

Annica Bresky
Executive Vice President
Division Consumer Board



Offering

- **Liquid packaging board** for, e.g. milk, yogurt, juice, soups, wine, soft drinks, and water, etc.
- **Food service board** for hot and cold drinking cups, fast food, ice cream, catering, etc.
- **Carton board** for, e.g. dry, frozen and chilled food, beverages, chocolate and confectionery, pharmaceuticals, cosmetics, luxury, and cigarettes etc.
- **Graphical board** for book and notepad covers, greeting cards, tickets, tags, and brochures, etc.
- **Speciality paper** for bags, pouches, labels, and banderoles, etc.

Business environment

Consumer packaging board accounts for 15% of the global consumer packaging materials market, while flexible and rigid plastics together make up close to 70%. By replacing fossil-based and unsustainable materials with innovative fibre-based products, we will be able to gain market share and significantly accelerate growth going forward.

The global consumer packaging market is growing by

2.5% per year.

Leading market position in core segments

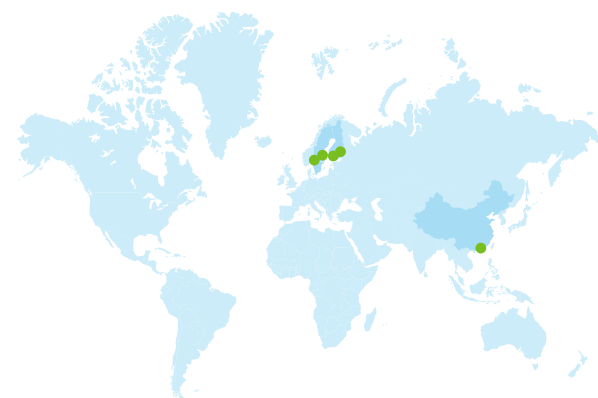


Stora Enso is one of the largest producers of virgin fibre board in the world. We are the global leader in liquid packaging and the biggest producer in our strategic segments in Europe.

The Consumer Board division operates five mills in Finland, Sweden and China.

Consumer Board has a strong foundation in European markets, where its main competitors are BillerudKorsnäs, Metsä Board, and Holmen. The main competitors outside Europe include Klabin, Evergreen, Weyerhaeuser, Georgia-Pacific, and International Paper.

The main growth opportunities in packaging lie within liquid packaging board (LPB), folding box board (FBB), and coated unbleached kraft (CUK).



● Consumer Board mills

Advantages

We are the industry leader in micro-fibrillated cellulose (MFC). The advantages of MFC in packaging are source reduction and light-weighting while maintaining strength. Further development includes bio-barriers based on MFC and biocomposites as alternatives to fossil-based materials.



Strong product brands based on renewable materials

Consumer Board offers the widest product portfolio within the premium sector of its industry in Europe. We have launched several new products in the last few years to meet our customers' increasing demands on product safety, functionality, sustainability and recyclability, for example CKB Nude, Trayforma, new Ensocoat, Performa Brilliance and Natura Life.



Leading position in attractive segments

We have a strong market position in all our product segments and have close, long-term relationships with our customers. We actively work together to find new solutions to improve the quality, efficiency and design of packaging by using renewable materials.

Global footprint geared for growth

The commercial ramp-up of our mill in Beihai allows us to serve new customers and new geographical markets. It continues to be a key growth initiative for the division because the most significant growth in virgin fibre-based consumer board is taking place in China and Asia Pacific.

Innovation driven from an existing customer base

We work in collaboration with our long-term customers to understand the drivers behind consumer needs in order to create the packaging of the future. Our innovation and R&D focus is on material efficiency and replacing fossil-based packaging materials with renewable solutions based on fibres. One example is the use of the micro-fibrillated cellulose (MFC) technology, to enable light-weighting of our board. Other examples are replacing PE-barriers for food and liquid packaging with fibre-based solutions and developing biocomposite components for different packaging applications, such as screw caps for milk cartons to reduce the use of plastics. We work internally within Stora Enso and also throughout our value chain with external partners, customers, and startups to accelerate innovation.

Strong assets with further development potential

Our asset base is strong, with cost-competitive integrated mills in Imatra and Skoghall, specialised mills in Fors and Ingerois, and a state-of-the-art mill in Beihai.

Our division's innovation work focuses on material efficiency, bio-barrier solutions and new materials and applications, such as micro-fibrillated cellulose and intelligent packaging.

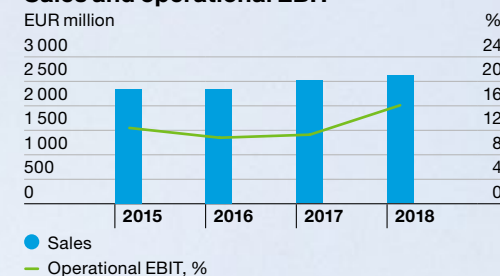
Financial performance

Operational ROOC

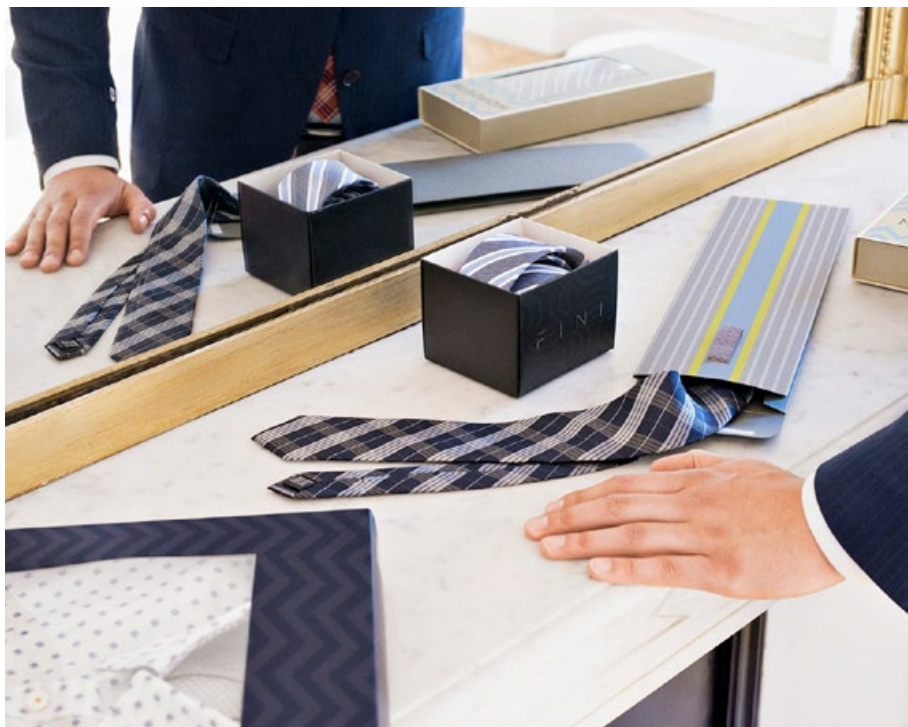
11.9%

(Target >20%)

Sales and operational EBIT



Highlights of 2018



Launch of the upgraded Performa Brilliance by Stora Enso

Stora Enso introduced new grammage ranges for its Performa Brilliance carton board. The new, higher grammage of 370 g/m² is intended for high-quality folding carton and graphical products such as calendars, cards and displays. The new 395 g/m² grade is enhanced with micro-fibrillated cellulose and designed for creating lighter, stronger and more sustainable folding cartons for premium and luxury packaging.



