

## Stora Enso

#### Your safety is important to us



- For visitor's
  - Listen to your host and advices given by.
  - The potential danger follow instructions given by your host.
  - On mill tour you need to use helmet, safety vest, earplugs and safety glasses
  - Stay on marked trails and do not overreach or put your hand over the machines
  - Hold the railings when walking on stairs
  - Photographing and filming on mill area is prohibited
  - Mobilephone is safetiest to keep in your pocket for whole visit
  - Smoking is allowed in specifically marked areas









#### Creating a renewable future in the bioeconomy





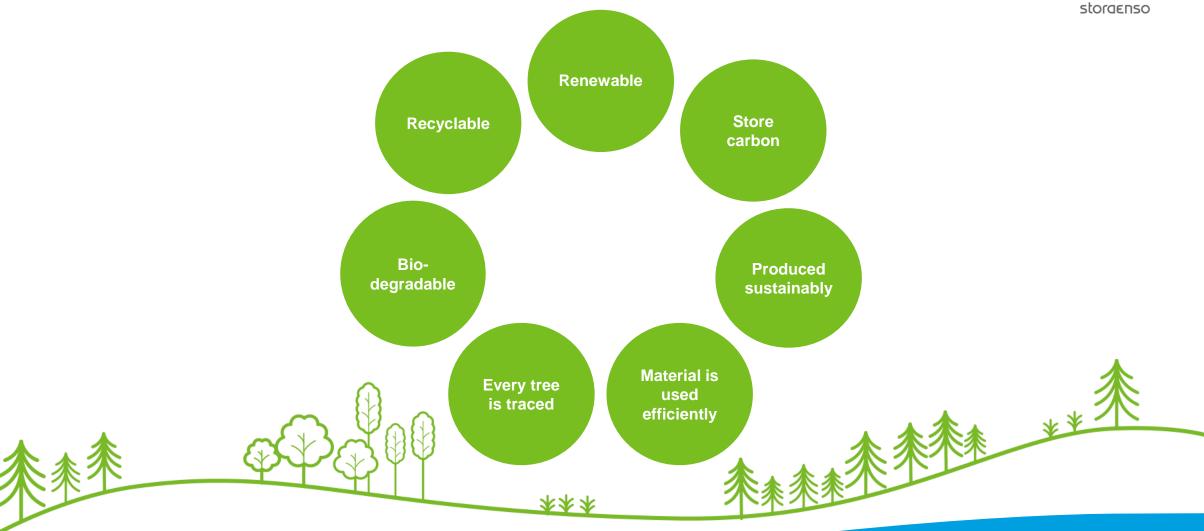
In the bioeconomy, products based on wood fibres are replacing non-renewable materials.





#### Our renewable products contribute to a greener planet





# Examples of our solutions replacing fossil-based materials today



Dissolving pulp can be used for producing textiles

EcoFishBox by Stora Enso can replace polystyrene packaging



Wooden construction elements can replace concrete in buildings

Lignin can replace e.g. fossil-based phenol in adhesives



Trayforma by
Stora Enso
can replace
plastic in e.g.
frozen food
packaging



#### **Stora Enso in brief**













## Stora Enso worldwide

- Countries where Stora Enso has production, plantations, or projects
- Stora Enso's markets



#### **Divisions**









Packaging Solutions



**Biomaterials** 



**Wood Products** 



**Paper** 

#### Portfolio aimed at growth













Consumer
Board –
Expansion of relative market share in profitable niches

Packaging
Solutions –
Selective
profitable
growth

Biomaterials –
Strengthening
current
business and
creating new
profitable
growth

Wood
Products –
Accelerating
growth

Paper –
Strategy for maximum cash generation





#### **Biomaterials division in brief**



- Variety of pulp grades to meet the demands of paper, board, tissue, textile and hygiene product producers
- Developing new business platforms such as second generation biochemicals and biomaterials based on non-food competing biomass feedstock
- Operations in Brazil, Finland, Sweden, Uruguay and the United States



#### Sustainable solutions for various end uses





Our **Supreme**, **Perform** and **Select** grades are transformed by our customers into all kinds of paper, packaging and tissue.



Our **Care** fluff grades are mostly used for the manufacturing of hygiene products such as diapers and feminine care products.



Our **Pure** dissolving pulp is used for the production of viscose fabrics, but also in applications in the food and pharmaceutical industries.



In addition to pulp, we also produce various byproducts such as Lineo™ by Stora Enso (kraft lignin), Tall Oil and Turpentine, used as raw materials in the adhesive and cosmetic industries among others.

