

Linear to Circular

TENCEL™  x REFIBRA

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The Lenzing Group in 2021



Financial year 2021 at a glance

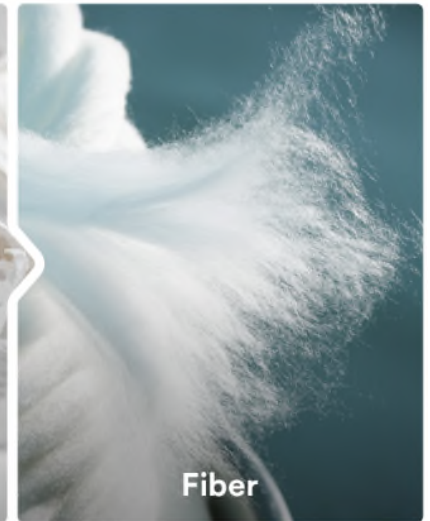
- Group revenue of EUR 2.19 bn
- Investments (CAPEX) of EUR 844.3 mn
- ROCE at 5.4 %
- R&D expenditures at EUR 31.6 mn
- Number of employees: 7,958 (as at 31/12/2021)

Key developments & strategic highlights

- Largest expansion program in corporate history:
 - 100 kt Lyocell plant in Thailand opened in Q1-2022
 - 500 kt DWP plant in Brazil started in Q2-2022
- Various well-known rating agencies honor Lenzing as one of the most sustainable companies in the world



Our core market: wood based cellulosic fibers



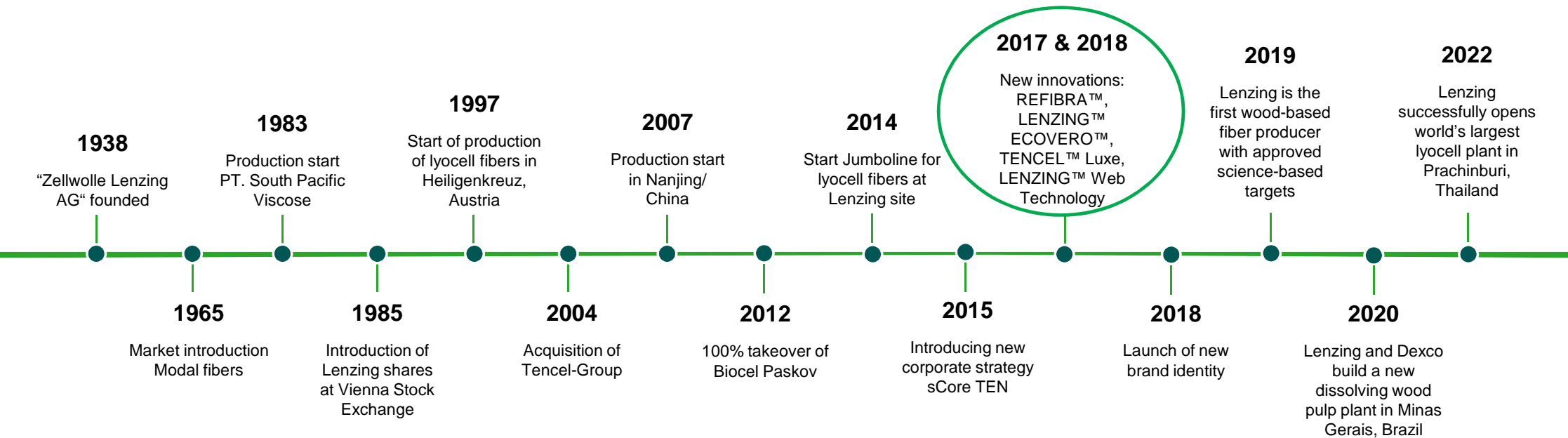
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www.lenzing.com

Our brand architecture



Key Milestones



Introduction TENCEL™ Lyocell



Introduction of TENCEL™ Lyocell

TENCEL™ Lyocell are regenerated cellulosic fibers known for their **natural comfort** and **environmentally responsible** closed loop production process. They deliver quality, performance and versatility. Their unique physical properties lead to their high tenacity profile, gentleness on skin and good moisture management, especially desired in products where good thermo-physiological performance of textiles is required.