Continued investments in micro-fibrillated cellulose

Stora Enso has invested in the acceleration of the product development of new micro-fibrillated cellulose (MFC) applications in recent years. MFC can be used in barrier layers for grease and oxygen, and in the future as biodegradable films that can replace aluminium in paperboard packaging. The operational optimisation and commercialisation of MFC for light-weighting is proceeding as planned, following the completion of the development projects and investments in the Ingeröis, Imatra and Fors mills.

Simplifying complex packaging information with Value Wheel

Stora Enso introduced a new digital presentation tool for choosing the right renewable material for different packaging purposes. Value Wheel by Stora Enso helps to compare different packaging boards and papers and shows how they meet different end use requirements.



Accelerated growth in renewable materials through co-operation

Stora Enso signed a joint development agreement with the startup company Sulapac to licence its materials and technology. The cooperation targets the development of biodegradable packaging components for packaging applications and accelerates the commercialisation of sustainable packaging components in the division. The cooperation between the companies began in 2017 through Stora Enso's Accelerator programme. This involves partnering with Aalto University and startups to ideate and innovate around renewable products.

Sustainable RFID tag technology ECO for intelligent packaging

Stora Enso launched a new sustainable RFID tag technology, ECO™ by Stora Enso, designed for intelligent packaging functionalities in supply chain, retail and e-commerce applications. The technology enables paper-based RFID tags, providing a plastic-free and recyclable solution for packaging authentication. In addition, a new Augmented Reality (AR) application was launched, presenting the life cycle of a liquid beverage package to showcase the potential of new technologies to customers.

Main focus and targets for 2019



Safety – aim for zero accidents



Continue the ramp-up of Beihai Mill, plus build a premium market position in the Chinese and South East Asian market



Maintain market position for core segments in Europe and grow in selected markets



Accelerate the commercialisation of innovation programmes within MFC, barrier board, biocomposites, and intelligent packaging



Strengthen competitiveness through the continuous development of assets

Iceland Foods goes for renewable packaging

With its 900 stores, Iceland Foods accounts for 30% of frozen ready meal sales in the UK and the business is growing. Until recently, ready meal trays have been mostly made of black plastic, which is currently not recycled and is one of the plastics littering our oceans.

“We are moving away from plastic. In 2018, we launched two new major product ranges in paperboard trays, which are fit for purpose and sustainable in every way. Sustainable forestry and an environmentally sound production process, largely run by bioenergy, make paperboard a sustainable choice and it is also recyclable in the paper stream when rinsed well,” says **Ian Schofield**, Own Label & Packaging Manager at Iceland Foods.

Trayforma™ by Stora Enso proved to be the right choice for Iceland Foods. Besides being sustainable, the board for ready meal packaging must be formable to different shapes and sizes, plus food-safe and suitable for cooking at high temperatures in ovens and microwaves. The trays are manufactured by Southern Cross Packaging.

For Iceland Foods, this is just the beginning. The company will continue to look for non-plastic options for packaging, not just board but also coatings and films.

➤ Read more about Iceland Foods



Packaging Solutions

The Packaging Solutions division provides fibre-based board materials and corrugated packaging products and services that are designed for a wide array of applications. Our renewable high-end packaging solutions serve leading converters, brand owners and retailers – including those in e-commerce that are looking to optimise performance, drive innovation and improve their sustainability.



“Our strategy remains focused on growing significantly in containerboard and expanding selectively in corrugated packaging. The global trends of sustainability and e-commerce currently favour market growth. Retailers and brand owners alike are becoming increasingly aggressive in their plastics replacement strategies, thus creating opportunities for fibre-based solutions. Furthermore, leveraging product innovation and digitalisation to create competitive advantage will play a key role in our strategic roadmap.”

Gilles van Nieuwenhuyzen
Executive Vice President
Division Packaging Solutions



Offering

- **Kraftliner:** corrugated box liner, e.g. for food, fruit, vegetables, and consumer electronics
- **Recycled liner:** corrugated box liner, e.g. for furniture, electronics, and e-commerce boxes
- **Semi Chemical fluting:** corrugated box fluting, e.g. for fruit, vegetables, and heavy-duty goods
- **Recycled fluting:** corrugated box fluting, e.g. for industrial and consumer goods
- **Corrugated packaging:** corrugated boxes, e.g. for food, retail, e-commerce, and industrial goods
- **Packaging automation:** packaging machines, such as box formers, case packers, and palletising robots
- **Design services:** packaging design development services
- **Technical services:** equipment optimisation services
- **Intelligent packaging:** RFID-based packaging solutions for track and trace possibilities
- **Kraft papers:** high strength paper, e.g. for grocery bags and construction materials

Business environment

The customer base in containerboards and corrugated packaging is fragmented as it encompasses converters, brand owners, retailers, industrial and e-commerce companies. This offers opportunities for differentiation as customer expectations are evolving to leveraging packaging as a tool for brand building and engaging with end-consumers.

Corrugated packaging and containerboards are the largest segments in the paper and board business globally with

45% of the total volume,

offering room for growth in several areas.

