Lenzing

Innovative by nature

2021

Linear to Circular

Sustainability Report

Champions of Circularity

The online Annual Report 2021 of the Lenzing Group contains many exciting stories that tell the story of our journey from a linear to a circular economy.

Read the Stories of 2021

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No matter how impressive the numbers, efficient the machines or innovative the processes, it is the resilience and hard work of people which results in our performance.

Letter from the CEO
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12%

Reduction of specific greenhouse gas emissions

Chapter Climate & energy
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10%

Reduction of specific water consumption

Chapter Sustainable innovations
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62%

Net-benefit products

Chapter Sustainable innovations
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Lenzing Group

2021

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Sustainability key performance indicators

Lenzing Group: Sustainability key performance indicators Table 01

		2019	2020	2021
Economic value creation[a]	Value creation[a]	EUR 575.7 mn	EUR 406.4 mn	EUR 685.4 mn
	Distribution of value creation			
	Employees[b,c]	EUR 389.2 mn	EUR 349.6 mn	EUR 446.4 mn
	Retained earnings	EUR 114.9 mn	EUR –10.6 mn	EUR 12.2 mn
	Public sector[d]	EUR 60.4 mn	EUR 44.8 mn	EUR 67.7 mn
	Shareholders (dividends)[e]	EUR 0.0 mn	EUR 0.0 mn	EUR 115.5 mn
	Lenders[b,f]	EUR 11.2 mn	EUR 22.5 mn	EUR 43.6 mn
	ROCE (return on capital employed)[b,g]	5.3 %	–0.6 %	5.4 %
	Adjusted equity ratio[g]	50.0 %	45.8 %	39.7 %
	Revenue	EUR 2,105.2 mn	EUR 1,632.6 mn	EUR 2,194.6 mn
	EBITDA (earnings before interest, tax, depreciation and amortization)[b]	EUR 329.9 mn	EUR 196.6 mn	EUR 362.9 mn
	Sales volume fibers (t)	899,000	787,000	909,000
Raw material security	Proportion of wood source certified or controlled by forest certification	> 99 %	> 99 %	> 99 %
	Share of own pulp	62 %	62.4 %	65 %
Sustainable innovations	R&D expenditure, calculated according to the Frascati method (EUR)	EUR 53.2 mn	EUR 34.8 mn	EUR 31.6 mn
	Specialty fiber share based on revenue[h]	51.6 %	62.0 %	61.7 %
	Specific sulfur emissions (kg/t, 2014 = 100 %)	67 %	61 %	74 %
	Specific water intake (index in percentage based on m³/t, 2014 = 100 %)	93 %	96 %	90 %
	Specific water emissions after wastewater treatment (Index in percentage based on kg/t, 2014 = 100 %)	86 %	100 %	92 %
Decarbonization	Specific[i] primary energy consumption (GJ/t, 2014 = 100 %)	98 %	97 %	97 %
	Specific GHG emissions[j] (tons of CO_2 eq./t, 2017 = 100 %)	86 %	84 %	88 %
Employees	Number of employees[k]	7,036	7,358	7,958
Health & Safety	Rate of recordable work-related injuries (TRIFR)	2.10	0.92	0.76
Partnering for systemic change	Proportion of suppliers with EcoVadis rating (%)	89 %	84 %	91 %

The above financial indicators are derived primarily from the IFRS consolidated financial statements of the Lenzing Group. Additional details are provided in the section "Notes on the financial performance indicators of the Lenzing Group", in the glossary to the Annual Report and in the consolidated financial statements of the Lenzing Group.

a) Value creation within the Lenzing Group is calculated as the company's business performance minus the cost of materials, other expenses, depreciation and amortization. The distribution of value creation shows the extent to which it is distributed among stakeholders such as employees, the public sector, and lenders.

b) Reclassification of capitalized borrowing costs, net interest from defined benefit plans and commitment fees from EBIT/EBITDA to the financial result (see note 2 of the Lenzing Group consolidated financial statements 2021).

c) Personnel expenses less municipal taxes.

d) Based on the proposed distribution of profits.

e) Income tax expenses plus asset taxes and similar taxes plus municipal taxes.

f) Financing costs less net foreign currency gain/losses from financial liabilities.

g) The financial indicators are derived primarily from the IFRS consolidated financial statements of the Lenzing Group. Additional details are provided in the section "Notes on financial performance indicators of the Lenzing Group" in the glossary of the Annual Report and in the consolidated financial statements of the Lenzing Group.

h) Lenzing's specialty fibers are net-benefit products that offer positive impacts and benefits to society, the environment, and value chain partners.

i) Specific indicators are reported per unit of production by the Lenzing Group (i.e. pulp and fiber production volumes).

j) Includes both scope 1 and 2 emissions of all greenhouse gases, expressed as CO_2 equivalents. It was observed that the system boundaries of different wood-based fiber producers differ from the Lenzing Group's boundaries. In particular, upstream production of chemicals that are consumed in Lenzings's facilities belongs to scope 3, according to the GHG protocol, so they should not be included here. However, some Lenzing Group sites produce chemicals themselves, namely H_2SO_4 and CS_2, leading to a higher energy demand and scope 1 and 2 CO_2 emissions for the Lenzing Group. This is relevant for all indicators. Scope 1 emissions are calculated from emission factors from EU ETS. Scope 2 emissions are calculated using a market-based method.

k) Employees (incl. apprentices, excluding supervised workers) in Austria, the Czech Republic, United Kingdom, USA, China, Indonesia, India, Taiwan, Thailand, Turkey, Korea, Singapore, and Brazil.

Highlights of the year

Strategic milestones

- Construction of new pulp mill in Brazil progressing on schedule
- Group-wide climate neutrality further advanced by investing EUR 200 mn over the next years in production sites in China and Indonesia
- Announced planning of ground-mounted photovoltaic plant at Lenzing site and state-of-the-art wastewater treatment plant at Grimsby
- Air purification and sulfur recovery plant at the Lenzing site successfully completed
- Cooperation and technology development agreement signed with Swedish pulp producer Södra to further boost closed-loop recycling
- First carbon neutral lyocell fibers introduced on global nonwovens market
- Announced expansion of carbon neutral textile fiber portfolio with inclusion of carbon-zero TENCEL™ fibers with REFIBRA™ technology
- Sustainable denim supply diversified with introduction of Indigo Color technology and launch of matte TENCEL™ branded lyocell fibers
- First TENCEL™ fibers made of orange pulp and wood sources presented as part of TENCEL™ Limited Edition
- Innovative fiber identification technology expanded to TENCEL™ fibers
- Digital fiber traceability with blockchain technology was achieved with more than 600 value chain partners
- Physical traceability of TENCEL™ x REFIBRA™ and LENZING™ ECOVERO™ expanded to all major Lenzing's specialty fibers for textiles
- First time disclosure of wastewater performance of all viscose sites in ZDHC gateway

Achievements

- Lenzing participates in Circular Fashion Partnership
- Listing on CDP's Supplier Engagement Leaderboard
- Biodegradability of LENZING™ fibers confirmed by renowned marine research institute at the University of California, San Diego – effective alternative to environmental pollution from plastic waste

Ratings and awards

- CDP: Lenzing is one of the only 14 companies worldwide to be recognized with an outstanding triple "A" for environmental leadership and disclosure in climate change, water security and forests
- MSCI ESG: "AA" rating achieved
- EcoVadis: Platinum status, achieved for the first time in 2021
- Achieved highest category in Canopy's Hot Button ranking for the second time
- First place in the "Climate protection" category of Austria's Leading Companies business competition
- Received award in China: "Pursuer of Excellence in Sustainability 2021" award as "Pioneer of Carbon Reduction". The organizers are China National Garment Association and Office for Social Responsibility of CNTAC, supporting by CHIC, China Fashion and WWD China.

About this report

This report is the combined, consolidated, non-financial report for the Lenzing Group[1] (according to §267a UGB) and for Lenzing Aktiengesellschaft (according to §243b UGB).

Since Lenzing operates on a global level with Group-wide approaches in various areas of operation, all descriptions of management approaches and concepts concerning the material topics identified apply to both the Lenzing Group and Lenzing Aktiengesellschaft. For those indicators where meaningful figures can be provided, separate data for Lenzing Aktiengesellschaft can be found in the annex (in accordance with the legal requirements stipulated by the Austrian Sustainability and Diversity Improvement Act (NaDiVeG[2]) and the AFRAC recommendation. The information on the EU taxonomy can be found in the chapter "Managing sustainability".

The description of non-financial risks has been integrated into the 2021 Annual Report, while compliance is covered in the chapter "Business ethics". Additional information concerning certain topics is provided on the Lenzing Group website. References can be found under the appropriate headlines.

This report covers all the fully consolidated legal entities of the Lenzing Group. Detailed information can be found in the Lenzing Group's annual report (Note 3, Note 43).

The contents of this report reflect the topics that are relevant and material to sustainable development of the Lenzing Group. The management approaches for each material topic can be found in the relevant sections. The information on human resources applies to the Lenzing Group, including the two construction sites in Thailand and Brazil. Specific environmental indicators have been calculated using data from all the production sites of the Lenzing Group. They account for 100 percent of the company's worldwide production volume. The construction sites in Brazil and Thailand are fully consolidated but are not yet in operation. Relevant data were included wherever available. 2014 was chosen as the base year for the presented data because Lenzing's first GRI report including the Lenzing Group sustainability targets was issued in 2017 with data covering 2016, 2015 and 2014. For the CO_2 figures, the baseline is 2017, as the corresponding target was developed in 2018/2019.

This report mainly covers data from 2021. Wherever possible, it also presents a series of data over three years (2019, 2020 and 2021)[3] to show progress and make the information transparent, relevant, and comparable.