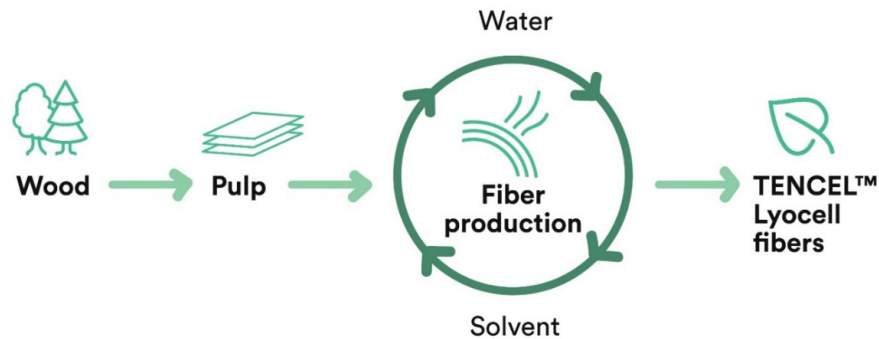


Lyocell fibers are the latest generation of wood-based cellulosic fibers. They have been produced at a commercial scale for almost 30 years. The branded products for textile applications from Lenzing are marketed as TENCEL™ Lyocell. **TENCEL™ is the trademark** of Lenzing AG.

Where are TENCEL™ Lyocell fibers produced?



Closed loop production with high resource efficiency



The lyocell process is a solvent-spinning process which transforms wood pulp in a **closed loop production** into cellulosic fibers. In contrast to the traditional chemical viscose process, the lyocell process directly dissolves cellulose in an organic solvent. This means that, in contrast to the viscose process, no complex chemical process is used. Compared to viscose, the lyocell process requires less efforts to close the loop. Thus, the total energy use of a lyocell production plant is lower than that of a viscose plant with equal production capacity. In addition, the lyocell process is much less resource-intensive and leads to a significant reduction in chemical use due to conversion of pulp into fiber in a closed-loop process.

With high resource efficiency in the Lenzing Group significant reduction of chemicals and water is achieved. Environmentally sound production is **certified with the EU Ecolabel** for textile products.¹



less
emissions



less
chemicals



> 99% solvent
recovery



recycling of
processed water²

¹ EU Ecolabel: AT / 016 / 001 – awarded to products and services meeting high environmental standards throughout their life cycle.

² Water that is obtained from the evaporation step is also fed back into the process and only a small amount of water is sent to the wastewater treatment plant



Dedicated to responsible sourcing

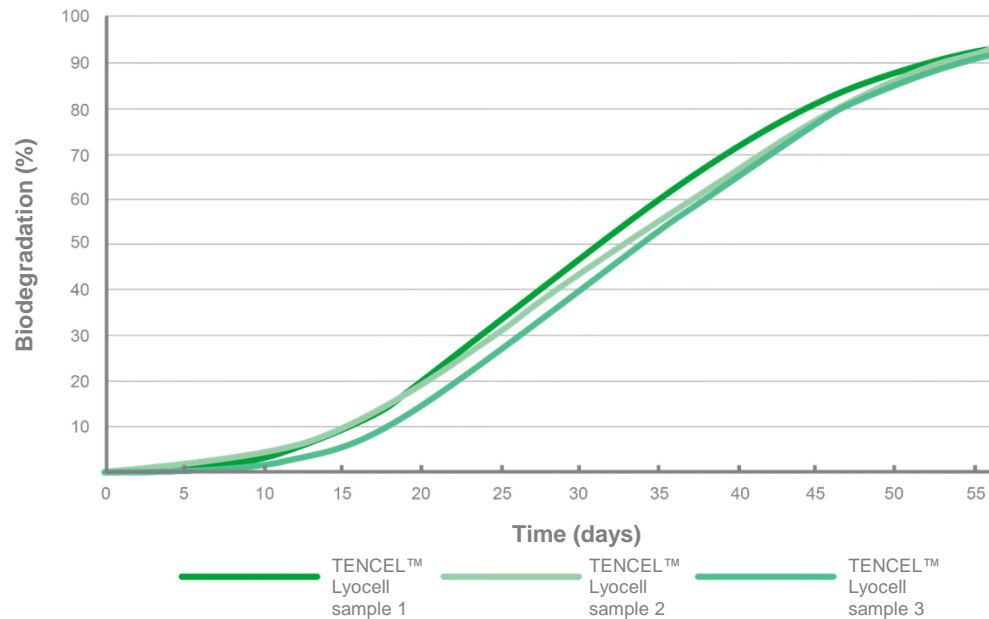


Canopy's Hot
Button Ranking

- TENCEL™ Lyocell is derived from the **natural resource wood**. Various **sustainably managed** tree species, such as spruce, pine, birch, beech and eucalyptus are used.
- The wood is harvested only from **certified and controlled sources**, protecting ancient and endangered forests, evident by:
 - FSC® certification (FSC-C041246),
 - PEFC certification (PEFC/06-33-92),
 - Recognized with “Dark-Green Shirt” - **the best ranking in Hot Button Report** from Canopy Style Initiative.¹

¹ Canopy is an environmental non-profit organization, working to protect ancient and endangered forests globally

Back to nature



Biodegradation as shown in this chart was determined by measuring the actual metabolic conversion of the compostable material into CO₂ by microbial activity (standard EN14046 or ISO 14855). The acceptance level is 90% which must be reached in 6 months. TENCEL™ Lyocell fibers biodegrade rapidly in less than 2 months (tested at low temperature of 28°C, higher temperature would even accelerate this process).