#### Innovative end-uses for wood fibre



- In strong collaboration with Stora Enso, Finnish company Lumir has developed a new acoustics solution using modified chemical pulp
- Innovative sound absorbing solutions based on wood fibre: for example to recently renovated Parliament House in Helsinki, where there is over 3 000 m<sup>2</sup> of acoustic surface
- Bio-based acoustic solutions are suitable for any space that needs better acoustics, reduced reverberation and improved comfort



## Renewable Lineo™ by Stora Enso can replace fossil-based materials



- Wood-based lignin is a renewable, non-toxic, traceable material
- Lignin opens up possibilities that benefit the environment, for example, in carbon fibres, energy storage and mechanical forest industry
- Today lignin can be used as a replacement for oilbased phenolic materials in glues that are used for example in plywood and paper lamination
- Lignin makes up 20-30% of wood, but has traditionally been discarded



# Allu – a dress made of wood in Pure Dissolving Pulp

Stordenso

- One example of the applications for dissolving pulp is the clothing industry
- Fabrics such as viscose, rayon, modal, lyocell, and cupro are all made from 100% wood fibres
- Enocell pulp mill produces 150 000 tonnes / year of dissolving pulp from birch wood
- Product development in collaboration with our customers



marimekko

#### Sustainable forestry is our passion



## Our wood comes from Nordic forests and eucalyptus plantations:

100% of our wood is traceable to its forest of origin

#### We look after our forests:

- Sustainable, certified forest management for healthy and productive forests
- We never convert natural forests or protected areas into plantations



#### We are differentiating our pulp mix...

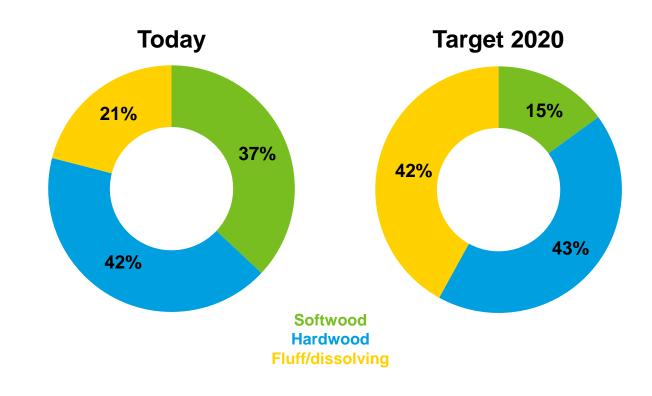




Maximise value from eucalyptus pulp



Improve
competitiveness of our
Nordic mills
(Fluff and dissolving)



#### Our three focus areas





## Maximise value from eucalyptus pulp

- Continue to improve production efficiency
- Improve cost competitiveness in Montes del Plata



### Differentiate our Nordic pulp business

- Reduce exposure in softwood
- Grow in fluff and dissolving pulp
- Continue to improve production efficiency
- Innovate on pulp applications with current customers



#### **Create new platforms for growth**

- We build and develop strong business on:
  - Improved pulp properties
  - Regenerated cellulose and MFC
  - Lignin
  - Bio-based chemicals
  - Extraction and separation technologies

#### Our three focus areas









Maximise value from eucalyptus pulp



Differentiate our Nordic pulp business



Delivering sustainable profitable growth

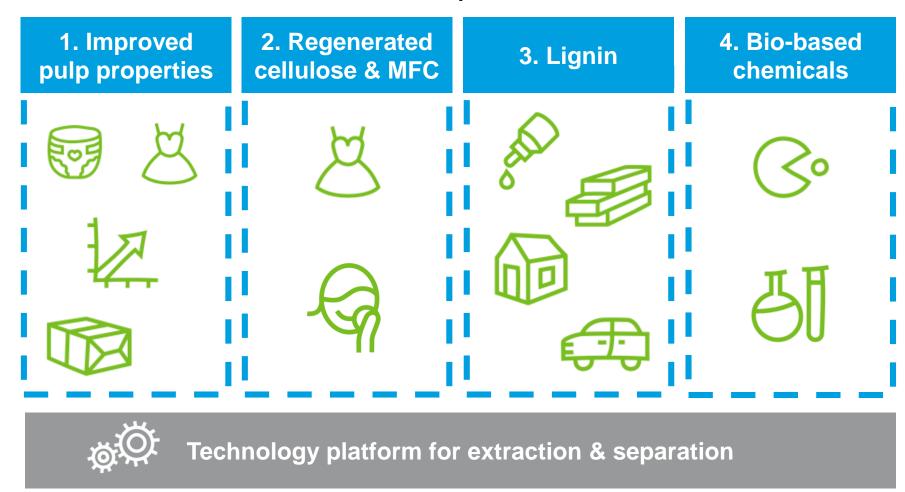
**Create new platform for growth** 



#### Innovation is key for sustainable profitable growth



#### **Product platforms**





#### When you want to know more

**Read our reports** 



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instagram.com/storaensoworld