Leading market position in core segments



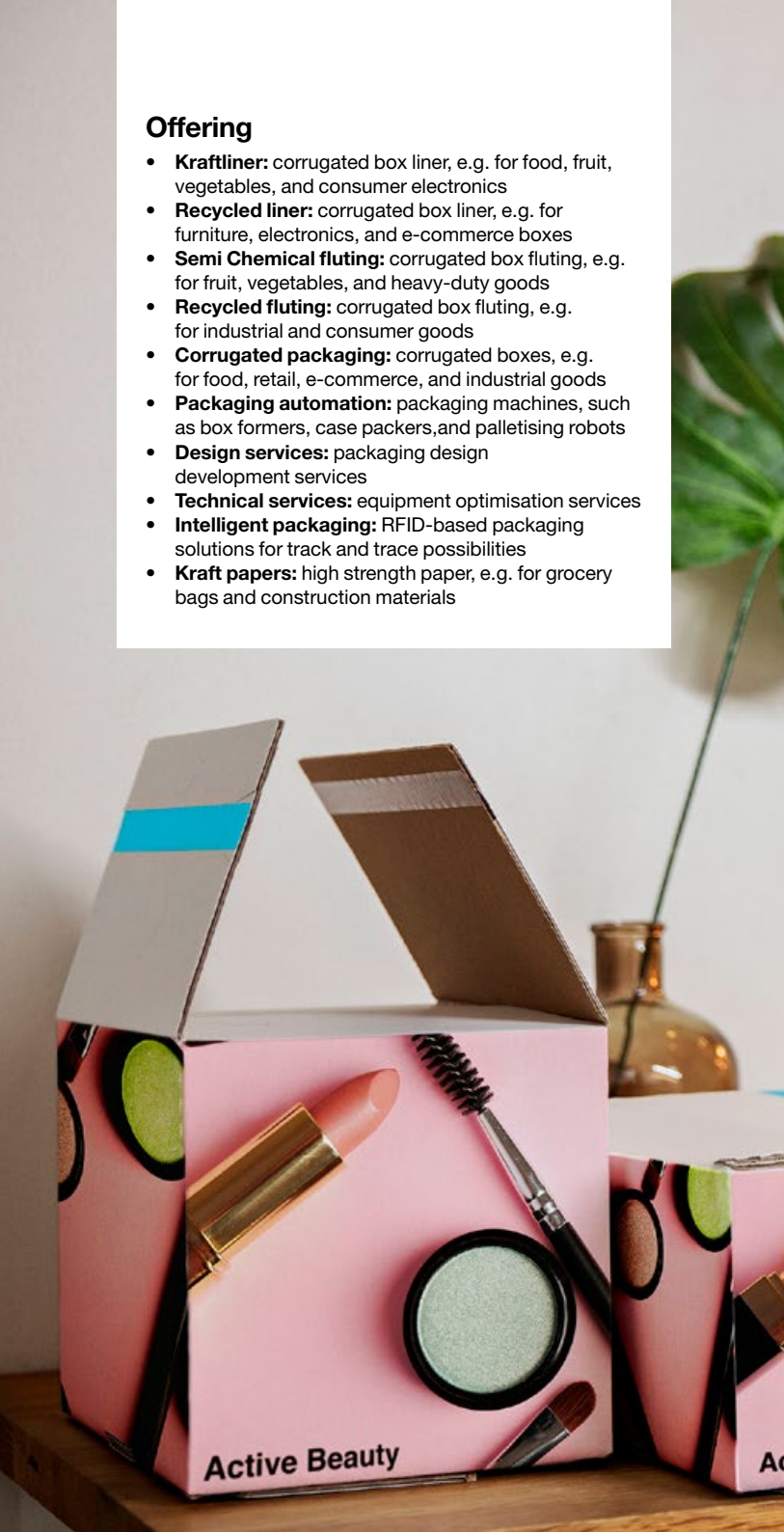
As an industry leader in renewable packaging, the Packaging Solutions division holds a strong position in the corrugated packaging focus markets: a leading status in the Nordics, second in the Baltics and Poland, third in China and fifth in Russia. The main competitors are Smurfit Kappa, Mondi, DS Smith and International Paper.

In containerboard the division has world-class assets and provides high-quality products. The market is fragmented in both containerboard and corrugated packaging with many larger and smaller players.

Packaging Solutions division operates three containerboard mills, four rigid box plants, 17 corrugated box plants, 10 design centres and one innovation centre.



- Containerboard
- Corrugated packaging



Advantages



Positive growth trends

In containerboard we see continued demand and growth for kraftliner for use in the areas of fresh produce and food, and demanding industrial and retail applications. Our focus is to be a strategic supplier and deliver high performing products and services within these segments.

In corrugated packaging we strive to build partnership positions with larger brand owners and retailers based on innovative value propositions. The e-commerce segment is especially attractive due to its anticipated fast market growth (15% CAGR 2017–2021). Corrugated packaging is fossil-free, renewable, recyclable and compostable and therefore well positioned as a packaging material in versatile application areas.

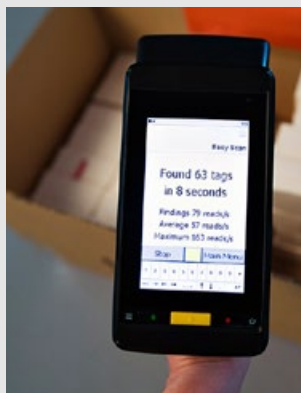
Integrated supply chains

Packaging Solutions maintains a vertically integrated position in the supply chain. Our operations cover paper collection for recycling and purchasing of wood up to the production of light-weight containerboards and versatile solutions for corrugated packaging.



Access to virgin fibre

Stora Enso has, partly through direct forest holdings, good access to the wood necessary for producing virgin containerboard.



Innovation capabilities

We bring added value to our customers through dedicated design centres for the development of innovative packaging, for example for traditional retail and e-commerce, high-quality printing facilities, market leading containerboard products and intelligent packaging.

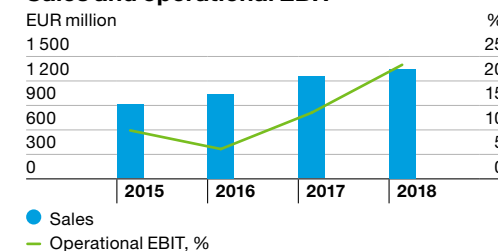
Financial performance

Operational ROOC

27.2%

(Target >20%)

Sales and operational EBIT



Highlights of 2018



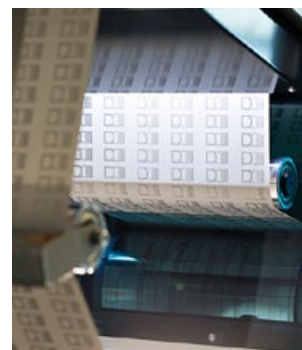
Upgrading Heinola Fluting Mill

The EUR 28 million investment in Heinola Fluting Mill in Finland was completed successfully. The investment was made to improve product quality and increase the production capacity of the AvantFlute SC product portfolio, thus meeting the increased demand for high quality fluting products used for food, fruit, and vegetable packaging. AvantFlute SC is Semi-Chemical fluting made from virgin fibre and has been developed to endure demanding conditions.



Investments to accelerate growth

Stora Enso is expanding the Tychy corrugated packaging plant in Poland. Furthermore, responding to a strong increase in demand, we are also investing in capacity expansion and technology upgrades in China. The project is expected to be completed in mid-2019. Additionally, there will be an EUR 9 million investment to upgrade and expand the corrugated packaging plant in Riga, Latvia.



Sustainable RFID tag technology

Stora Enso launched a new sustainable RFID tag technology, ECO™, designed for intelligent packaging functionalities in supply chain, retail, and e-commerce applications. The technology enables paper-based RFID tags, thus providing a plastic-free, recyclable and cost-effective solution.

Centre of excellence for corrugated packaging established in Lahti

The consolidation of corrugated packaging manufacturing in Finland was completed, improving profitability and competitiveness by creating a centre of excellence for corrugated packaging in Lahti. The Heinola corrugated plant was closed permanently, and packaging manufacturing was transferred to the upgraded Lahti plant.