Restatements
Due to reclassification of capitalized borrowing costs, net interest from defined benefit plans and commitment fees from EBIT/EBITDA to financial result (see Note 2 to the 2021 of the Lenzing Group consolidated financial statements), there have been changes in the table of key figures (table 1) for the year 2019 and 2020.

A recalculation of scope 3 emissions from 2017 towards 2021 was necessary due to updated market pulp supplier data.

Due to subsequent corrections of the wastewater volumes at the Lenzing site, there is a reduction in water consumption of about 19 percent in the figures of 2020.

In 2021, the materiality analysis of the Lenzing Group was renewed. This resulted in changes to the material topics. Detailed information can be found under "Materiality analysis" and in the "Materiality analysis" focus paper.

This report has been prepared in accordance with the Global Reporting Initiative (GRI) standards: Core option. A detailed GRI content index can be found on the website. In accordance with the legal requirements, the reporting cycle for Lenzing's sustainability performance is annual.

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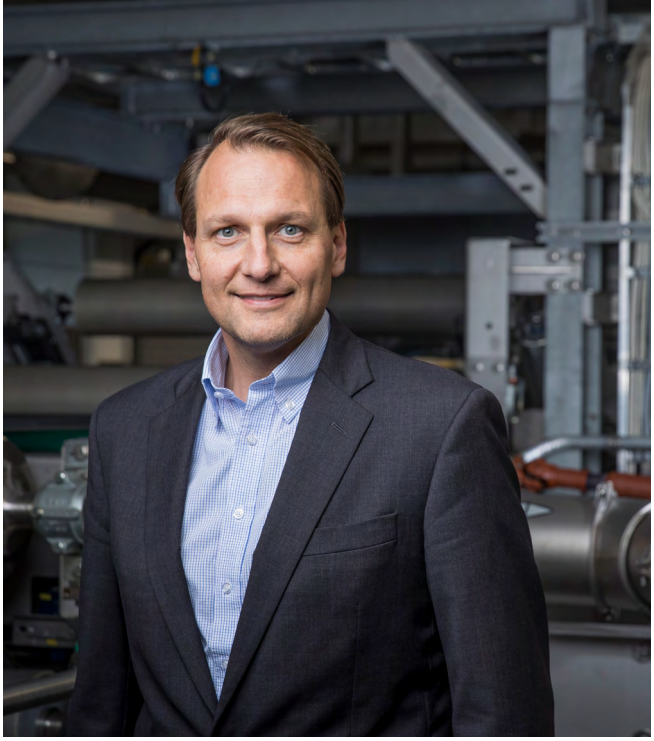
All focus papers mentioned in this report can be found here: https://www.lenzing.com/investors/publications

1) "The Group" (for better readability occasionally referred to as "Lenzing") comprises Lenzing Aktiengesellschaft and its subsidiaries
2) Nachhaltigkeits- und Diversitätsverbesserungsgesetz (§243b, §267a UGB)
3) The financial year of the Lenzing Group is the calendar year (January 1 to December 31)



Letter from the CEO

Dear Reader,

It is my great pleasure to welcome you. Introducing a report of this kind so soon in my tenure as Chief Executive Officer means that all the credit and recognition for the results outlined here goes to others, primarily to Lenzingers, as we like to call our employees. Credit is also due to our customers, shareholders, suppliers and partners, who are with this company on its journey towards a model of prosperity and growth that protects and enhances the natural world. As part of that journey, our reporting has made the transition from print to digital. I hope you will like the functionality this provides, as well as approve of its reduced environmental impact. I invite you to explore the links and features you will find here, and I hope you enjoy creating your own experience according to your particular needs and interests.

My role at Lenzing has two aspects. I joined the Supervisory Board in May 2021, and took over as Chief Executive Officer on an interim basis in November. This allows me to combine detailed knowledge of the company with the clear eye of a new hire. I will continue to serve on the Supervisory Board once a permanent Chief Executive Officer is appointed, and whoever that person is, I am certain they will share the passion I have felt over many years for this industry, especially for its transformational potential in sustainability. With that in mind, allow me to express my thanks to my predecessor, Stefan Doboczky, for his service.

There is a human as well as an environmental meaning to sustainability, and it is that sense of the word I wish to address first. In the context of the ongoing COVID-19 pandemic, which has caused so much loss and disruption, it is hard to express adequately the admiration I feel for the way Lenzingers responded. In every location, in every function, in every team, the commitment and resilience shown by our people has been extraordinary. This is a business report so, naturally, you will read about strategic, financial and operational matters. But however impressive the numbers, however efficient the machines, however innovative the processes, it is the resilience and hard work of people – Lenzingers, and others – which results in our performance.

And, as you will see from the stories and numbers presented in this report, that performance has been excellent. This is in no small measure due to the loyalty of our customers. They faced the same challenging context as we did in 2021, yet continued to work with us commercially, in many cases in increasing volumes, and often encouraged and supported our focus on the shift from a linear to a circular economic model. And, as reported last year, we remain strategically on track despite all the challenges of operating during a global pandemic. This is evident throughout our production, brand, technology, community and sustainability work. It's especially evident in the progress made on our key projects in Brazil and Thailand.

The construction of such large scale projects in the midst of COVID-19 called for an unparalleled approach towards planning, recruitment, training and safety management. The utmost care was taken not only to safeguard our employees and contractors, but also their families. This was no small task considering the Prachinburi (Thailand) site will be the world's largest lyocell plant of its kind once production begins. It's also the first project of this scale that we've delivered outside Austria. Moreover, the plant in Brazil is our largest ever investment in the provision of sustainable raw materials for wood-based (cellulosic) fiber production. Both projects have run on time to budget, and both will be operational early 2022, which is an accomplishment we do not take lightly. Despite the challenges that our people faced on site in Brazil and Thailand, they delivered on our strategic vision and promise.

We continue to benefit from a steadily growing fiber market as people along the entire value chain seek, and adopt, more sustainable solutions. The renewable origin of our products and our dedication to sustainable innovation make us the "go-to"

manufacturer for growing numbers of customers and partners. We are very proud of the steady stream of accolades we receive for our environmental credentials. In 2021, these included Platinum status for CSR from EcoVadis; a Sustainability Champion "AA" rating on the MSCI ESG listing; and a Triple A listing from global environmental non-profit CDP, for leadership in climate change, water security and forests. We are one of just 14 companies world-wide to be awarded a Triple A listing by CDP, but that is not something to celebrate. We want – and expect – many more companies to join us.

These, and other awards, show that Lenzing is a company completely committed to the reduction of our environmental footprint. Our goal of becoming climate-neutral by 2050 requires investment, intelligence and ingenuity, qualities that are woven into the headline events of our 2021 story. For example, our EUR 200 mn investment in Asia which, among other things, includes our Nanjing site that will rely on natural gas rather than coal as a power source. It also puts our Purwakarta facility in Indonesia at the leading edge of reducing CO_2 emissions through the use of biogenic fuel. We introduced the first carbon neutral lyocell fiber for the nonwovens industry, with VEOCEL™ lyocell fibers certified as having a net-zero carbon footprint under the CarbonNeutral Protocol.

We invested more than EUR 23 mn in a state-of-the-art wastewater treatment plant at our site in Grimsby, United Kingdom. We expanded fiber identification technology to TENCEL™ branded fibers as part of an ongoing campaign for greater supply chain transparency. At our Lenzing (Austria) site, planning started on Upper Austria's largest ground-mounted photovoltaic plant, which will generate nearly 5,500 megawatt hours per year. We also built a new air purification and sulfur recovery plant – the result of EUR 40 mn invested since 2019 – which takes us another step closer to meeting our climate targets.

2021 saw the development of exciting new partnerships. For instance, we teamed up with world-class pulp producer Södra to develop more ways of giving waste a new life. Like us, Södra are champions of post-consumer textile recycling, and we are working together to drive change at every stage of the textile value chain. We also began a collaboration with Orange Fiber, an Italian company which has patented the pulp production process for citrus by-products. This allows us to upcycle waste materials in our products, such as creating the first TENCEL™ branded lyocell fiber made of orange pulp and wood sources. Our innovation in sustainability is visible at the end of the product lifecycle, as well as the start. An investigation by scientists at the Scripps Institution of Oceanography in California has provided further evidence of the biodegradability of our fibers. The study showed that clothing made from wood-based fibers biodegraded in sea water within 21 days, compared to clothing from synthetic fibers which showed no biodegradation after more than 210 days.

These and other partnerships Lenzing is building are generating value for the planet while, at the same time, making a positive impact on our commercial results. I am convinced there is a great future to be built on sustainability and the circular economy model for Lenzing as a business. This matters first and foremost because of the contribution it makes to the quality of the natural environment, on which all life depends, as well as the growth and prosperity it offers shareholders, employees and customers. There is so much more I could mention here from the pages of Lenzing's 2021 calendar, and from our plans for 2022 and beyond. However, now it's time to hand over to you.

Which links will you follow first? Which stories resonate most strongly with you? How can Lenzing's extraordinary achievements and even greater ambitions support yours? This is for you to determine. We look forward to hearing about the results of your efforts because, in the understandably terse terms of those protesting the degradation of our shared global environment, no nature equals no future. Everything we do, therefore, as we go about running this successful and growing business, is designed to ensure that the future not only exists, but also provides for future generations the kind of existence we want for ourselves.

Thank you for reading. Stay safe and well, and be sure to visit our main site at Lenzing.com to find out more about us and what we do.