27 THE RENEWABLE MATERIALS COMPANY



# Stora Enso in textile value chain

## The world is changing. Stora Enso too. Major global trends drive the world's demand for renewable materials

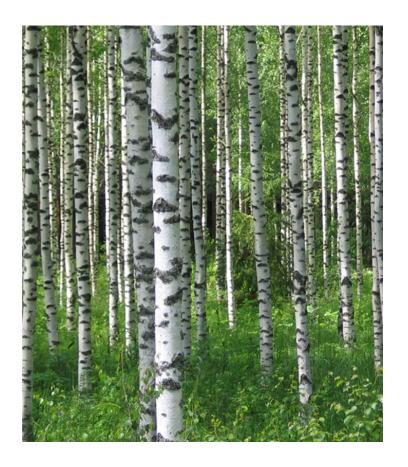




#### Stora Enso is already part of the textile value chain



- Dissolving pulp production started in our Enocell pulp mill in Eastern Finland in 2012 with the capacity of 150.000 tonnes yearly production
- Currently, we are expanding our capacity and will start producing also softwood dissolving pulp from pine and spruce in the near future
- Main part of our production is sold to viscose staple fibre producers
- Specialising our Nordic pulp mills is part of our strategy



# Demand for sustainable and traceable fibres is increasing



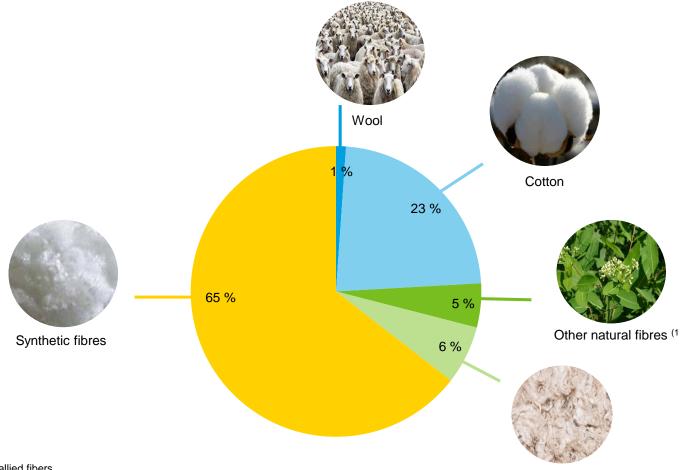
"Choosing materials for us is about making responsible decisions. When we're not able to use renewable resources, we aim for recycled or recyclable ones." (IKEA) "We work intensely to increase the share of sustainably sourced fabrics and materials in our products — and to only use recycled or sustainably sourced materials by 2030 at the latest." (H&M)

"We are part of major international initiatives to promote sustainable raw materials and fibres, helping to make their widespread use in the industry a reality." (Inditex)

My job is to make desirable, luxurious, beautiful clothing and accessories women want to buy. My first decision is always based on, 'Can I do this in a more sustainable way without sacrificing design?' If I can, then there is no reason not to. (Stella McCartney)

## But the world is still dressing mainly in fossil-based fibres





<sup>1)</sup> Incl. bast, flax, hemp, jute, silk and allied fibers

2) Sources: CIRFS, The Fiber Year

## What kind of textiles should we choose in the future?





Produced with high input efficiency (less water, energy, chemicals)



Having a climate positive value chain (positive impact on the environment)



Designed to be re-used or recycled and retain significant value after recycling



Designed for higher durability and longer use



Made from renewable raw materials



Traceable to origin and giving complete transparency across the value chain



Having a socially positive value chain

#### It all starts in the forest



- Renewability requires sustainable forestry that keep forests healthy and productive.
  - Sustainably managed forests grow forever.
- 88% of our wood comes from managed seminatural forests, the rest from tree plantations.
- We know the origin of all the wood we use through traceability systems.
  - 100% comes from sustainable sources.
  - -85% is certified.
- 92% of lands owned and managed by Stora Enso are covered by certification.



#### New technologies for sustainable wood fibre in textiles













PULP

## How is dissolving pulp made?





















**Forest** 

Trees that are too small for logs are transported to pulp mills.

At the mill the tree is debarked...

...and chipped into small pieces, like potato chips.

Chips are then boiled. During boiling cellulose is separated from lignin and hemicellulose. After boiling the pulp is washed clean from black liquor... ...and bleached.

Then the pulp is dried and cut into sheets.

Finally the pulp sheets are piled up as bales and these bales are sold to customers.