Main focus and targets for 2019



Safety – aim for zero accidents



Drive the containerboard business to its full potential



Expand the corrugated business in selected markets



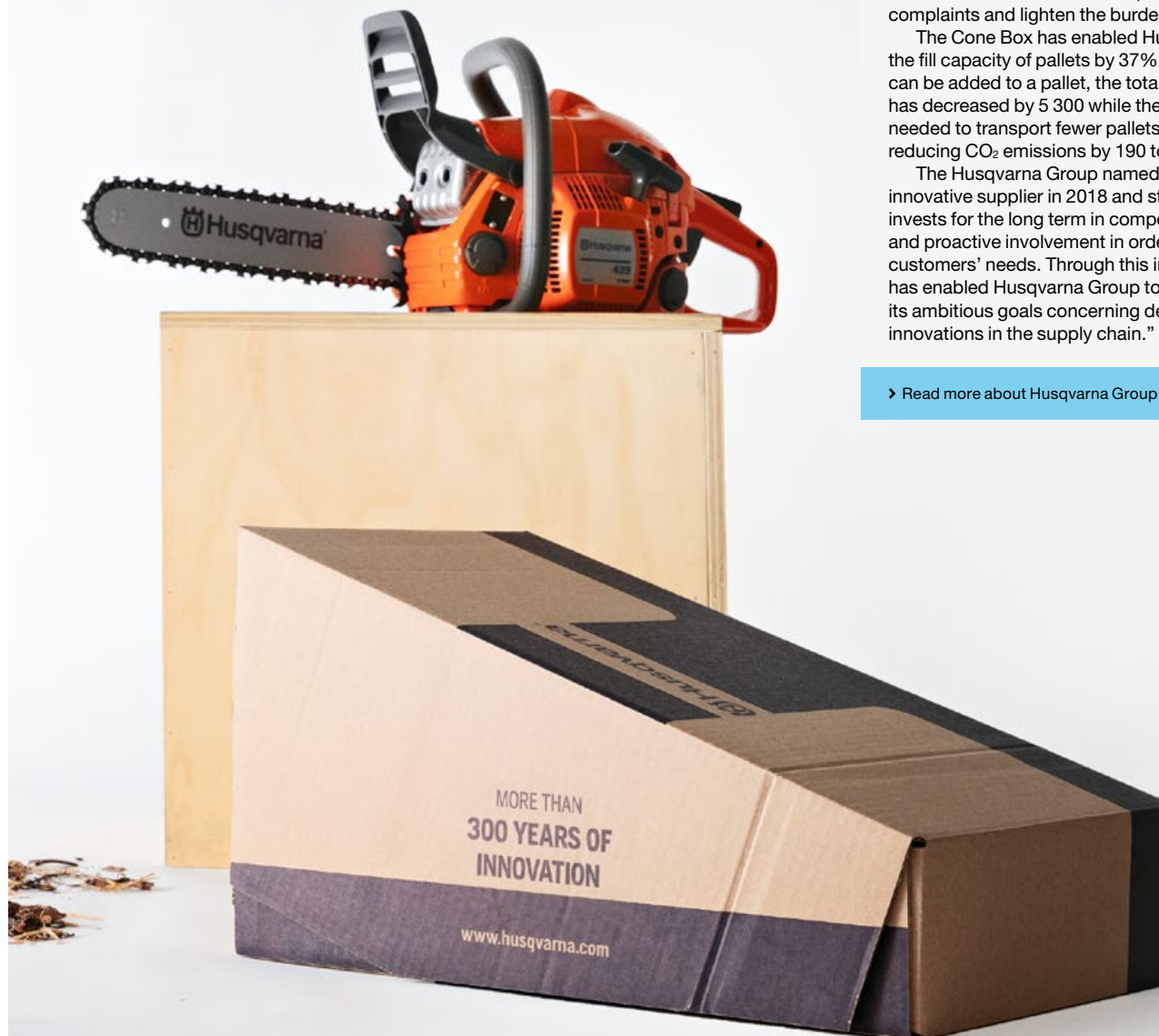
Leverage digitalisation for better customer experience and operational efficiencies



Increase our focus on customer value creation



Capitalise on completed investments and upgrades



Packaging innovation reducing transport costs and emissions

Stora Enso supplies corrugated packaging to Husqvarna Group, a leading global producer of outdoor power products and innovative solutions for forest, park and garden care. Our Packaging Solutions division has, in deep cooperation with Husqvarna, created a cone-shaped package for Husqvarna's chainsaw, which has enabled them to save on transportation costs, reduce complaints and lighten the burden on the environment.

The Cone Box has enabled Husqvarna to increase the fill capacity of pallets by 37%. And as more packages can be added to a pallet, the total number of pallets has decreased by 5 300 while the number of containers needed to transport fewer pallets has decreased by 180, reducing CO₂ emissions by 190 tonnes.

The Husqvarna Group named Stora Enso its most innovative supplier in 2018 and stated: "Stora Enso invests for the long term in competence, resources and proactive involvement in order to understand its customers' needs. Through this initiative, Stora Enso has enabled Husqvarna Group to sustainably achieve its ambitious goals concerning development and innovations in the supply chain."

› Read more about Husqvarna Group

Biomaterials

The Biomaterials division offers a wide variety of pulp grades to meet the demands of paper, board, tissue, textile, and hygiene product producers. We are maximising the business potential of the by-products extracted in our processes, such as tall oil and turpentine from biomass. Based on our strong innovation approach, all fractions of biomass, like sugars and lignin, hold substantial potential for use in various applications.



“Biomaterials aspires to meet the growing demand for replacing products made from fossil-based materials. As a strong and specialised chemical pulp producer, we develop new offerings and solutions with wood-based biomass. Our aim is to maximise the value of eucalyptus pulp in Latin America, to differentiate our Nordic mills’ business and pulp production and to generate profitable growth from innovation platforms.”

Markus Mannström
Executive Vice President
Division Biomaterials



Offering

- **Bleached hardwood pulp** for papers, labels, release liners, wallpaper, container board, packaging
- **Bleached softwood pulp** for papers, labels, release liners, wallpaper, container board, packaging
- **Unbleached pulp** for container boards, kraft papers, specialty papers
- **Fluff pulp** for personal and medical care, incontinence protection, baby diapers, napkins, etc.
- **Dissolving pulp** for viscose staple fibres, sustainable textiles, pharmaceuticals, sponges, cellophane
- **Lignin** for phenol replacement, formaldehyde-free binder, carbon fibre or energy storage
- **Xylose** for dental care and food applications
- **Tall oil** for use in detergents, soaps, adhesives, lubricants, paints, coatings, biofuels, etc.
- **Turpentine** for fragrances, flavours, detergents, solvents and thinners among other products

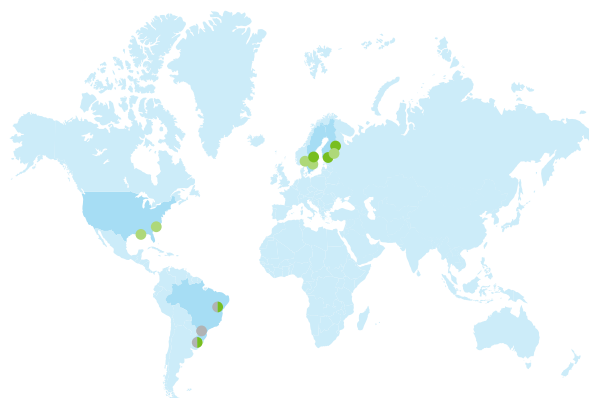


Business environment

The global pulp market continues to grow with demand and supply in balance, and supported by the megatrends of the growth of the middle class in the developing countries and progress in digitalisation, urbanisation, eco-awareness and changing lifestyles. The market for renewable textiles, non-wovens, carton board, hygiene products, specialty and tissue papers continues to grow, generating demand for our various pulp grades with the aging population specifically driving demand for fluff pulp. Furthermore, the megatrends are driving demand for virgin pulp in China.

Our aim is to maintain our competitive position and to extract the maximum value from our joint operations at Veracel and Montes del Plata, in Latin America. We continuously improve production, ensure operational reliability and guarantee wood availability at competitive cost.

Leading market position in core segments



- Biomaterials pulp mills
- R&D facilities and/or pilot plants
- Plantations

Biomaterials division has operations in Brazil, Finland, Sweden, Uruguay, and the United States.