Yours sincerely,

Cord Prinzhorn

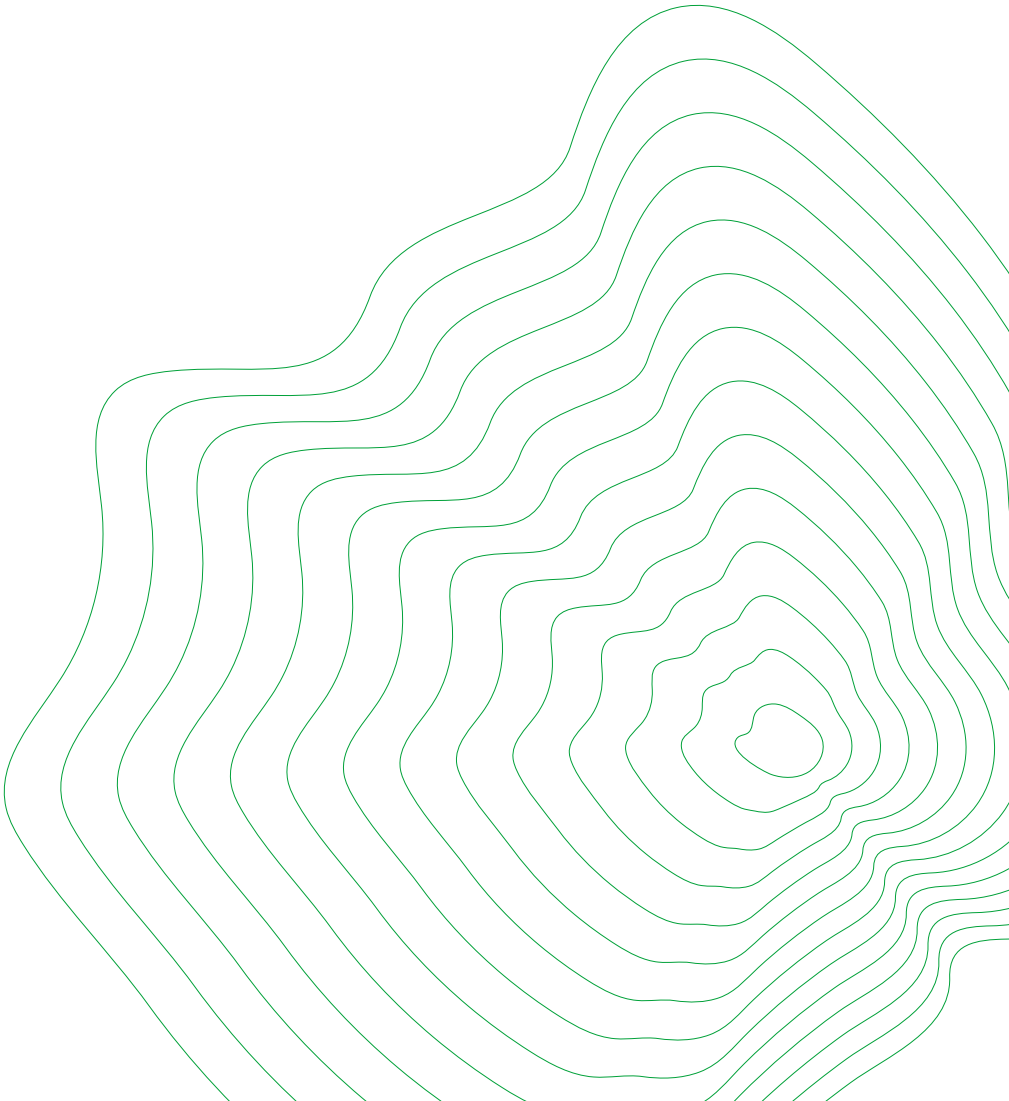
Impacts of COVID-19 pandemic on Lenzing Group

In 2021, the global economy recovered from the previous year's recession, despite the ongoing COVID-19 pandemic.

The International Monetary Fund estimates that growth amounted to 5.9 percent in 2021 (–3.1 % in 2020). The economy in industrialized nations is expected to have expanded by 5 percent (2020: –4.5 %). Despite the economic recovery, 2021 was characterized by numerous economic challenges: supply failed to keep pace with demand in many areas of the global economy. In addition to further reasons, including structural reasons, this led to significant price increases, particularly in the energy area, and to problems in global supply chains.

Following the pandemic-related shock in the previous year, the demand situation in the textile and apparel industry largely recovered in 2021. Retail sales of apparel returned to pre-crisis levels worldwide. However, major regional differences were evident. The extensive recovery in the textile and apparel industry and continuing high demand for medical and hygiene products, which also led to strong demand for nonwoven fibers in 2021, fed through to a significant recovery in the world fiber market.

Thanks to its strategic focus on specialty fibers and a largely positive market environment, the Lenzing Group recorded a significant year-on-year improvement in revenue and earnings trends in 2021. Growing optimism in the textile and apparel industry as a consequence of the progress made with vaccinations and the continuing recovery in the retail sector ensured a significant rise in demand and prices on the global fiber market, particularly at the beginning of the year under review. The focus on wood-based specialty fibers, such as those of the TENCEL™, LENZING™ ECOVERO™ and VEOCEL™ brands, also exerted a positive impact on revenue growth. The earnings trend mainly reflects Lenzing's position within the current market environment. Significant increases in energy, raw material and logistics costs were recorded throughout the reporting year.



Lenzing Group: A brief portrait

Based in Austria, the Lenzing Group (Lenzing Aktiengesellschaft and its subsidiaries) is one of the world's leading producers of dissolving wood pulp, and cellulosic fibers, with production sites in major markets and a global network of sales and marketing offices.

Lenzing Group Table 02

	2019	2020	2021
Employees[a]	7,036	7,358	7,958
Revenue	EUR 2,105.2 mn	EUR 1,635.6 mn	EUR 2,194.6 mn
EBITDA	EUR 329.9 mn	EUR 192.3 mn	EUR 362.9 mn[b]
Total assets	EUR 3,121.1 mn	EUR 4,163.0 mn	EUR 5,322.8 mn
Equity	EUR 1,537.9 mn	EUR 1,881.4 mn	EUR 2,072.1 mn
Liabilities	EUR 1,583.2 mn	EUR 2,281.6 mn	EUR 3,250.7 mn
Total number of operations	17	18	18
thereof production sites	7	9[c]	9[c]
Sales and marketing offices	10	9	9
Sales volume fibers	899,000 tons	787,000 tons	909,000 tons

a) Employees (incl. apprentices, excluding supervised workers) in Austria, the Czech Republic, United Kingdom, USA, China, Indonesia, India, Taiwan, Thailand, Turkey, Korea, Singapore, and Brazil.
b) Reclassification of capitalized borrowing costs, net interest from defined benefit plans and commitment fees from EBIT/EBITDA to the financial result (see note 2 of the Group consolidated financial statements 2021).
c) Including construction sites in Brazil and Thailand

For more information on detailed financial figures, please see annual report.

Nature of ownership

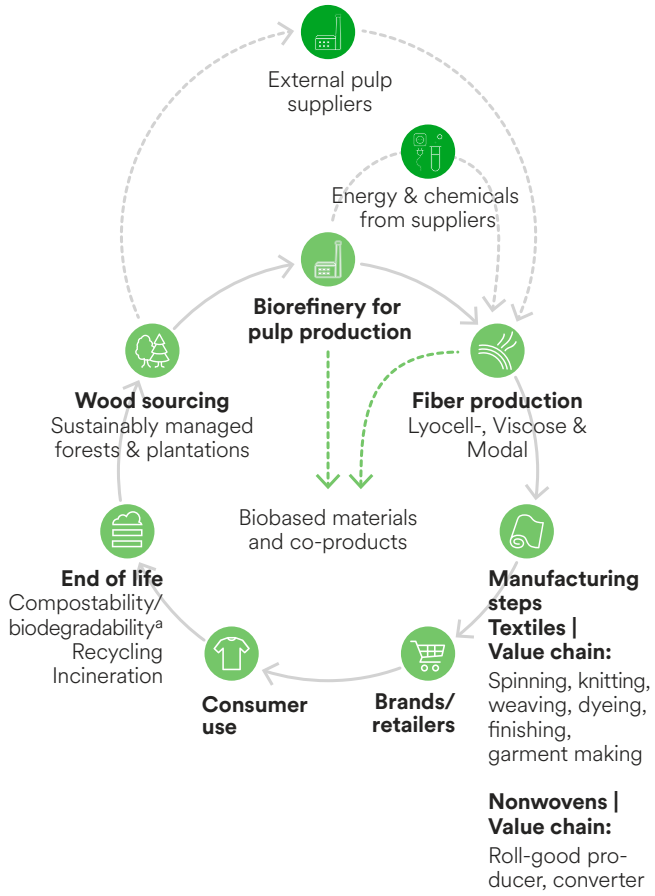
Lenzing Aktiengesellschaft is a publicly traded company. Its shares are quoted on the Vienna Stock Exchange. In 2021, its ownership structure was as follows:

The Austrian B&C Group was the majority shareholder of Lenzing AG with an investment of 50 percent plus two shares as of December 31, 2021. NN Investment Partners held approx. 5.1 percent of the Lenzing shares. The free float equaled approx. 44.9 percent on the reporting date and was distributed among Austrian and international investors. The Lenzing Group did not hold any treasury shares as of December 31, 2021.

Value creation in the Lenzing Group

The Lenzing Group is committed to the ecologically responsible production of fibers made from the renewable raw material wood grown in sustainably managed forests and plantations. As an innovation leader, Lenzing partners with global textile and nonwoven manufacturers and drives many new technological developments.

Value chain for Lenzing's products Figure 01



a) All standard fibers from Lenzing are compostable and biodegradable in freshwater, marine and soil conditions. The compostability and biodegradability of final consumer textile and nonwoven products depend on the material composition (fiber blend) and processing in the value chain steps.

Lenzing's product portfolio extends from dissolving wood pulp as the basic raw material to standard fibers and innovative specialty fibers as well as energy, biobased biorefinery products, and co-products. Lenzing's own pulp production at its sites in Lenzing (Austria) and Paskov (Czech Republic) is based on a biorefinery concept, completely utilizing the raw material wood.