#### From forest to catwalks

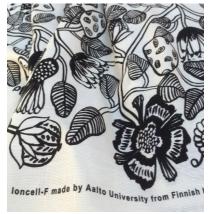




Marjaana Tanttu, Aalto University



Eveliina Netti, Aalto University



Erja Hirvi, Marimekko



Akino Kurosawa



Anna-Mari Leppisaari, Aalto University



Pirjo Hirvonen, Aalto University and Sirpa Välimaa, Stora Enso



Tuula Pöyhönen, Marimekko

#### **Collaboration benefits all**



**Brand owners** 



**Suppliers** 



**Consumers** 



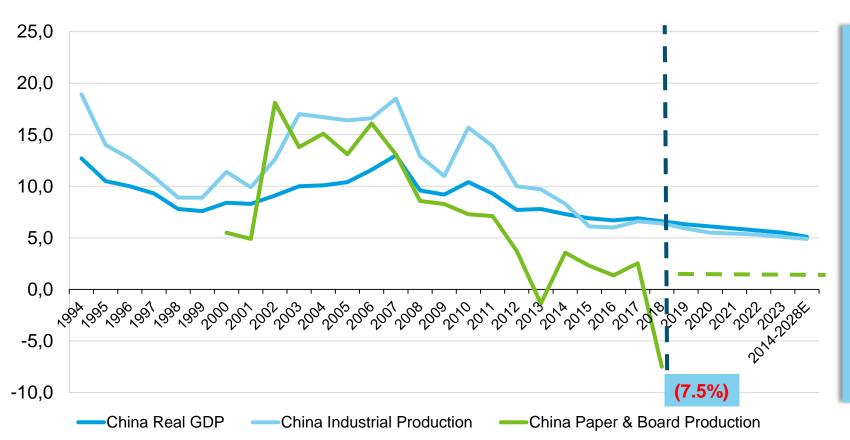
**Planet** 





# Overall Growth of P&B Output Slow Down in 2018, Not Following the Industrial Output or even GDP



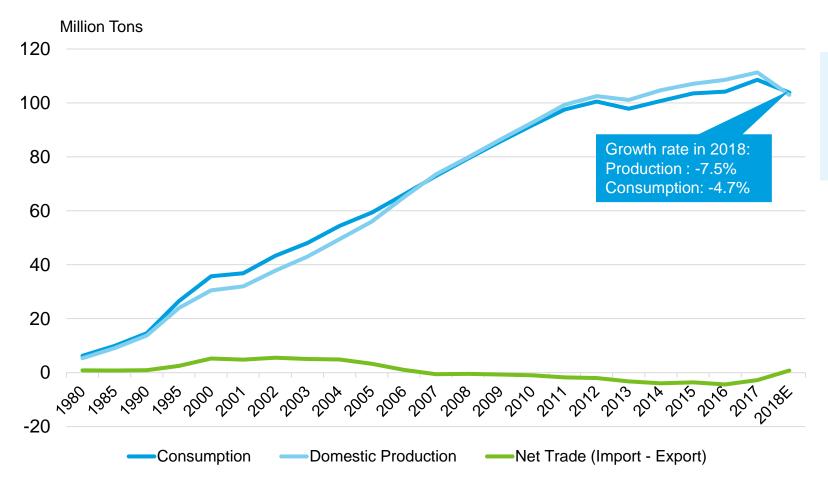


- Lag effect of inventory from 2017 production increased by price hiking
- Fiber storage of RCP impacted by import policy
- Unexpected low demand from domestic downstream industry
- Antipollution inspection continuously stress on backward capacity

Sources: Consensus Global Outlook (10/2018), China Paper Association 2018 estimate

# Production and consumption of paper & board in China 1980-2018E





Average annual growth from 2008 to 2018E:

- Production 3.3%
- Consumption 3.2%

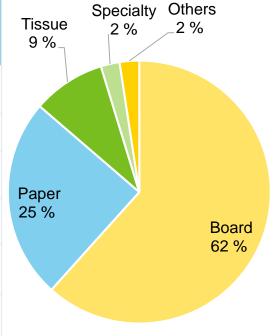
Sources: China Paper Association 2018 estimate

### All Grades Declining in 2018, Except Tissue



#### China paper and board demand was estimated 103.8 mn tons in 2018, decreased 4.7% YoY.

Grade	2018 market size estimate million tons	Change % '18 vs. '17	Growth outlook % '18-'23
WFC	5.4*	(8.0%)	(1.9%)
WFU	16.1*	(1.0%)	(0.3%)
CWC	0.5**	(2.0%)	(3.3%)
UWC	1.2*	(1.0%)	(5.8%)
Newsprint	2.4*	(9.0%)	(6.4%)
Total	25.6**	(3.2%)	(1.4%)



Grade	2017 market size estimate million tons	Change % '18 vs. '17	Growth outlook % '18-'23
Sack paper	6.9**	(2.5%)	1.0%**
Consumer board	12.8*	(1.5%)	1.8%
Liner board	22.7*	(10.0%)	1.3%
Corrugated medium	21.6*	(10.0%)	1.2%
Total	64.0**	(7.4%)	1.5%**