In our Nordic mills, the aim is to increase the share of specialised pulp, i.e. fluff and dissolving pulps. This responds to the increasing demand for sustainable fibres in the textile industry and for renewable hygiene products, among others. We are also exploring areas where digitalisation can help us improve efficiency and safety in our mills while reducing cost.

Other pulp makers in the markets include, for example, UPM, Metsä Fibre, Södra, Eldorado, CMPC, Arauco (our partner in Montes del Plata), and Suzano (our partner in Veracel since early 2019 when Suzano merged with our previous partner Fibria).

In terms of new potential markets for renewable solutions, the Biomaterials division faces competition from biochemical companies and the chemical industry.

Advantages



Fibre knowledge

World-class experts in fibres and chemistry work for the Biomaterials division and continually advance our know-how of what wooden fibres can do. Their daily mission is to transform biomass into renewable solutions on our selected innovation and technology platforms. We are proud to work with top scientists who link us to global research and thus also add value to our customers' businesses.

In addition to innovating in pulp products, the Biomaterials division consistently develops a strong business portfolio for regenerated cellulose and MFC as well as for lignin and bio-based chemicals.



Superior customer service and strong customer relations

We have been working closely with our customers to understand their business challenges and to identify and develop unique or innovative value offerings that respond to those challenges. Our technical experts advise customers on the best usage of our pulp for reaching the desired runnability and quality of their products. Most of our sales go directly to producers instead of traders, thus allowing us to build solid, regular and long-term relationships with them.

Strong focus on innovation

Our Innovation Centre for biomaterials in Stockholm, and the Pulp Competence Centres in Imatra and Karlstad, plus the pilot project plant in Danville and demonstration plant in Raceland concentrate on research, product development and the commercialisation of new products and services.

Largest portfolio of pulp grades with the right pulp mix for customer needs

Unlike many other suppliers that are focused on one specific pulp grade, we offer the widest pulp portfolio in the market. This, combined with stable quality, allows our customers to keep their recipes unchanged and to improve the efficiency of their own products and processes.

Financial performance

Operational ROOC

17.9%

(Target >15%)

Sales and operational EBIT



Highlights of 2018

Lignin commercialised and awarded

Lineo™ by Stora Enso was launched as a renewable replacement for oil-based phenolic materials. Lineo is made of bio-based lignin – one of the building blocks of trees. Lignin can be used in a range of applications in which fossil-based materials are currently used. Examples include adhesives used in plywood, laminated veneer lumber, oriented strand board, and laminates. In the future, lignin can be developed into other types of formaldehyde-free binders and could potentially also be used in carbon fibre and energy storage applications. Lineo was awarded 'Bio-Based Product of the Year' at the Bio-Based World News Innovation Awards 2018, 'Best Product Innovation' at the ICIS Innovation Awards 2018 and 'Innovative Product Award 2018' by the Institution of Chemical Engineers (IChemE). Stora Enso has been producing quality kraft lignin on an industrial scale since 2015.



New fluff pulp line up and running in Skutskär

Production started as planned at the new fluff pulp line at Skutskär Mill in Sweden following the EUR 26 million investment to meet the growing demand in the hygiene market. We also completed the EUR 16 million investment to improve Skutskär Mill's environmental performance by reducing sulphur emissions.



Dissolving pulp investment in Enocell proceeding as planned

Biomaterials is increasing its dissolving pulp production capacity in Finland. Enocell Mill will be converted to focus entirely on the production of dissolving pulp with completion during the second half of 2019. This investment improves our pulp mix, adding softwood dissolving pulp to our product portfolio and supporting the mill in becoming an integrated biorefinery plant for new bio-based chemicals.

Innovation in the core business

Biomaterials explores the potential for its innovations by discussing issues with its current pulp customers. We will continue to build strong business with lignin, create new business in regenerated cellulose and MFC, and further develop extraction and separation technology and bio-based chemicals. Also, we will look into the opportunities offered by extracted sugar. In lignin, the short-term focus is on the replacement of phenol. However, there is great potential within other applications, such as carbon fibres. Lastly, we are also exploring the potential for bioplastics, working closely with our packaging divisions.

Stabilising xylose production and commercialising xylose

Biomaterials started producing xylose at the division's Raceland facility in May 2018. The xylose will be sold to xylitol producers to be used in dental care and food applications. The demonstration plant is the first of its kind and utilises sugar cane bagasse, which is the bio-based waste from sugar cane processing.

Main focus and targets for 2019



Safety – aim for zero accidents



Production and operational efficiency focusing on business continuity and digitalisation



Customer centricity and supply chain efficiency ensuring product quality, lead-time reliability, and the traceability of pulp deliveries



Generate profitable growth from new products and services



People, competence, and capability development for entering new markets

Aiming at future with 100% bio-based resin

Rolkem is a producer of phenolic resin for plywood application, with another core business in the impregnation of technical papers. Since late 2015, Rolkem has used renewable lignin from Stora Enso to replace fossil-based chemicals in its phenolic resin production.

“Stora Enso provides industrial lignin that can be adapted to Rolkem’s needs, so the partnership has been a perfect fit for us,” says **Patrick Palos**, General Manager at Rolkem. “Lignin allows us to reduce the use of fossil-based materials and chemicals in our production. Renewable products such as lignin are also linked to sustainable commercial development. For example, it is important that our customers see that we are able to develop new products.”

The collaboration is an interesting exchange between two companies of very different sizes.

“Rolkem’s small size brings reactivity into the relationship while Stora Enso can provide excellent support with, for example, research and development activities,” says Palos. “Perhaps, in the future, we can work together to develop a 100% bio-based resin for plywood bonding or paper impregnation.”

Lineo™ by Stora Enso, Stora Enso’s commercial lignin offering, can be tailored to any customer’s specific needs. Lineo was awarded ‘Bio-Based Product of the Year’, ‘Best Product Innovation’ and ‘Innovative Product’ in 2018.

› Read more about Rolkem

Wood Products

The Wood Products division is a leading provider of innovative wood-based solutions. The product range covers all areas of construction, including massive wood elements and wood components. It also includes a variety of sawn timber goods and pellets for sustainable heating. The emerging product range of biocomposites addresses the opportunities to replace plastics in consumer goods and creates potential in various demanding exterior applications in a cost-competitive way.



“Wood Products continues its successful transformation from a traditional classic sawn producer to a leading provider of innovative wood-based solutions. We aim to grow our business profitably, driven by three focus areas – growing Building Components and Solutions faster than the market, the fast growth of Biocomposites and selective growth in Classic Sawn.”

Jari Suominen
Executive Vice President
Division Wood Products



Stora Enso provided the PEFC-certified cross-laminated timber (CLT) panels for the 9 metre high timber sculpture, 'Head Above Water' in London, UK.

Offering

- Classic sawn
- Classic planed
- Cross laminated timber (CLT)
- Laminated veneer lumber (LVL)
- Construction beams
- Window and door components
- Building solutions
- Building components
- ThermoWood
- Pellets
- Biocomposite

Business environment

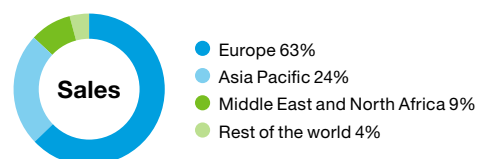
Wood Products has close to 2 500 customers in 60 countries. The customer and supplier market is highly fragmented, competitive, and volatile because it is connected to the construction market. We see this as an opportunity for a developed player like us.