The Lenzing Group combines comprehensive expertise in operating pulp and biorefinery processes with decades of experience in three major fiber process technologies:

- Viscose (rayon)
- Modal
- Lyocell

Further developments and technologies resulted from the above-mentioned processes. For more information, please see the "Net-benefit concept" section or Lenzing website.

The Lenzing Group's high-quality fibers form the basis for a variety of nonwoven and textile applications ranging from elegant clothing and versatile denims to high-performance sports apparel, luxurious bed linen, and sustainable footwear. Due to their consistently high quality, biodegradability, and compostability, Lenzing fibers are also highly suitable for hygiene and personal care products as well as technical applications.

The business model of the Lenzing Group goes far beyond that of a traditional fiber producer. Together with its customers and partners, Lenzing develops innovative products along the value chain, creating added value for consumers. The Lenzing Group strives for the efficient utilization and processing of all raw materials and offers solutions to help redirect the textile sector towards a closed-loop economy. In order to reduce the speed of global warming and to accomplish the targets of the Paris Climate Agreement and the "Green Deal" of the EU Commission, Lenzing has a clear vision: namely to make a zero-carbon future come true.

Lenzing stands at the beginning of a long value chain in the textile and nonwovens industry that comprises several processing steps. The Lenzing Group's business model is based on intensive collaboration and innovation support across all stages of this value chain. As a raw material producer, the company is exposed to largely the same risks and opportunities as the value chain as whole.

Supply and sourcing

The principal raw materials for producing Lenzing's fibers are wood and process chemicals. The company uses dissolving wood pulp from its own production operations and from external suppliers.

Dissolving wood pulp and cellulosic fiber production

Production takes place in two stages: first, the production of dissolving wood pulp and second, the production of fibers based on dissolving wood pulp. Lenzing's own dissolving wood pulp is produced in two biorefineries at sites in Lenzing (Austria) and Paskov (Czech Republic). Lenzing strives for state-of-the-art sustainable production technology.

This entails high resource efficiency, high chemical recovery rates and, where possible, closed loops for process chemicals and water. Bioenergy and biorefinery products are generated as well. Lenzing combines its comprehensive expertise in pulp and biorefinery technologies with decades of experience in cellulosic fiber production.

Down-stream manufacturing

As shown in figure 01 under "Manufacturing steps", the customers in Lenzing's downstream value chain use the fibers to manufacture textile, nonwoven, or industrial products.

Lenzing works closely with value chain partners from direct customers to retail level in the textile and nonwovens sector and for industrial applications in order to provide expertise in processing and the development of innovative applications.

Distribution and use phase

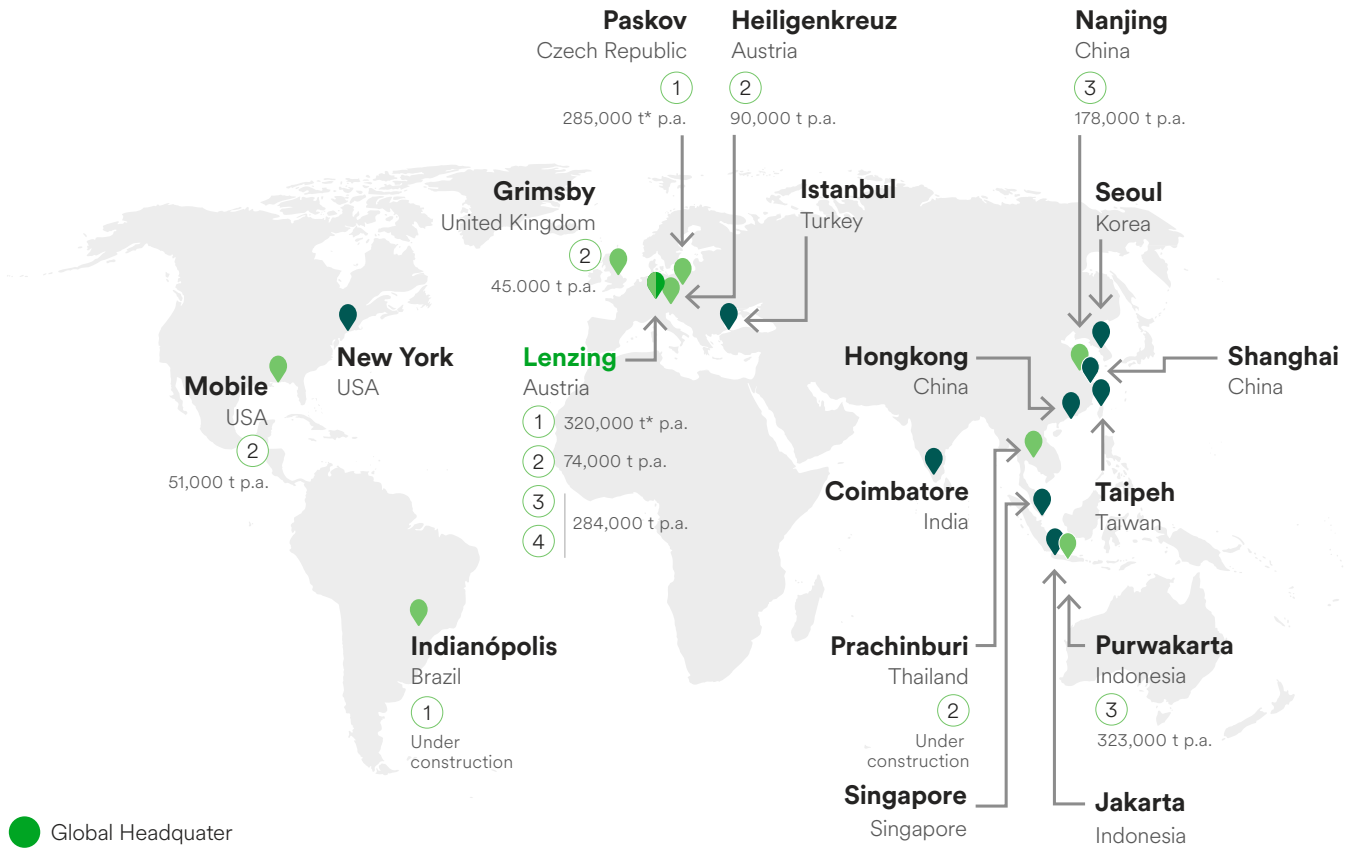
Finished products are distributed after manufacturing and enter the consumer use phase.

End of life

All Lenzing standard fibers are compostable and biodegradable in freshwater, marine, and soil conditions. However, the compostability and biodegradability of final consumer textile and nonwoven products depend on material composition (e.g. fiber blend) of the product and processing in the value chain.

The locations of the Lenzing Group

The locations of the Lenzing Group Figure 02



- Global Headquater
- Sales and marketing office
- Production site
  - 1 Dissolving wood pulp
  - 2 Lyocell fiber
  - 3 Viscose fiber
  - 4 Modal fiber

Numbers = Nominal capacities as at December 31, 2021

*Airdry

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Managing sustainability

2021

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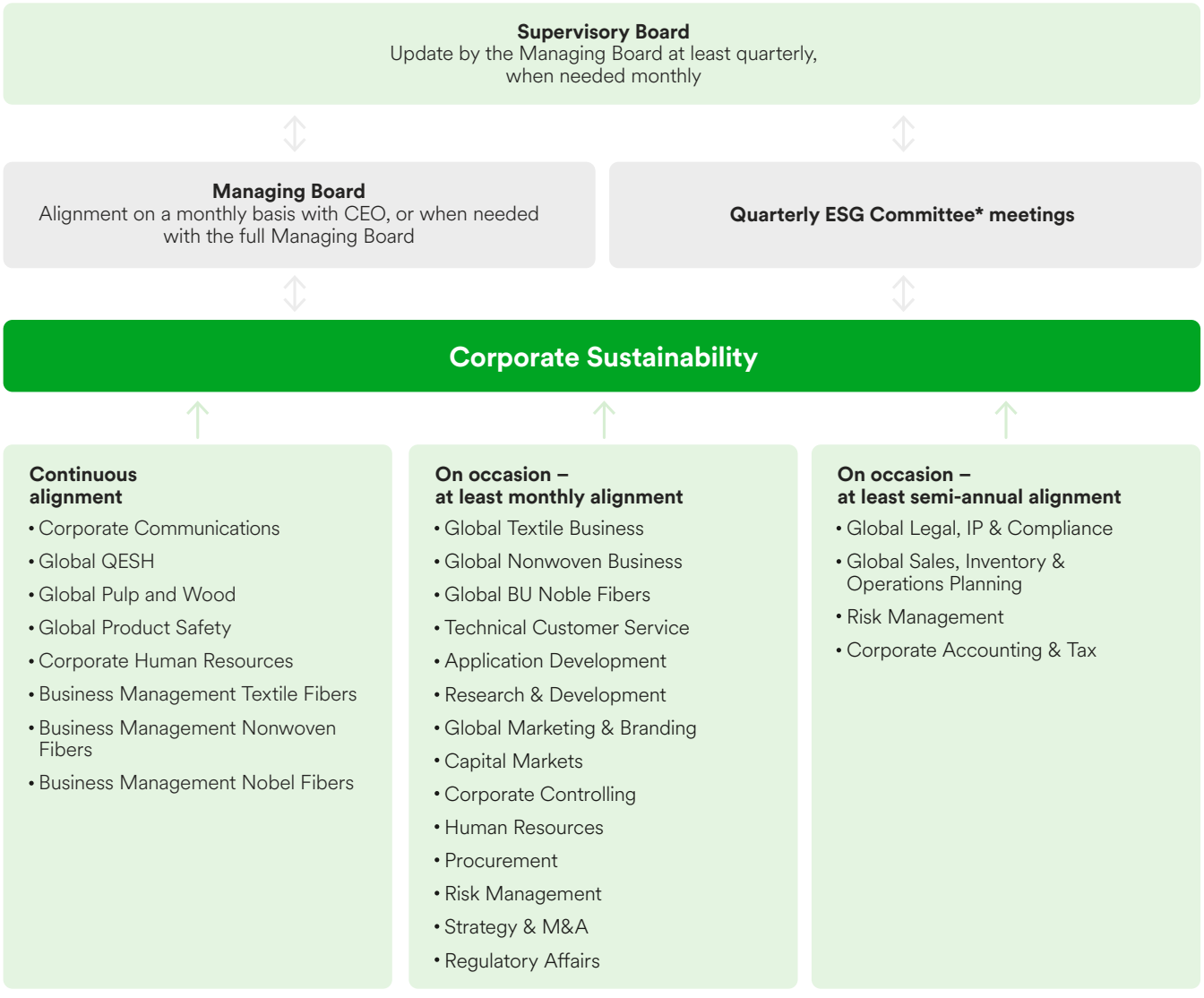
Governance structure for sustainability

Corporate Sustainability reports directly to the Managing Board.