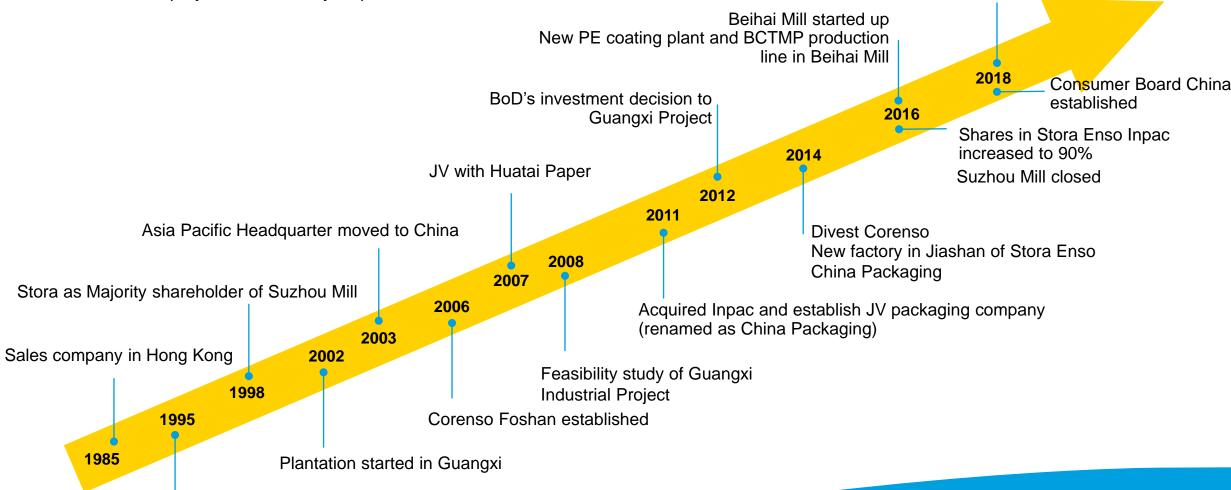
## Stora Enso's path in China

New factory in Changzhou of Stora Enso China Packaging and new Innovation Center in Dongguan



Total 5110 employees in China by September 2018

AP office in Singapore



#### Stora Enso's business and operations in China





#### China headquarter and sales offices

- China HQ in Shanghai
- Sales offices in Shanghai, Beijing, Guangzhou & HongKong
- MA team in Hong Kong

# Dawang Mill Paper Division

- 170,000 tons of magazine paper
- Using recycled / virgin fiber

# China Packaging One-stop packaging solution

- Focus on consumer packaging
- Serve for international brandowners
- Multi production sites
- Innovation centers

#### Beihai Mill

#### Consumer Board division

- BM 450,000 tons of consumer board
- 200,000 tons of BCTMP
- 80,000 tons of PE coating
- LPB, FBB, FSB, CUK
- Raw material from sustainable eucalyptus plantation

Production sites
Plantation
Offices

\* Total investment in China reached USD2.2 B by end of 2017



# About Stora Enso and our presence in China



# How we work towards the UN's Sustainable **Development Goals (SDGs)**







































- Stora Enso supports all 17 SDGs, but we have identified three strategic goals that our business has the most impact on.
  - We recognise our contribution to other SDGs as well.
- The SDGs support our Sustainability Agenda but do not replace it as the foundation of our work.

# How we work towards the UN's Sustainable Development Goals (SDGs)





- The use of renewable materials
- Bioeconomy
- Circular economy
- Material efficiency



- Renewable materials in the carbon cycle
- Carbon risks and opportunities
- Science-based targets



- Sustainable forestry
- Biodiversity

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#### Saving is the Best Thing a Board Mill Can Do for Water



- Usable fresh water counts for only 0.26% globally
- Stora Enso takes care of water
  - Maximize water recycling up to 97%, annual volume of recycled condensed water amounts to more than 900,000 cubic meters
  - Minimize water use in production processes
  - Apply state-of-the-art facilities
  - Use only surface water
  - All discharged water is purified to meet emission standards.
  - All water for future irrigation for 100 hecture greenland in mill site will come from the mill's water recycling system
- Awarded "Guangxi Water-saving Industrial Enterprise" as a role model in 2018

#### 广西壮族自治区

#### 住房和城乡建设厅文件

桂建城 [2018] 9号

自治区住房城乡建设厅关于命名斯道拉恩索 (广西)紫纸有限公司和富丽华·海御 物业小区等为广西节水型企业 (单位)、居民小区的通知

北海市创建节水型城市领导小组办公室:

你办《关于组织对 2017 年北海市创建节水型企业(单位)小 区进行考核验收的请示》(北创节报 [2017] 2 号)收悉。根据住 房城乡建设部《节水型企业(单位)目标导则》和《节水型社区 评价导则》规定的评选程序和评选标准,我厅组织有关专家对北 准市申报的节水型企业(单位)、节水型层层小区进行了现场审核

-1-

# 7-Year Monitoring Biodiversity in Eucalyptus Plantation



- Plantation's important role cater to continuously growing consumer demands for renewable materials, easing global warming and preventing natural forests from being logged
- Feb 2010 2017, Stora Enso Guangxi Forestry teamed up with Fauna & Flora International (FFI) to launch a long-term program to monitor biodiversity of eucalyptus plantation
- The monitoring results showed that the buffer zone in Stora Enso's plantation played a positive role in biodiversity protection
- Stora Enso Guangxi Forestry received Ecological Civilization Award at the 13th International CSR Forum in 2018



A Black Collar Starling at Stora Enso eucalyptus plantation, Da Fan Po town, Qinzhou Clty

## Forest Operation and Management with 'Eagle Eyes'



- 20 drones for a 70 pilot team
- Cost-wise and efficient for plantation monitoring over wide range, few roads and complex terrains.
  - Damages from pests and diseases
  - Conservation rates of seed
  - Prevention of forest fire
  - Safety



Birdview of eucalyptus plantation by drone

## **Shankou Nursery Farms Fish through Planting Trees**



- Stora Enso Nursery in Shankou was established in 2004
- Capacity: 12 million eucalyptus seedlings / year
- Great consumption of water, and great waste if just to let rest water flows into ground.
- Left irrigation water and fertilizer-containing water flows via ditches to a 5-mu (about 3330 sqm) fishpond with duckweed and few kinds of herbivorous fish.



Finshpond at Shankou nursery



# Stora Enso Oyj Enocell Pulp Mill General Presentation

August 2018

#### **Stora Enso in North Karelia**



	Capacity	Staff Apprx.	Wood Consumption 1 000 m <sup>3</sup>
Enocell Pulp Mill	450 000 tones	180	2 600
Kitee Saw Mill - Processed products - Pellets	260 000 m³ 120 000 m³ 25 000 t	107 incl. Fin-Terpuu and Efora	550 Spruce logs
Uimaharju Saw Mill - Processed products	300 000 m³ 20 000 m³	90 incl. Fin-Terpuu	650 Pine logs
Efora (Enocell's maintenance company)		70	
Efora (sawmill's maintenance company) - Uimaharju		15	
Stora Enso Wood Supply East-Finland Procurement		107	





THE RENEWABLE MATERIALS COMPANY

There was German's devoted company Haukivuoren Puutavara Oy in Uimaharju, which moved ownership to the Soviet Union's after the Second World War.

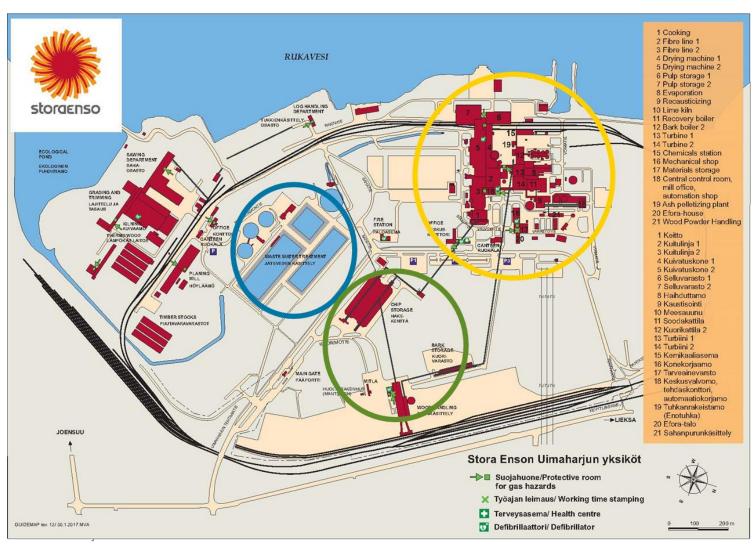
1955	Enso-Gutzeit bought a saw mill from Soviet Union
1967	Enso-Gutzeit's pulp mill started 16th of April
1989	Decision of Enocell project and contract with Soviet Union
1991	Enocell started operating; pulp mill, saw mill and planning mill. Enocell was Stora Enso's subsidiary company, 99 % owned by Stora Enso and 1 % by Russian
1992	Renewed pulp mill started
1996	Sawmill started to operate under Enso Timber Ltd Uimaharju Saw Mill
1999	Swedish Stora Kopparberg and Finnish Enso-Gutzeit merged and one big company, Stora Enso started
2005	Stora Enso bought shares back from Russian. Fortek took care of technical planning, mechanical and automation maintenance
2006	10th million pulptonne was made on March
2009	New maintenance company is Efora
2012	Dissolving pulp production started
2015	A merger of Stora Enso
2019	Stora Enso Enocell Mill is ready to do dissolving pulp on both fibre lines.