The European new construction market is growing at

3.5% annually.

Stora Enso's Wood Products division is the largest supplier of wooden construction material in Europe and the fourth largest in the world with 21 production units in 11 different countries.

Leading market position in core segments

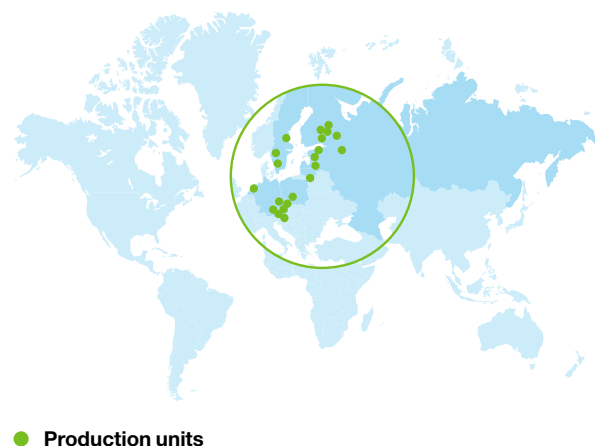


Approximately 60% of Wood Products sales go directly to industry, merchants or retailers and the remaining 40% go through wholesalers and trading houses. As the share of value-added products and the development of distribution centres increases, the share of direct sales will grow.

The global market growth for sawn softwood is estimated to be 2–3% annually.

Competition varies from other sawmills to manufacturers of construction and interior materials. Wood pellets face competition from other heating systems whereas for biocomposites, the main competitor is conventional plastic. In the construction market the new usages of wood is gaining market share from materials such as concrete, steel, glass, and metal.

Other significant sawmilling and wooden material providers include: Binderholz, Pfeiffer, SCA Timber, Metsä Fibre, Holzindustrie Schweighofer.



Advantages



Global sales network combined with local presence

Our global know-how and broad product portfolio are our competitive advantage. We are close to our customers and serve them locally through our extensive sales network. We also differentiate through innovative services such as our integrated distribution centres, building systems and building components as well as eBusiness solutions.



Renewability as a competitive advantage

Wood is the only construction material suitable for large scale construction that is both fully recyclable and renewable. Using wood with efficient building processes reduces CO₂ emissions. Wooden buildings also store carbon.



Broad product and service offering

Our high-quality wood-based products and services target the end-user segments of construction, packaging, furniture and bioenergy. Our fibre products like wood chips and sawdust are sold as raw material to the pulp, pellets or bioenergy sectors. We always utilise our wooden materials to the fullest. On average, the utilisation rate of wooden raw material is over 99%.

Wood-based innovations are our future and digital services and technology will take it to the next level.

Competitiveness through innovation and digitalisation

To support our accelerated growth agenda, selected innovation projects have been defined to ensure focus and speed to market. Examples include bringing new and updated building components and solutions to the market and ensuring successful launches of biocomposites as a renewable replacement for plastics.

As a part of a leading forest industry company, we see significant opportunities in driving digitalisation in, for example, wood procurement, value chain optimisation, the introduction of robotics to increase operational efficiency, and the development of our online service offerings. Digital solutions will increase transparency between all players in the building process.

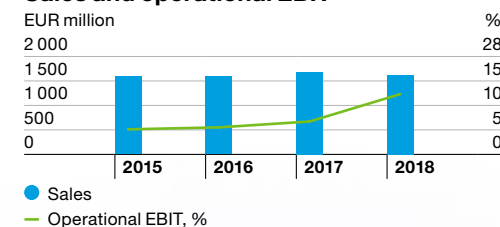
Financial performance

Operational ROOC

28.1%

(Target >20%)

Sales and operational EBIT



Highlights of 2018

New Building Solutions concept for commercial offices

Coming soon, Stora Enso will extend its portfolio of building concepts. Besides concepts for residential multi-storey buildings as well as schools, Stora Enso will launch a new concept for commercial office buildings. Building Solutions by Stora Enso will enable customers in the construction sector to build using massive wooden products and components.



Biocomposites in production and commercial use

The production of biocomposite granules began in 2018 at Hylte Mill in Sweden under the brand name DuraSense™ by Stora Enso. Biocomposite granules enable the use of wood to substitute for a large percentage of the fossil-based materials in products typically produced in plastics.

During the fall, Stora Enso and household products company Orthex brought to the market a new range of kitchen utensils made from DuraSense. These innovative products contain 98% bio-based material. In addition, Stora Enso has been collaborating with several brand owners, including H&M group, to introduce products made from DuraSense to the market – the initial market focus will be on Europe.

At the Hylte Mill, Stora Enso is also building a Biocomposites Competence Centre and diversifying the raw material base for biocomposites, which will provide more choice in technical properties and the selection of fibres. Production is scheduled to begin before the end of 2019.

Joint development of digital services for wooden buildings with Trä Group

Stora Enso and the startup company Trä Group signed a joint development agreement to develop innovative digital services for wooden buildings. The target is to make the design and specification easier by establishing a digital platform and toolbox that connects wood construction industry professionals throughout the value chain. The first services are planned for launch in 2019. The co-operation between the companies began in 2017 in Stora Enso's Accelerator programme, which involved partnering with Aalto University and startups to ideate and innovate renewable products and services.



Strengthening position as a market leader in CLT

The EUR 45 million investment in a new cross laminated timber (CLT) unit at the Gruvön sawmill in Sweden proceeded during the year as planned. Production is scheduled to begin during the first quarter of 2019.

To meet the continuously growing demand for sustainable building components, Stora Enso has started up CLT rib panel production in Ybbs, Austria. Rib panels offer an effective and cost competitive solution for construction projects that require long spans, such as commercial and industrial buildings and schools.



Varkaus investment completed, Launkalne coming up

The new laminated veneer lumber (LVL) line at Varkaus Mill reached EBITDA break-even during the first quarter and the ramp-up was completed successfully during the second quarter. Stora Enso is also investing approximately EUR 13 million in an additional sawline, a planing line and a pellet mill at Launkalne, Latvia. The start-up is expected to take place in phases during the second and third quarter of 2019.

Building with wood

Stora Enso was selected as the provider of wooden material to several new building projects around the world, including:

- 25 King Street in Brisbane, Australia, the largest wooden commercial office building in the world: total floor area of close to 15 000 m² covering 10 floors
- 14-storey wooden building in Joensuu, Finland: Light House Joensuu to be the country's tallest wooden high-rise building, providing 120 student apartments
- Üstra apartment buildings in Hannover: project of 9 houses and 139 flats to be built as rental homes for employees of Üstra – a major transport company
- The Arts Centre at Sherborne Girls School, Dorset, England, the final project in the school's Growing for the Future development programme driven by multiple needs and aspirations
- Grand CARRE-Auchan, Lille, France, five office buildings linked together and a first-floor carpark

Main focus and targets for 2019



Safety – aim for zero accidents



Improve service to the Scandinavian building market by successfully ramping up Gruvön CLT mill



Grow the attractive offerings of biocomposites to replace fossil-based plastics



Develop new building concepts for new building types and applications



Develop innovative digital services for wooden buildings together with Trä Group



Continue the implementation of the digital roadmap



Supercell proudly building with wood

The demand for building offices with massive wood is increasing. Stora Enso has delivered massive wooden elements like Cross Laminated Timber (CLT) and Laminated Veneer Lumber (LVL) to an increasing number of office projects in Europe like Green Office Enjoy in Paris as well as some large-scale projects in Australia.