Sustainability organization Figure 03

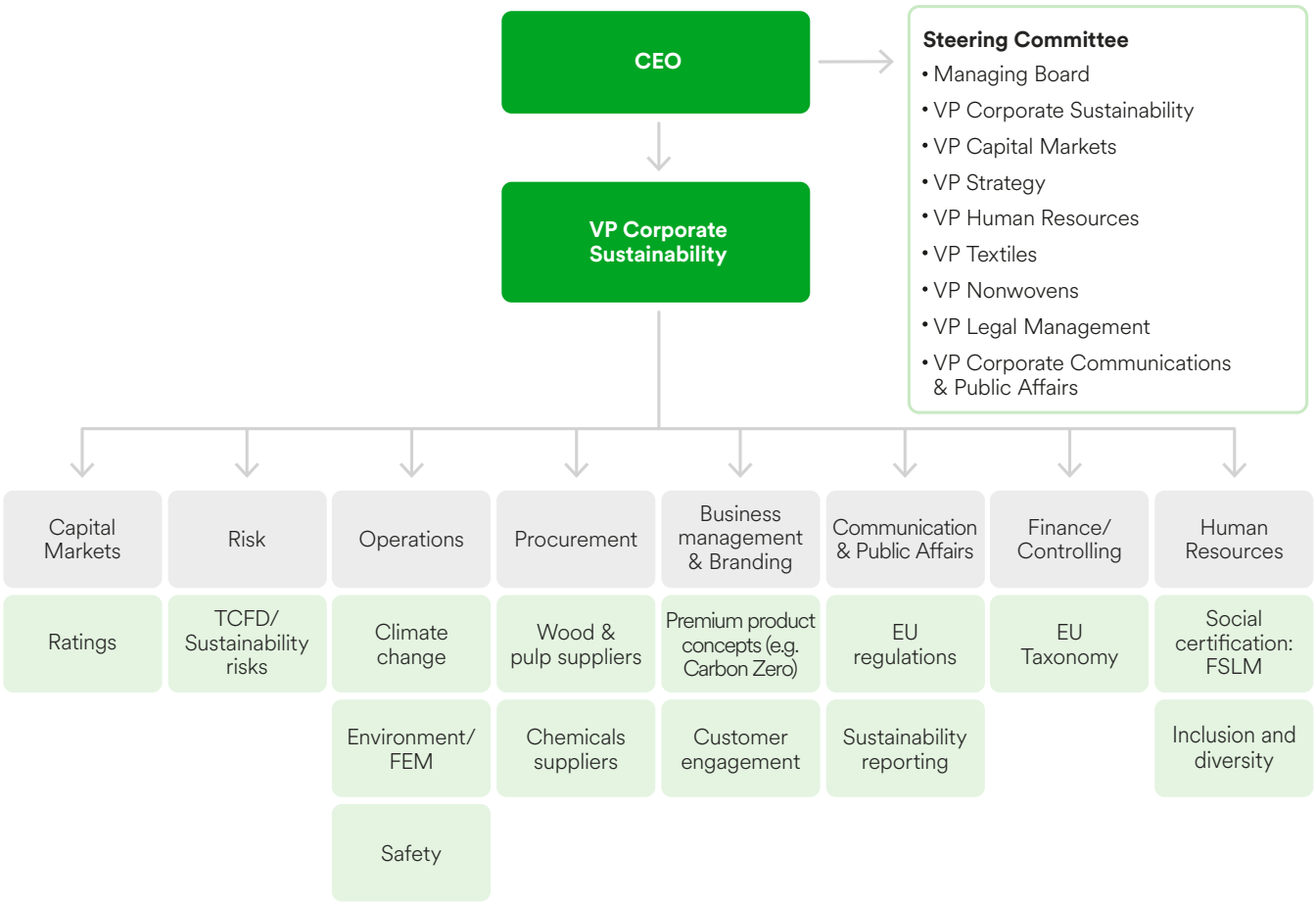


* ESG Committee is an internal committee to accelerate sustainability agenda. Members are Managing Board, Global Strategy and M&A, Corporate Sustainability, Global Wood & Pulp, Corporate Audit & Risk, Capital Markets, Global QESH, Corporate HR, Corporate Controlling, Global Procurement, Global Textile Business, Global Nonwoven Business, Corporate Communications, Research & Development

ESG Committee

Sustainability is a value, business driver and innovation driver in the Lenzing Group. The company increasingly leverage the sustainability work by positioning itself in key ratings (for investors) and benchmarking tools (wider industry level). To support this effort an ESG committee was installed to supervise and accelerate sustainability agenda. The key objectives are to formulate ESG bench-markings, vision and strategy.

ESG Committee structure Figure 04



For information on the Lenzing Group's governance structure, please refer to the Lenzing Group's Annual Report 2021 (Corporate Governance Report, 49).

Risk management

Dissolving wood pulp and fiber production require highly complex chemical and technical processes that pose potential risks...

...to people, including internal staff, visitors, neighboring communities, and parties dealing with Lenzing's products along the value chain. Furthermore, these processes constitute risks for the environment at and around the production sites as well as potential negative impacts such as water contamination or foul odors. Risk management also includes risks arising from environmental, social and governance (ESG) topics for the company operations, other stakeholders and throughout the value chain. Any potential impacts could negatively affect the success of the Lenzing Group and its reputation. For more information, please see the Risk Report in the Lenzing Group's Annual Report 2021.

Compliance

For a detailed description of compliance management, please refer to the chapter "Business ethics".

Materiality analysis

Materiality analysis 2021 Figure 05

Lenzing presented its “Naturally positive” sustainability strategy in 2017. In the run-up to this, it performed a comprehensive materiality analysis for the first time in 2015. This materiality analysis was updated and expanded in 2021. A so-called double materiality analysis was carried out for the first time.

The new materiality matrix of the Lenzing Group was developed in three phases. The first phase was dedicated to defining the potential material topics. Around 300 internal and external topics and trends in environment, social and governance (ESG) domain were identified for the present and future. This list of topics was then consolidated into 16 relevant topics (i.e. the shortlist), which yielded the potential material topics.

In the second phase, internal and external stakeholders were brought in to prioritize these 16 topics. For each of these topics, a brief description of the impacts, risks, opportunities, expectations and current situation was prepared and a questionnaire was created. This questionnaire was sent worldwide to employees from different levels, supervisory board, investors, suppliers, customers, partners from the value chain, brands , insurance companies and the media.

In addition, an impact analysis of these topics was carried out with 40 employees in various areas who are also involved in sustainability reporting on ecological and social impacts. ESG topics can also include both risks and opportunities that are financially material. Therefore, the materiality analysis was extended to include the financial perspective (i.e. double materiality).

Material aspects

Materiality analysis – allocation of topics Table 03

Material aspects	Strategic focus area	NaDiVeG	SDG
Circularity & resources	Partnering for systemic change, Sustainable innovations	Environmental matters	9, 12, 17
Climate & energy	Decarbonization	Environmental matters	7, 13, 17
Responsible wood sourcing	Raw material security	Environmental matters	15
Biodiversity & ecosystems	Raw material security	Environmental matters	15
Sustainable innovation & products	Sustainable innovations	Environmental matters	9, 12, 17
Health & safety	Empowering people	Employee-related matters	3
Human rights & fair labor practices	Empowering people	Employee-related matters, Respect for human rights	5, 8, 10
Business ethics	Empowering people	All non-financial matters	16
Digitalization & cyber security	Sustainable innovations	All non-financial matters	9, 8, 16
Further sustainability aspects			
Supply chain sustainability	Raw material security, Partnering for systemic change	Environmental matters, Respect for human rights	8, 12, 17
Water stewardship	Sustainable innovations	Environmental matters	6
Community wellbeing	Enhancing community wellbeing	Social matters	1, 3, 11
Diversity, inclusion & equal opportunity	Empowering people	Employee-related matters, Respect for human rights	5, 10
Employee empowerment & development	Empowering people	Employee-related matters, Respect for human rights	5, 10

For further information on the update of the materiality analysis please see the “Materiality analysis” focus paper.

“Naturally positive” sustainability strategy

OUR SUSTAINABILITY VISION

Our passion is to provide truly sustainable solutions for a growing world. We create a positive impact for the people we work with, the consumers we serve, and the society and environment in which we operate. In doing so, we are commercially successful.

OUR SUSTAINABILITY MISSION

We are change agents and collaborate with our suppliers and value chain partners to catalyze change for the better. We actively contribute towards improving environmental performance throughout the value chain and, consequently, in final products. We promote social wellbeing. Creation of more positive impacts and benefits is the guiding light for our innovation and business practices.