18. maaliskuu 2019

### The Map of the Mill Area

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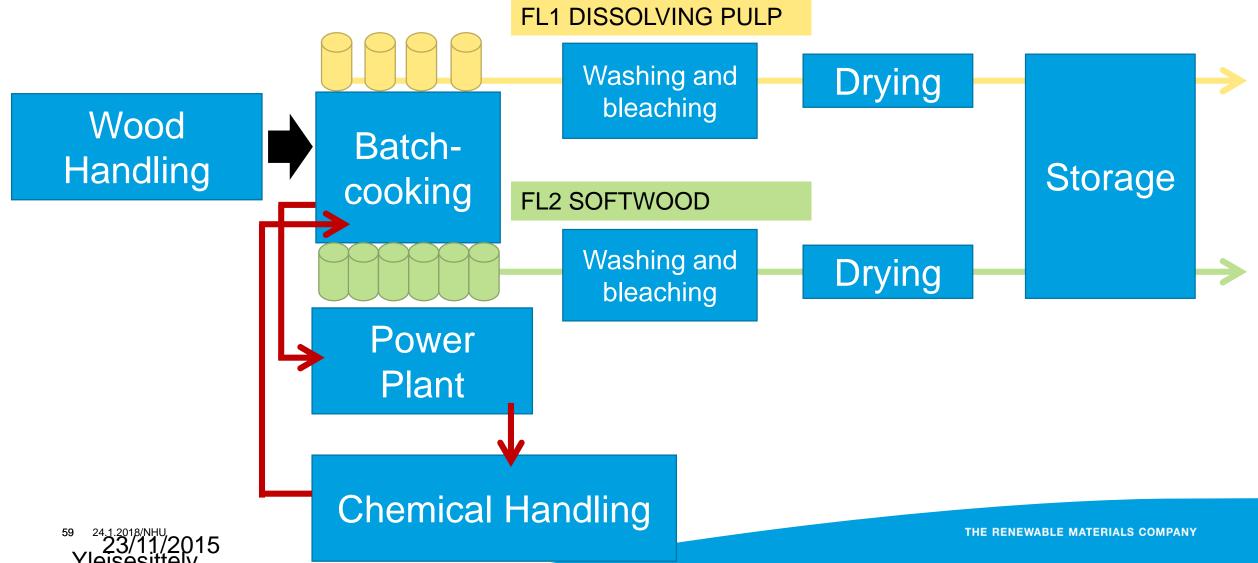