One of the most recent projects is the Helsinki headquarters of the mobile game company Supercell, known for games like Clash of Clans and Hay Day. The eight-storey building will be part of Wood City, a whole city block built with massive wood, which should be completed by 2020.

“We are proud to be part of innovative and environmental-friendly way of building. Wood has been an essential part of all our office interiors in San Francisco, Shanghai, Seoul, and Tokyo and now it is the main element for our headquarters. It represents our Finnish roots and shows that we take pride in them,” says **Ilkka Paananen**, CEO of Supercell.

Stora Enso is the leading provider of innovative wood-based solutions. In early 2019, the company will launch a concept for office buildings that includes information about building with wood – for example, design guidance, case studies with BIM models and cost analysis – that is directed towards architects, designers, developers and construction companies. This concept widens the portfolio of already existing solutions for residential and modular buildings.

› Read more about Supercell

Paper

Stora Enso is the second largest paper producer in Europe with an established customer base and a wide product portfolio for print and office use. Customers benefit from Stora Enso's broad selection of papers made from recycled and virgin fibre as well as our valuable industry experience, know-how, and customer support.



“Our ambition is to be the best sustainable value creator in the paper business through customer focus and efficiency. This means being better than the competition in understanding customer needs, commercial, and operational excellence and profitability.”

Kati ter Horst
Executive Vice President
Division Paper



Offering

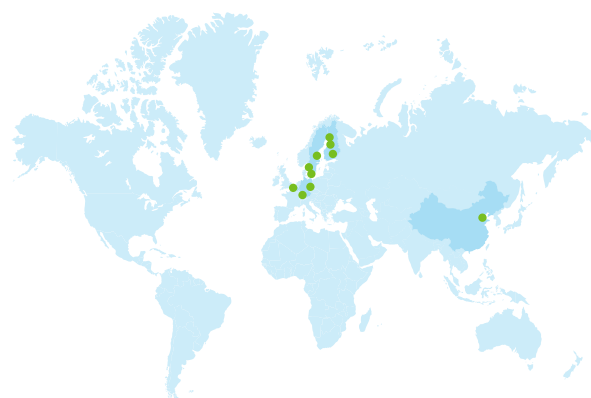
- **Newsprint and book papers**
- **Uncoated magazine papers (SC)** for magazines and retail advertising
- **Coated papers** for magazines, brochures, catalogues, and art books
- **Office papers** for notepads, envelopes, printing, and copying
- **Technical customer service**
- **eBusiness solutions**
- **Sustainability support**

Business environment

European paper demand is declining at a rate of 3–5% per year, varying across paper grades and geographies. However, this is still a large global business and paper will continue to play a significant role in media and advertising in the future. After significant capacity closures and conversions, especially in newsprint and supercalendared (SC) papers in the last few years, the European paper markets are currently well balanced.

Stora Enso has nine paper mills with 18 production lines in Europe and one joint venture paper machine in China.

Leading market position in core segments



● Paper mills

Print and digital media complement each other: flyers and folders are used in advertising and online retailers publish printed magazines and establish physical store locations to improve customer experience.

Publishers still create most of their revenues from print and print media remains the most trusted source of information. Print advertising brings consumers into stores.

Book paper sales have remained stable as many people prefer reading books in the traditional paper and ink format. Copy paper is performing relatively well as people continue to print at offices and home.

With its comprehensive product range, Stora Enso's Paper division is the second biggest paper manufacturer in Europe, where the main competitors are UPM, Sappi, Holmen, Norske Skog, and the Navigator company.

Advantages



Strong assets serving global paper markets

Paper division reviews its key assets – pulp mills, paper machines, and energy set-ups – continuously. We ensure that asset and sales strategies are aligned to increase our competitiveness in changing market conditions. We are developing our ways of working for instance in supply chain area, and utilising data to improve efficiency and safety in our operations.

We continuously improve the operational efficiency of our paper mills. For example, Anjala Mill has achieved an EUR 8 million improvement in productivity during the last three years.



More than 90% of Stora Enso paper brands awarded ecolabels

We use our sustainability expertise to help our customers perform better on sustainability measures. Our ambition is to make sustainability a competitive advantage. Our performance in different areas of sustainability has been recognised by many stakeholders, for example WWF's Environmental Paper Company Index. More than 90% of our own paper brands have been awarded the European Ecolabel, the official EU recognition for Greener Products.

Commercial excellence through long-term customer relationships

Key focus areas in our commercial excellence include optimising sales by product and mill through product management, pricing as well as solid business intelligence and the commercial competence of our global sales network.

Focused innovation

Operational excellence is about having competitive assets and a sound cost structure. Our process innovations improve the division's efficiency and ways of working, for example, through digitalisation. The investments for green energy solutions at our Maxau and Nymölla Mills are examples of improved competitiveness and a reduced environmental impact.

New or improved paper grades to fit customer needs. Many of our products have been developed together with our customers, like our carbon-neutral copy paper Multicopy Zero.

Non-paper related new businesses utilising our knowhow and infrastructure. For example, the Hylte biocomposites business emerged from the Paper innovation process.

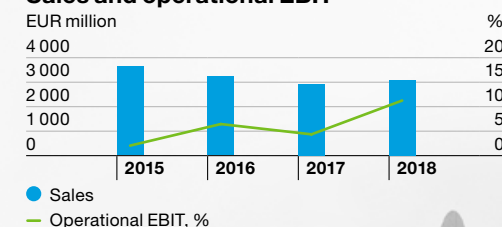
Financial performance

Cash flow after investing activities to sales

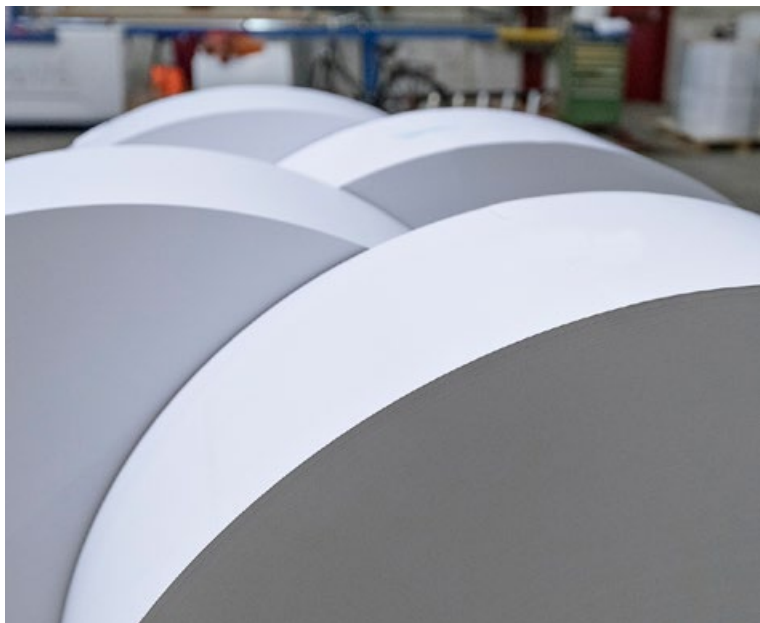
5.7%

(Target >7%)

Sales and operational EBIT



Highlights of 2018



Optimised paper handling and logistics with ReadyReel

Stora Enso launched a new service, ReadyReel, from its Lumipaper NV converting services site located in Antwerp, Belgium. ReadyReel is a rewinding and palletising service that offers a rapid delivery of reels ready in the format and position needed for loading directly on to a press. This allows customers to manage the ever-growing demands for shorter runs and faster turnaround within their process.