“Naturally positive”, the Lenzing Group’s sustainability strategy, was developed from the results of the materiality analysis and is firmly rooted in the Lenzing Group’s sCore TEN strategy. Within the dimensions People – Planet – Profit, this strategy defines those sustainability areas where Lenzing can do the most to create a more sustainable world. It is the basis for Lenzing’s approach to contributing to the United Nations Sustainable Development Goals (SDGs).

Strategic focus areas of sustainability in the Lenzing Group and the corresponding SDGs Figure 05

Three strategic principles

1. Driving systemic change
Complex global challenges call for a collaborative approach to designing systemic solutions that involve many stakeholder groups. As a leader in wood-based cellulosic fibers, Lenzing has a particular responsibility and an ambition to help raise the bar for sustainability in the textile and nonwovens industries. Transparency and traceability are a prerequisite for fostering trust and building long-term relationships. With its contributions to developing industry-wide methods, tools, and approaches, Lenzing is helping the industry to progress on its sustainability roadmap by overcoming critical challenges. The sustainability targets for assessments and disclosures with FEM, FSLM, ZDHC, supplier engagement and for physical and digital traceability contribute to this change.

2. Advancing circularity
According to Lenzing's circular economy vision, "We give waste a new life. Every day", Lenzing drives the industry towards a fully-fledged circular economy by striving to give waste a new life in all aspects of its core business and by co-developing circular solutions with potential partners in and outside the current value chain to close loops wherever possible. This vision is based on Lenzing's determination to create value with as little virgin resources as possible and reduce the use of fossil carbon in the company and the value chain while improving sustainability performance.

The company unites the cellulosic fiber cycle of its wood-based products (biological cycle) with its innovative technologies that focus on closing loops in the production and recovery of raw materials and chemicals (technical cycle).

Dedicated targets for development of recycled content based fibers and circular business models with value chain partners contribute to this principle.

3. Greening the value chain
Lenzing's responsible practices and innovative products enable its customers and value chain partners to improve their environmental performance and achieve their sustainability targets and commitments. Responsible sourcing practices, water stewardship, decarbonization, and sustainable innovations are the basis for Lenzing's efforts in greening the value chain. The sustainability targets for air emissions, water emissions, pollution, and climate protection are the cornerstones of Lenzing's responsible entrepreneurship and act as innovation drivers.

For further information on Lenzing's Sustainability Strategy, strategic principles, and focus areas, please see the "Sustainability Strategy" focus paper.[4]

4) www.lenzing.com/sustainability-strategy [Accessed February 15, 2022]

Sustainability targets, measures and progress

Lenzing set Group sustainability targets for the most important challenges in each of its strategic focus areas. To increase transparency, the corresponding implementation measures and target progress made during the reporting year are described.

Color code status

- On track
- Achieved
- Delayed

Sustainability targets, measures and progress Table 04

		Target year	SDG
Sustainable innovations			
Target 1	**To improve the Lenzing Group's specific sulfur emissions by 50 percent by 2023 (baseline 2014)[a]**	**2023**	12
Measure(s)	Lenzing implements a sulfur recovery plant (CAP) upgrade at the Purwakarta plant (Indonesia)	**2023**	
Progress made in 2021	The current situation with COVID-19 has delayed several investment activities and creates challenges for contractors carrying out work under COVID-19 restrictions. However, progress has been made, such as funding approval, selection of a contractor, development of the land and the start of construction work. The project is at a critical stage, but still on track.		
Target 2	**To offer viscose, modal and lyocell staple fibers with up to 50 percent post-consumer recycled content on a commercial scale by 2025**	**2025**	9, 12, 17
Measure(s)	All fibers with recycled content offered by Lenzing contain a share of post-consumer waste	**2022**	
	Lenzing increases the recycled content from 30 to 40 percent for fibers produced with REFIBRA™ technology for textiles and with Eco Cycle technology for nonwovens	**2023**	
	Lenzing introduces its viscose and modal fibers with REFIBRA™ and with Eco Cycle technology with a minimum of 30 percent recycled content	**2023**	
Progress made in 2021	A cooperation with Södra has been established to create a base for industrial scale pulp development with post-consumer recycled content. Overall, Lenzing continued with product and process development towards reaching this target. The biggest challenges were experienced in initiating, building and implementing partnerships and joint development processes under the restrictions of COVID-19.		
Target 3	**To innovate a new circular business model by closing the loops for post-consumer materials and partner with 25 key supply chain companies by 2025**	**2025**	9, 12, 17
Progress made in 2021	The organizational structure was set up to create new business models. There have been initial discussions and scouting of brands and supply chain partners to develop collaborative pilot projects. A concept and roadmap have been defined. There are many challenges that need to be resolved, such as the technological gaps in sorting.		
Target 4	**To achieve "aspirational" MMCF level for ZDHC wastewater and air emission guidelines at Lenzing viscose facilities by 2024**	**2024**	6, 12
Measure(s)	Lenzing commits to implementing ZDHC MMCF wastewater guidelines at all viscose sites	**2020**	
	Lenzing implements ZDHC MMCF wastewater guidelines and reports viscose site data on ZDHC gateway	**2021**	
	Lenzing achieves ZDHC MMCF aspirational level for wastewater at Lenzing site	**2021**	
Progress made in 2021	All Lenzing viscose sites, Lenzing (Austria), Nanjing (China), Purwakarta (Indonesia), have completed the planned first year ZDHC gateway Wastewater guideline reporting. While the site in Lenzing has basically achieved aspirational level as defined by the wastewater guideline, the sites in Nanjing and Purwakarta have developed their own action plans for further improvement in the coming three years.		

Water stewardship			
Target 5	**To improve Lenzing Group's specific wastewater emissions (COD) by 20 percent by 2024 (baseline 2014)[a]**	**2024**	6
Measure(s)	Lenzing implements a wastewater treatment plant upgrade at Purwakarta plant (Indonesia)	**2023**	
	Lenzing implements a new wastewater treatment plant at Grimsby (UK) plant	**2024**	
Progress made in 2021	The current situation with COVID-19 has delayed several investment activities and creates challenges for contractors carrying out work under COVID-19 restrictions. For Indonesia, progress has been made, such as funding approval, selection of a contractor, detailed engineering and procurement completed for wastewater treatment plant upgrades. The project is at a critical stage, but still on track. For Grimsby, different technologies have been under evaluation. The technology and vendor selection will be the next steps.		
Raw material security			
Target 6	**To implement a conservation solution of 20 ha in Albania in combination with a social impact project by 2024**	**2024**	1, 15
Measure(s)	Lenzing reforests 20 ha of degraded land in Albania	**2024**	
	Lenzing establishes a training center for local communities in Albania	**2024**	
	Lenzing supports interdisciplinary vocational trainings and school partnerships in Albania	**Yearly**	
Progress made in 2021	By the end of 2021, the first 10 ha had been reforested. The construction of a tree nursery began. Moreover, ten training courses were held with more than 400 local forest users trained so far in forest management, fire prevention and safety.		
Target 7	**To implement conservation solutions on 15,000 ha at the new pulp site in Brazil by 2030**	**2030**	15
Measure(s)	Lenzing takes responsibility for 13.000 ha protected land in Brazil	**2020**	
	Lenzing increases the protected area in Brazil from 13,000 ha to 15,000 ha	**2030**	
Progress made in 2021	Compared to 2020, Lenzing increased the total conservation area in Brazil by another 11 percent to around 14,620 ha. Accordingly, 97 percent of the overall target has been achieved.		
Target 8	**To engage in further conservation, biodiversity protection, and restoration activities in regions where forests are at risk or should be improved by 2025**	**2025**	15
Progress made in 2021	In 2021, Lenzing made some progress by looking into various approaches and holding discussions with various expert organizations.		
Partnering for systemic change			
Target 9	**To assess the sustainability performance of 80 percent of the Lenzing Group's "most relevant suppliers" by 2022**	**2022**	
Target 10	**To improve transparency by implementing the Higg Facility Environmental Module (FEM 3.0) at all sites by 2019**	**2019**	12, 17
Measure(s)	Lenzing conducts self-assessments	**2019**	
Target 11	**To implement and annually update FEM in all pulp and fiber production facilities and share verified modules with customers from 2024[b]**	**2024**	12, 17
Measure(s)	Lenzing implements SAC membership requirements	**2021**	
Progress made in 2021	Internal targets as well as group and site level roadmaps have been developed. Lenzing determined the expansion of FEM to new sites and adjusted the group roadmap accordingly.		
Target 12	**To achieve digital fiber traceability by having 500 value chain partners with blockchain technology by 2021**	**2021**	9, 12, 17
Target 13	**To increase physical traceability from TENCEL™ x REFIBRA™ and LENZING™ ECOVERO™ to 100 percent of Lenzing's textile special fibers by 2021**	**2021**	12