Area 250 hectares

Wood Handling
Waste Watertreatment

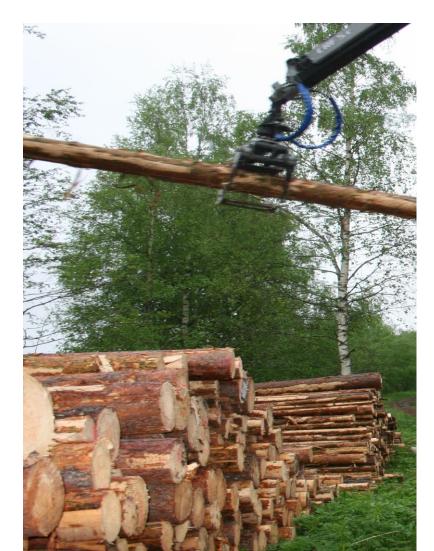
#### **Enocell's production chart**





#### **Wood Procurement**

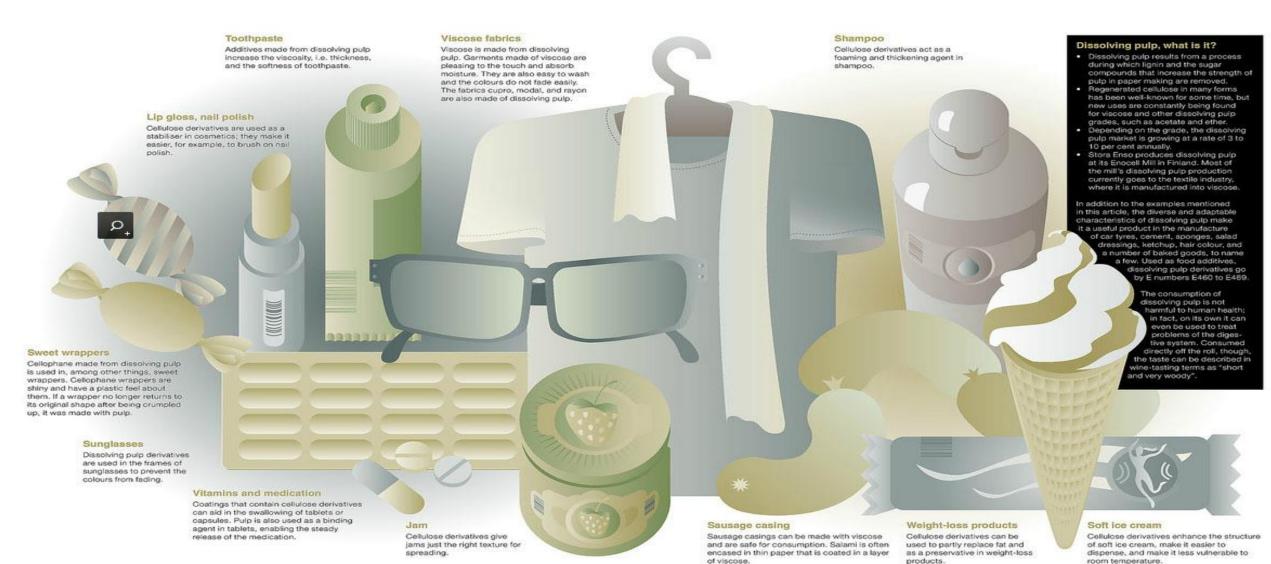
- Stora Enso Forest supply as well softwood as hardwood raw materials from domestic and some from Russia.
- Deliveries to mill happens by trucks from Finland and by train from Russia.
- •The consumption of wood is total about **2,7 million** cubic meter.
  - -Pulp Mill uses about 1,8 million cubic meter softwood, including chips from nearest sawmills.
  - -The Mill uses hardwood about 0,9 million cubic meter.





## **Possibilities of Dissolving Pulp**





# **By-products**

#### **Electricity**

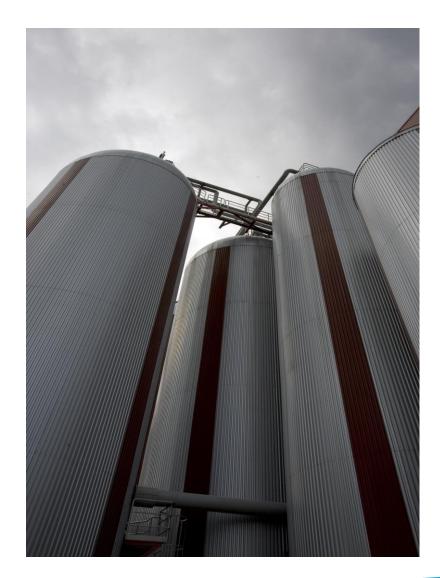
- Production 390 GWh own consumption
- 170 GWh sale to national grid

#### **Turpentine**

Production 205 tones all sold

#### Tall oil

Production 16 002 tones all sold

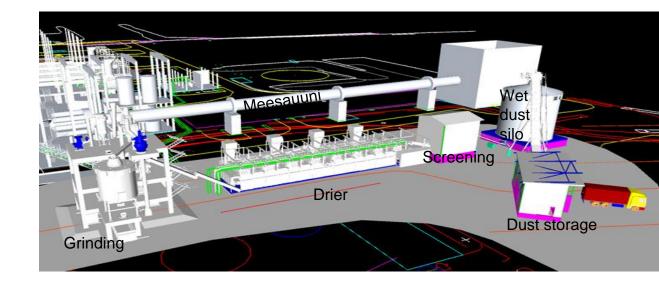




#### **Saw Dust Burning Plant**



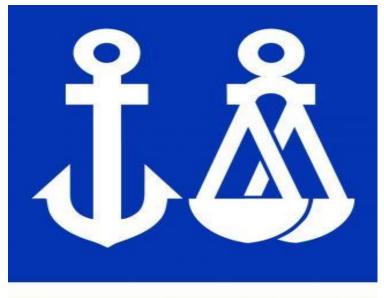
- Heavy oil (appr. 70-90 tones/d) in lime kiln has been replaced by sawdust
- About 10 trucks sawdust per day
- Burning process shortly
  - ✓ saw dust is screened, dried and crushed grinded
  - ✓ Dust is measured out and blown to burner of lime kiln
- Enocell is HFO free mill during normal production



#### **Environment**

storaenso

- Certificated environmental management program from the year 1995
- Chain of Custody of Wood certificate 2004, it covers production and marketing of pulp
- Occupational health and safety management certificate OHSAS 18001:2003
- Energy Management System ISO 50001:2011





# **Everybody safe home – every day!**







# Thank you!



#### THE RENEWABLE MATERIALS COMPANY