TENCEL™ Lyocell standard fibers are **biodegradable** under soil, freshwater and marine conditions,^{1,2} thus they can fully revert back to nature.



TENCEL™ Lyocell standard fibers are also **compostable** in home applications as well as in industrial facilities. After 16 weeks fibers are completely disintegrated.^{1,3}



¹ Report „Technical Bulletin Compostability“ - testing at TÜV following the European standard EN14045 and EN14046

² Lenzing Sustainability Report 2020

³ Disintegration is the fragmentation of a compostable material into smaller pieces and thus loss of visibility in the final compost.

Supply chain transparency







Our unique identity is ingrained in every genuine TENCEL™ fiber with **fiber identification technology** and can be verified in the value chain, guaranteeing **fiber authenticity from fiber to final product**. Fiber identification enables the traceability of TENCEL™ fibers, providing a backbone for sustainability in the supply chain.



Testing for authenticity is part of our **fabric certification system** via the E-Branding Service. This platform is a fast and simple way for value chain partners to obtain product certificates, licenses and swing tags to showcase their use of TENCEL™ fibers and branding. Fiber identification technology helps the E-branding Service by verifying the authenticity of TENCEL™ fibers in products.

TENCEL™ Lyocell benefits at a glance



 Botanic origin	<ul style="list-style-type: none">• For TENCEL™ Lyocell only wood from certified and controlled sources is used.• This has also been recognized with “Dark Green Shirt” by CanopyStyle Initiative.¹
 Environmentally sound production	<ul style="list-style-type: none">• Closed loop technology for TENCEL™ Lyocell re-uses more than 99% of solvent and recycles process water.• This leads to a 30% lower chemistry score than viscose and 50% lower global warming score than generic lyocell.² Water consumption is lower than for most natural fibers.²
 Verifiable	<ul style="list-style-type: none">• So far⁴, only Lenzing offers an LCA for its lyocell products, which offers true transparency of the environmental impact from cradle-to-gate.• All claims are based on proven evidence.
 Back to nature	<ul style="list-style-type: none">• TENCEL™ Lyocell standard fibers are fully biodegradable and compostable, as certified by TÜV and thus offer a solution to textile waste pollution, as they can fully revert to nature in landfill, marine and freshwater conditions and soil.
 Identifiable origin	<ul style="list-style-type: none">• True transparency and security through trackable fiber identification technology
 Service	<ul style="list-style-type: none">• Lenzing offers technical service and support for spinning, weaving/knitting and wet-processing.• Lenzing offers multiple co-branding options, marketing materials and activities for TENCEL™ Lyocell.

¹ Canopy Hot Button Report 2020+2021

² based on Higg MSI tool provided by the Sustainable Apparel Coalition, database V3.1, Dec 2020.

³ Except for new production site in Thailand (to be certified by end of 2022)