Decarbonization			
Target 14	**To reduce scope 1, 2, and 3 (purchased goods and services, upstream and downstream transport, and fuel and energy-related activities) greenhouse gas emissions 50 percent per ton of fiber and pulp sold by 2030 (baseline 2017)**	**2030**	7, 13
Progress made in 2021	Lenzing maintained its approach towards mitigating climate change by reducing its GHG emissions compared to baseline 2017. Detailed information on achievements in 2021 is available in the "Climate & energy" chapter.		
Target 15	**To achieve net-zero CO_2 emissions by 2050 (scope 1 and 2)**	**2050**	7, 13
Measure(s)	Lenzing achieves 100 percent green electricity for four sites	**2024**	
	Lenzing phases out coal in Lenzing's Nanjing operations	**2022**	
	Lenzing installs on-site photovoltaic power generation at the Lenzing plant	**2022**	
	Lenzing increases the share of renewable energy consumed by the Lenzing Group and supplies excess bioenergy from the pulp production facility in Brazil	**2023**	
	Lenzing achieves scope 1 and 2 carbon neutrality at its new lyocell fiber production site in Thailand by using 100 percent bioenergy	**2023**	
	Lenzing engages 20 key suppliers, by spend and CO_2 impact, in order to reduce Lenzing's scope 3 emissions and incentivize the suppliers that help Lenzing offer more low-carbon-footprint fibers	**Continuous[c]**	
	Lenzing engages and enables 50 percent of 'customers with approved SBT and commitment' (textile and nonwoven brands/retailers as well as manufacturers working with LENZING™ fibers) to fulfill their ambition by providing information on low GHG-footprint specialty products such as TENCEL™, LENZING™, ECOVERO™ and VEOCEL™ branded fibers	**Continuous[a,c]**	
	Lenzing runs a campaign to reach 50 percent of TENCEL™ and VEOCEL™ customers (textile and nonwoven brands/retailers as well as manufacturers using the TENCEL™ and VEOCEL™ brands) to promote the use of innovative new carbon-zero TENCEL™ products and climate care VEOCEL™ products	**Continuous[a,c]**	
Progress made in 2021	Four production sites in the Lenzing Group use 100 percent renewable electricity from the grid (Lenzing (Austria), Heiligenkreuz (Austria), Paskov (Czech Republic), and Mobile (USA)). The site in Nanjing (China) made some progress (construction and mechanical installations) in transitioning from coal to natural gas. All legal permits and the necessary financing have been obtained for the on-site photovoltaic power generation project at the Lenzing site. Construction is planned for mid-2022. Supplier engagement continued with key chemicals and pulp suppliers. Two additional new products with climate change benefits were launched.		
Empowering people			
Target 16	**To have a continuously valid third-party audited accredited social certificate for every Lenzing Group production (fiber or dissolving wood pulp) site by 2024[b]**	**2024**	8, 12
Measure(s)	Lenzing implements and annually updates Facility Social Labor Module (FSLM) at all pulp and fiber production facilities and shares verified modules with customers from 2024 onwards	**2024**	
Progress made in 2021	A roadmap has been prepared. Required resources have been acquired.		
Target 17	**To enable a good life for people amplified by means of products offered by Lenzing and by respecting human rights, employee wellbeing, and diversity**	**Continuous**	3, 5, 10
Measure(s)	Lenzing implements training courses for 75 percent of workforce on diversity, discrimination, nondiscrimination policy, and human rights	**2025**	
	Lenzing establishes a working condition policy	**2021**	
Progress made in 2021	Lenzing has taken initial steps to identify and understand the barriers to gender equality in order to promote diversity in its workforce. In addition, a gender pay analysis has been conducted in 2021 to identify any pay gaps. The results of this analysis look very encouraging for the Lenzing Group. In this context, preparations were made to anchor the performance of an annual gender equal pay analysis in the Lenzing Group Reward Guideline in order to ensure equal pay and close any gaps. As for the working conditions policy, some improvements have been made towards flexible working to address COVID-19 related challenges.		

Target 18	**To continuously support the development of local communities near Lenzing production sites and support social welfare programs to 2025 and beyond**	**Continuous**	1, 3, 11
Progress made in 2021	In 2021, Lenzing continued supporting numerous social and environmental initiatives for enhancing community development and wellbeing. Depending on local requirements, activities range from donations, sponsorships, health and medical care, scholarships and other educational programs, as well as local environmental projects. A current overview of activities conducted in 2021 at each site is provided in the "Social responsibility" focus paper.		

a) The target year was moved from 2022 to 2024 due to the current COVID-19 situation. The target has the same production volumes and scope of facilities as the 2014 baseline (i.e. excluding new legal entities in Thailand and Brazil).

b) The target year was moved from 2023 to 2024. The scope was extended to all facilities (i.e. including new legal entities in Thailand and Brazil).

c) The target year was removed and changed to "continious" as suppliers/customers are engaged periodically.

Information on environmentally sustainable economic activities according to the EU Taxonomy Regulation

According to the EU Taxonomy Regulation (EU) 2020/852, Lenzing Group is required to disclose three key performance indicators (turnover, CAPEX and OPEX) associated with EU Taxonomy-eligible economic activities within Lenzing Group. Lenzing Group designed an EU Taxonomy guideline for describing the methodology for reporting the three KPIs by following the time sequence and requirements as outlined in the Delegated Act as from 1st January 2022. To determine the Taxonomy-eligible activities (EU and non-EU countries), Lenzing Group assessed all economic activities listed in the EU Taxonomy. For each economic activity, economic industries (NACE codes) were used as a framework to capture all economic sectors. Due to the current state of EU legislation not all economic activities and industries are covered by the currently applicable two environmental objectives. As a consequence, Lenzing Group core business activities (wood-based fiber production, dissolving wood pulp production and supporting activities) are currently not included. Therefore, the information on environmentally sustainable economic activities for 2021 covers only a very small portion of activities within Lenzing Group (namely afforestation and forest management, transmission and distribution of electricity, cogeneration of heat/cool and power from renewable non-fossil gaseous and liquid fuels and manufacture of soda ash). Future developments in legislation may change the scope of the Taxonomy-eligible activities for the Lenzing Group.

Currently, the turnover of Taxonomy-eligible Lenzing Group activities is 1.43 % (EUR 31.4 mn) and for non-eligible activities is 98.57 % (EUR 2,163.3 mn) of the total turnover 2021 (EUR 2,194.6 mn). The CAPEX for Taxonomy-eligible activities is 2.35 % (EUR 23.0 mn) and for non-eligible activities is 97.65 % (EUR 954.2 mn) of the total CAPEX 2021 (EUR 977.2 mn). The OPEX for Taxonomy-eligible activities is 2.09 % (EUR 1.4 mn) and for non-eligible activities is 97.91 % (EUR 65.2 mn) of the total OPEX 2021 (EUR 66.6 mn).

Lenzing Group avoids any double counting by evaluating the data for each key performance indicator independently. The disclosed KPIs are only count once to one environmental objective "Climate Change Mitigation". Lenzing Group assessed the turnover, CAPEX and OPEX according to the definition of Taxonomy-eligible activities as set out in the Taxonomy.

The total turnover covers the revenue recognized pursuant to International Accounting Standard (IAS) 1.82 (a), as adopted by Commission Regulation (EC) 1126/2008 and is reported in the consolidated financial statements 2021 (see consolidated income statement line "revenue"). The turnover derived from products or services, including intangibles, associated with Taxonomy-eligible economic activities, is presented in relation to the total turnover.

The total CAPEX covers book (not cash-effective) additions to property, plant and equipment, intangible assets, biological assets and right of use assets. The CAPEX related to assets or processes associated with Taxonomy-eligible economic activities, is presented in relation to the total CAPEX.

EU Taxonomy CAPEX Table 05

	EUR mn 1–12/2021
Additions intangible assets (see note 18 of consolidated financial statements 2021)	8.7
Additions property, plant and equipment excluding down payments	944.9
Additions land and buildings (see note 19 of consolidated financial statements 2021)	28.9
Additions technical equipment and machinery, factory and office equipment (see note 19 of consolidated financial statements 2021)	53.8
Additions down payments and assets under constructions (see note 19 of consolidated financial statements 2021)	755.7
Reclassification of down payments to assets under constructions (see note 19 of consolidated financial statements 2021)	106.5
Additions biological assets	13.5
Acquisitions biological assets (see note 20 of consolidated financial statements 2021)	1.5
Capitalized production costs biological assets (see note 20 of consolidated financial statements 2021)	12.0
Additions right of use assets (see note 21 of consolidated financial statements 2021)	10.1
Total	**977.2**

The total OPEX covers direct non-capitalized operating expenses that relate to research and development, building renovation measures, short-term lease, maintenance and repair (external). Maintenance and repair expenses relate to the day-to-day servicing of assets of property, plant and equipment by the Lenzing Group. The OPEX related to assets or processes associated with Taxonomy-eligible economic activities is presented in relation to the total OPEX.

EU Taxonomy OPEX Table 06

	EUR mn 1–12/2021
Maintenance and repairs (see note 6 of consolidated financial statements 2021)	35.0
Rental and leasing expenses (see note 21 of consolidated financial statements 2021)	8.5
Research and development expenses (see consolidated financial income statement 2021)	24.0
Less depreciation included in research and development expenses (see note 6 of consolidated financial statements 2021)	–0.9
Total	**66.6**

Partnering for systemic change

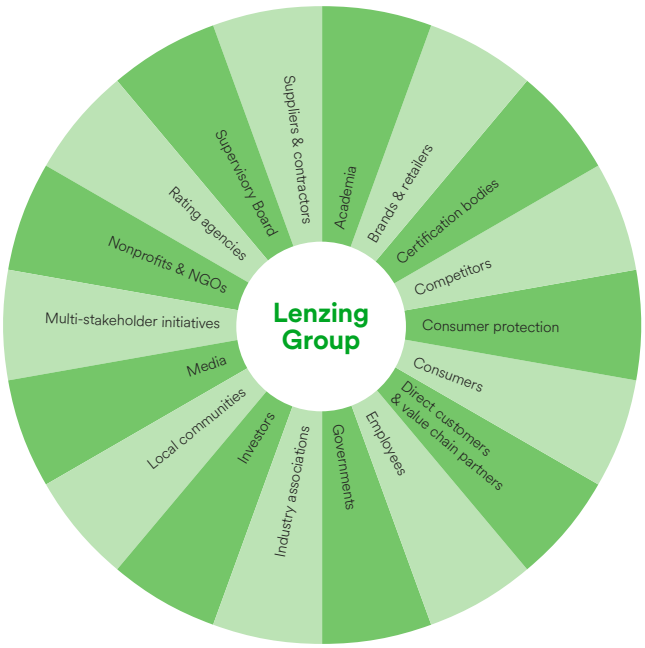
The world is more interconnected today than ever before. Improving access to technology and knowledge is an important way to share ideas and foster innovation. The complex global sustainability challenges we are facing, such as the COVID-19 pandemic, climate change, widespread biodiversity loss, plastic pollution, etc., call for a collaborative approach to designing systemic solutions.