The steam turbine investment in Maxau Mill reduces CO₂ emissions by
50 000 tons annually.

Collaborating with Gasum on biogas

Stora Enso and the energy company Gasum will build a biogas plant at Nymölla Mill in Sweden to turn the mill's wastewater effluent into renewable energy. The expected liquified biogas production of the plant is 75–90 GWh per year, equal to the amount of fuel needed annually for more than 200 long haul lorries.

Increasing efficiency with the Paper Production System

The roll-out of the Paper Production System continued during the year. Based on lean manufacturing principles, this shared method of operating our mills aims for further improved productivity and reduced waste regarding time or the use of excess materials. The programme also investigates how digitalisation could best be used to our benefit and which competences need to be developed in operations.



Harnessing digitalisation for mill operations

As technology advances, the Paper division increasingly utilises the benefits of digitalisation. For example, the Oulu Mill in Finland has piloted augmented reality and 5G technology solutions in mill maintenance. By using a virtual model of a machine and real-time data concerning information points, we can improve the operational reliability of the mills.



Boosting green energy generation in Maxau

Stora Enso is investing EUR 25 million at Maxau Mill in Germany and installing a new steam turbine with a closed-loop cooling system and additional biomass storage. This will reduce the energy cost and secure the long-term cost competitiveness of the paper mill. The investment enables a higher share of biomass and a clear reduction in our CO₂ emissions.

Main focus and targets for 2019



Safety – aim for zero accidents



Focus on the right products and customers by paper mill



Pricing excellence across all paper grades



Variable and fixed cost control to ensure continued profitability



High operational efficiency and capacity utilisation at all paper mills



Focused innovation and digitalisation in paper sales, supply chain, and operations.

Production Manager Fabrice Nicolle and Quality Manager Roger Ferry from Lagardère.



Softproofing gets the colours right

Getting the colours right on a print job used to require trial runs that took time and money. What you see on the computer screen is not always what you get to print and the changes are not always dependent on the paper. Hard proofs need to be sent via physical post, which slows down the process.

Softproofing by Stora Enso is a service that streamlines the printing process. Saving both time and money, it is the choice of the Lagardère group, a global leader in content publishing, production, broadcasting and distribution.

Softproofing employs unique software specially calibrated to show what a print job will look like before it hits the presses. During the softproofing process, users can select different paper types to show what results each type of paper would produce, allowing them to adjust the pre-press files accordingly. Lagardère also greatly appreciates the flexibility Softproofing brings – now it is possible to make even last-minute changes.

Housed in a standardised environment similar to an old-fashioned telephone booth – with defined light resources and

a defined screen – the Softproofing service is a ready-made solution that allows users to check their pre-press data on site. Lagardère has one booth and the printing company has another.

When the processes are optimised, the best print results are found quickly and the customer saves time, effort, money and materials. “We are particularly pleased with this solution as it is a very simple tool with an efficient back-up team that is highly reactive,” say **Fabrice Nicolle**, Production Manager at Lagardère.

› Read more about Lagardère

Group Leadership Team

Karl-Henrik Sundström
Chief Executive Officer (CEO)

Johanna Hagelberg
Executive Vice President,
Sourcing and Logistics

Jari Suominen
Executive Vice President,
Division Wood Products

Annica Bresky
Executive Vice President,
Division Consumer Board

Ulrika Lilja
Executive Vice President,
Communications

Kati ter Horst
Executive Vice President,
Division Paper

Per Lyrvall
Executive Vice President, Legal,
General Counsel, Country
Manager Sweden

Markus Mannström
Executive Vice President,
Division Biomaterials

Noel Morrin
Executive Vice President,
Sustainability

Malin Bendz
Executive Vice President, HR

Gilles van Nieuwenhuyzen
Executive Vice President, Division Packaging Solutions

Seppo Parvi
Chief Financial Officer (CFO), Deputy
to the CEO, Country Manager Finland

For more detailed information about the Group Leadership Team, see **Governance 2018**, or storaenso.com/investors/governance.



Stora Enso Oyj

P.O. Box 309
FI-00101 Helsinki, Finland
Visiting address: Kanavaranta 1
Tel. +358 2046 131

Stora Enso AB

P.O. Box 70395
SE-107 24 Stockholm, Sweden
Visiting address: World Trade Center
Klarabergsviadukten 70
Tel. +46 1046 46 000

storaenso.com
group.communications@storaenso.com

Concept and design: Miltton Oy

Photography: Mattias Andersson, Justyna Veni Ejsmont, Magnus Fond, Sanna Heiskanen, Kaapo Kamu, Tuukka Koski, Tim Kinnander, Veikko Kähkönen, Annamari Luukkainen, Mikko Nikkinen, Tiina Nykänen, Mikko Ryhänen, Topi Saari, Niklas Sandström, Juha Sarkkinen, Mikael Strinnhed / Scandinavian Design Group, Patrik Svedberg / NY, Mattias Södermark, Ernst Tobisch, Roland Weegen / Huber&Sohn, Anttinen Oiva Architects, Casual Friday Studios, Getty Images, Giesbers Communicatie, Guillaume M, Iceland Foods, Lagardère, Orthex, Studio Skaala, Sulapac, stakeholders' own images, and Stora Enso's image bank.

It should be noted that Stora Enso and its business are exposed to various risks and uncertainties and certain statements herein which are not historical facts, including, without limitation those regarding expectations for market growth and developments; expectations for growth and profitability; and statements preceded by "believes", "expects", "anticipates", "foresees", or similar expressions, are forward-looking statements. Since these statements are based on current plans, estimates and projections, they involve risks and uncertainties, which may cause actual results to materially differ from those expressed in such forward-looking statements. Such factors include, but are not limited to: (1) operating factors such as continued success of manufacturing activities and the achievement of efficiencies therein, continued success of product development, acceptance of new products or services by the Group's targeted customers, success of the existing and future collaboration arrangements, changes in business strategy or development plans or targets, changes in the degree of protection created by the Group's patents and other intellectual property rights, the availability of capital on acceptable terms; (2) industry conditions, such as strength of product demand, intensity of competition, prevailing and future global market prices for the Group's products and the pricing pressures thereto, price fluctuations in raw materials, financial condition of the customers and the competitors of the Group, the potential introduction of competing products and technologies by competitors; and (3) general economic conditions, such as rates of economic growth in the Group's principal geographic markets or fluctuations in exchange and interest rates. All statements are based on management's best assumptions and beliefs in light of the information currently available to it and Stora Enso assumes no obligation to publicly update or revise any forward-looking statement except to the extent legally required.