⁴ as per July 2021

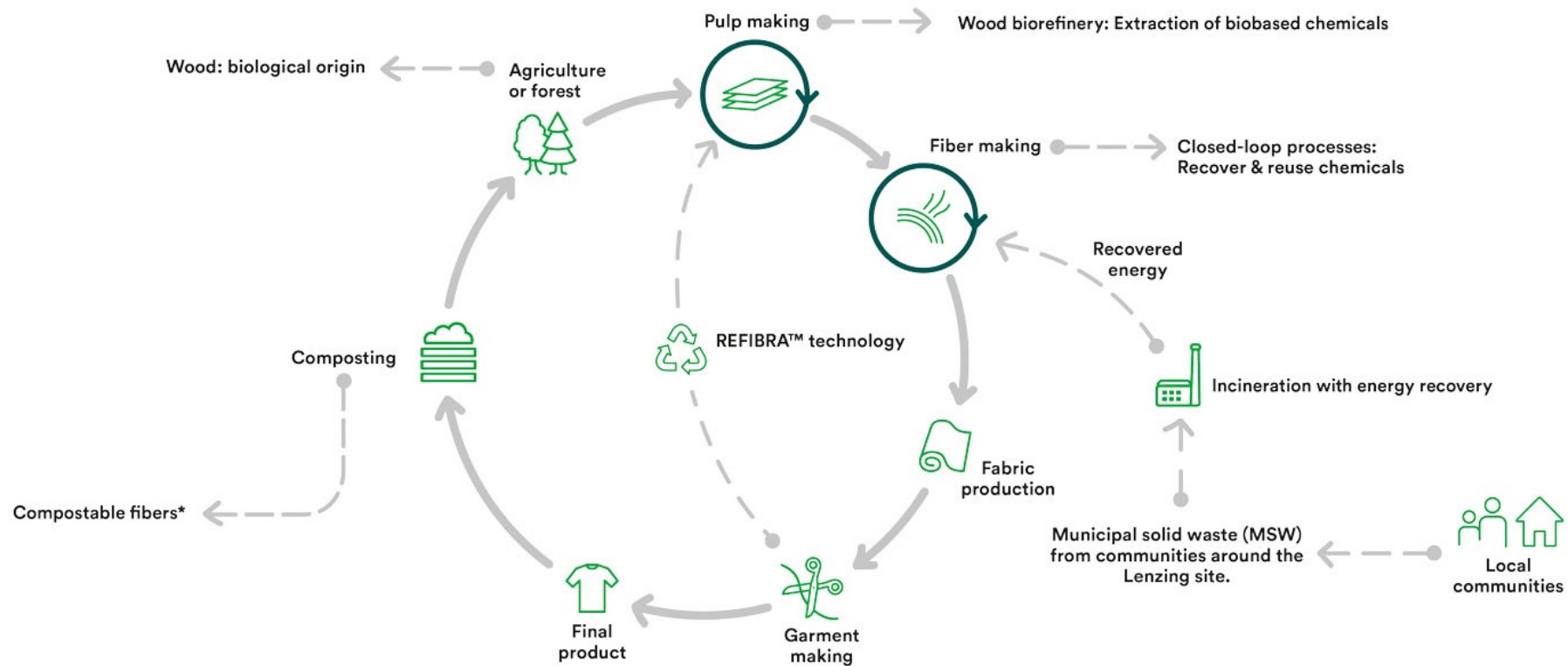
REFIBRA™ technology



Circular economy – a systemic change



X



TENCEL™ x REFIBRA™ using post-consumer waste



x



Launched in **2017**, TENCEL™ Lyocell fibers with REFIBRA™ technology now feature up to **30% of recycled raw material content from pre-consumer cotton textile waste**.

- In **2019** REFIBRA™ technology reached an **important milestone towards post-consumer textile recycling**
- First tons scale production of TENCEL™ x REFIBRA™ Lyocell made from post- and pre-consumer waste
- Using post-consumer T-shirts and bed linen
 - Not suitable for resale
 - Colored and printed
- In **2022** Lenzing started a strategic cooperation for textile recycling with **Södra, a Swedish pulp producer**.

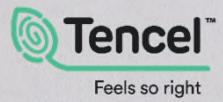


TENCEL™ Lyocell x REFIBRA™

What are TENCEL™ x REFIBRA™ fibers?



x



x



Our target on circular economy



Lenzing's **vision until 2025** is to raise the industry bar by producing fibers with REFIBRA™ technology with **up to 50% recycled content from post-consumer cotton textile waste**.

The goal is to recycle **25,000 tons of textile waste per year by 2025** to make textile waste recycling as common as paper recycling.



Available fiber types



X

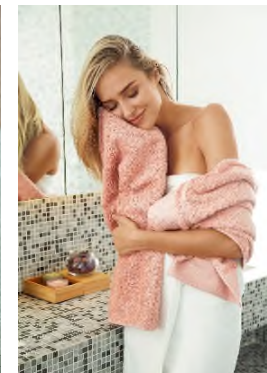


REFIBRA™ technology

Lyocell
Filling fibers

Lyocell
Standard fibers

Lyocell
Low-fibrillating
fibers



TENCEL™ Lyocell x REFIBRA™

Key benefits of TENCEL™ Lyocell x REFIBRA



Sustainable benefits



botanic origin



biodegradable



circular



sustainable
production



supply chain
transparency



Science
Based Targets
commitment

Functional benefits



smoothness



strength



moisture
management



sheen



gentle on skin



contributes to
breathability



minimal static
charge



unfavorable for
bacterial growth



drape



certified safe

Certificates and eco-labels



The European Ecolabel (EU Flower)

Standard 100 by OEKO-TEX®

Recycled Claim Standard

USDA Certified Biobased Product

FSC® (Chain of Custody)*



* upon request

Where to buy TENCEL™ x REFIBRA™ technology



There are already several fabric mills working with our TENCEL™ x REFIBRA™ fiber.

If you want to source such fabrics, please get in touch with our Business Development team for support on the best suitable sourcing.

Thank You

For your attention