Transparency is a prerequisite for fostering trust and long-term relationships. Guided by the United Nations Sustainable Development Goal (SDG) 17, Partnerships for the Goals, the Lenzing Group regularly engages with a wide range of stakeholders and business partners in order to integrate different perspectives, understand global trends, and mitigate risks. Lenzing strives to identify and develop cross-industry business cases to make progress in instituting circularity at Lenzing and throughout the industry. With its contributions to developing methods, tools and products, Lenzing helps the industry to progress on its path towards a more sustainable future. For example, Lenzing Group actively contribute to multi-stakeholder associations such as Textile Exchange MMCF roundtable and Sustainable Apparel Coalition's (SAC) Higg transparency program as well as Policy hub for accelerating circularity with forward-looking policy frameworks and for engaging policy makers in Europe. Lenzing's launch of carbon-zero TENCEL™ fibers contributes to reducing the carbon footprint of customers' supply chains.

Engaging in a dialog means respecting stakeholders, contributing Lenzing's expertise and knowledge, and taking the opportunity to learn from partners' perspectives. Each dialog starts with providing transparent information, supporting stakeholders to form an educated opinion and assess risks, and avoiding misunderstandings by building trust. Furthermore, stakeholder relationships built on trust and openness help solve existing tensions and avoid potential conflicts.

The ongoing stakeholder dialog was considerably affected by the COVID-19 pandemic in the reporting year and was predominantly conducted online. Despite some cancellations and delays, the Lenzing teams made great efforts to continue their activities online with virtual workshops and webinars with customers, one-on-one discussions, training sessions, interviews, surveys, education, joint product development, web platforms, roadshows, regular media relations, online trade shows and conferences, press interviews, risk assessments, and audits.

Key stakeholder groups Figure 07



Various business functions are involved in reaching out to individual stakeholders. In addition to the Lenzing Sustainability team, the Managing Board, managers of the different business functions, and key account managers are all important players who drive the company's proactive approach towards an ongoing stakeholder dialog.

Key stakeholders in 2021

The Lenzing Group's key stakeholders are the people and entities who are potentially affected by its operations, business conduct, and strategic targets. Lenzing regards them as strategic partners who have a significant interest in and impact on areas that matter the most to Lenzing.

One very special stakeholder group is Lenzing's staff. Transparency, collaboration, and sharing of information make them key testimonials to credible Lenzing Group sustainability performance. For the special challenges COVID-19 presented for the Lenzing staff in the reporting year, please see the "Human rights & fair labor practices" chapter.

Main topics discussed in 2021:

- COVID-19 pandemic
- Climate change, CO_2 climate target, and biogenic emissions and carbon removals (science-based target, SBT)
- EU Single-Use Plastics Directive
- Responsible sourcing, in particular sustainable sourcing of wood and pulp
- Circular economy
- Waste, emissions and water management
- Transparency and traceability of supply chain
- Raw material assessments (definition of sustainable raw materials)
- Biodiversity

For more information on stakeholder dialog, please see the "Stakeholder engagement" focus paper.

United Nations Sustainable Development Goals (SDGs)

The SDGs are a collection of 17 goals adopted by all Member States of the United Nations in 2015 to address global economic, social, and environmental challenges and achieve a more sustainable future by 2030. Progress is being made in many areas but with just only about 10 years to go, the UN is calling for a "Decade of Action" to accelerate sustainable solutions and address the world's biggest challenges.

Sustainable development plays an important role in addressing global challenges such as the current health crisis by aiming to provide access to healthcare and clean water for all.

Lenzing recognizes its responsibility and sees its pioneering role in the textile and nonwovens industries as an opportunity to contribute to the achievement of sustainable development goals. Lenzing's Sustainability strategy and targets contribute towards these goals. For more information on Lenzing's approach to the SDGs, please see the "Sustainable Development Goals" focus paper.

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Material Aspects 2021

Table of content

Circularity & resources

MANAGEMENT APPROACH

Material topic: Circularity & resources

Importance for Lenzing

- Advancing circularity in the industry and within Lenzing itself is one of the three core principles of Lenzing's "Naturally positive" sustainability strategy
- Improved resource efficiency in order to stay competitive in terms of costs and upcoming legal requirements
- Providing new business opportunities
- Being prepared for upcoming societal challenges (climate change, resource scarcity, textile waste and recycling, etc.)

Opportunities

- Creating new product offerings and business models to help the industry to change
- Optimizing the eco-footprint of the Lenzing products
- Optimizing the value Lenzing generates via the environmental responsible products it supplies
- Lowering emissions by closing energy and material loops
- Replacing products that cause end-of-life pollution (e.g. microplastics contamination) with biodegradable alternatives
- Valorizing biorefinery products
- Decreasing use of virgin raw materials
- Driving innovation on recycling and optimizing closed loop processes
- Joining forces and sharing know-how within partnerships for systemic change

Risks

- Transitional risks due to changing legislation and stakeholder expectations (NGOs, customers)
- Increasing ecological footprint due to less efficient production steps and waste streams

Guiding principles

- sCore TEN specialization strategy and net-benefit thinking are a guiding light for circular economy innovations
- "Naturally positive" sustainability strategy with "Advancing circularity" as one of its three major principles and "Partnering for systemic change" focus area
- Lenzing Group Environmental Standard
- Lenzing Waste Management Guideline

Due diligence processes and (ongoing) measures

- Environmental management system based on ISO 14001:2015 (including risk assessment and internal audits to ensure effectiveness of the measures implemented)

Objectives

- Advancing circularity in the Lenzing Group
- Strategy to grow with REFIBRA™ and Eco Cycle technology
- Developing technologies for post-consumer cellulosic recycling
- Establishing partnerships and collaboration to drive the circularity topic in the industry
- Increasing Lenzing's specialty and forward-solution portfolio (net-benefit products)
- All sites need to comply with the Group Environmental Standards
- Establishing best practices to improve waste management and reduce the risks related to waste management
- Developing new biobased biorefinery products
- Developing fiber applications to replace products that cause end-of-life pollution (e.g. microplastics contamination) with biodegradable alternatives
- Enhancing the sustainability performance of the biobased biorefinery product portfolio (e.g. carbon neutral LENZING™ Acetic Acid Biobased)
- Supporting, contributing to and implementing the EU Circular Economy Action Plan (CEAP) and EU Textile Strategy
- Helping to reduce waste streams in the textile and nonwovens value chains

Achievements/activities in the reporting year

- Strategic investments in pulp and fiber projects fully on track despite COVID-19
- Collaboration signed with Södra to jointly install a process for post-consumer cellulosic recycling
- Targets for textile recycling on track
- Lenzing intensified its collaboration with leading stakeholders and initiatives
- Partner in the newly founded Christian Doppler Laboratory for a recycling-based circular economy
- Contribution to supply chain transparency to facilitate circular economy projects
- Viscose defined as non-plastic in the European Single-Use Plastics Directive (SUPD) (Directive (EU) 2019/904)
- Results of marine biodegradation study published

Responsible

- Board members for pulp and commercial areas
- Head of Circularity Initiative

Supporting

- Corporate Sustainability
- Global Textile Business
- Global Nonwoven Business
- Global BU Noble Fiber
- Division Pulp
- Global Quality, Environment, Safety & Health (QESH)
- Research & Development
- Site Managers

What is circular economy?

Circular economy is a thriving economy that can benefit everyone within the limits of our planet. Our finite resources need to be used and preserved so that future generations can enjoy them, too. Circular economy is built on the idea that closed loops allow maximum value to be extracted from resources. Products last longer, and waste from one process can be used as a raw material in another process, which reduces the need for virgin resources, avoids waste, increases resource efficiency and thereby minimizes environmental impacts. Circular economy broadly covers two areas: biological materials and technical materials.

Lenzing's circular economy vision

We give waste a new life. Every day

Lenzing drives the industry towards a fully-fledged circular economy by striving to give waste a new life in all aspects of our core business and by co-developing circular solutions with potential partners in and outside the current value chain to close loops wherever possible. This vision is based on our determination to create value with as little virgin resources as possible and to reduce the use of fossil carbon in the company and the value chain while improving sustainability performance. It is built on the three following pillars.

We use regenerative and recycled raw materials to protect the planet

An important element in Lenzing's circular economy vision is its use of wood, a renewable raw material harvested from sustainably managed forests. In its biorefineries, Lenzing converts 100 percent of the wood it receives to make high-value products and bioenergy. At the same time, Lenzing proactively participates in conservation projects to protect the world's ecosystems. We are also using an increasing amount of alternative cellulose feedstock, in particular from textile waste, as a raw material and focus on further developing the technology therefore.

We think circular to design out waste and pollution in all our processes

In addition to using raw materials highly efficiently, Lenzing reduces its waste by closing loops in production. By implementing circular thinking and high environmental and social standards in Lenzing's operations, procurement and innovations, we minimize the impact on ecosystems and society not only for Lenzing, but also throughout the value chain. Lenzing proactively develops and drives innovations in recycling, such as our REFIBRA™ and Eco Cycle technologies, to deliver solutions to the issue of global textile waste.

We innovate processes to use and reuse materials again and again

We continuously improve our biorefinery concept by optimizing the cascading use of biomass in order to minimize the utilization of virgin resources. We set standards in the industry by further closing the loops in the technologies we use.

We develop recycling technologies at a commercial scale to increase resource efficiency and reduce waste in the value chain. Lenzing implements close digital connections (blockchain technology) and relevant tools (e-branding services) to enhance transparency across the network to give customers and end users confidence and to facilitate the transition from a linear to a circular supply chain.

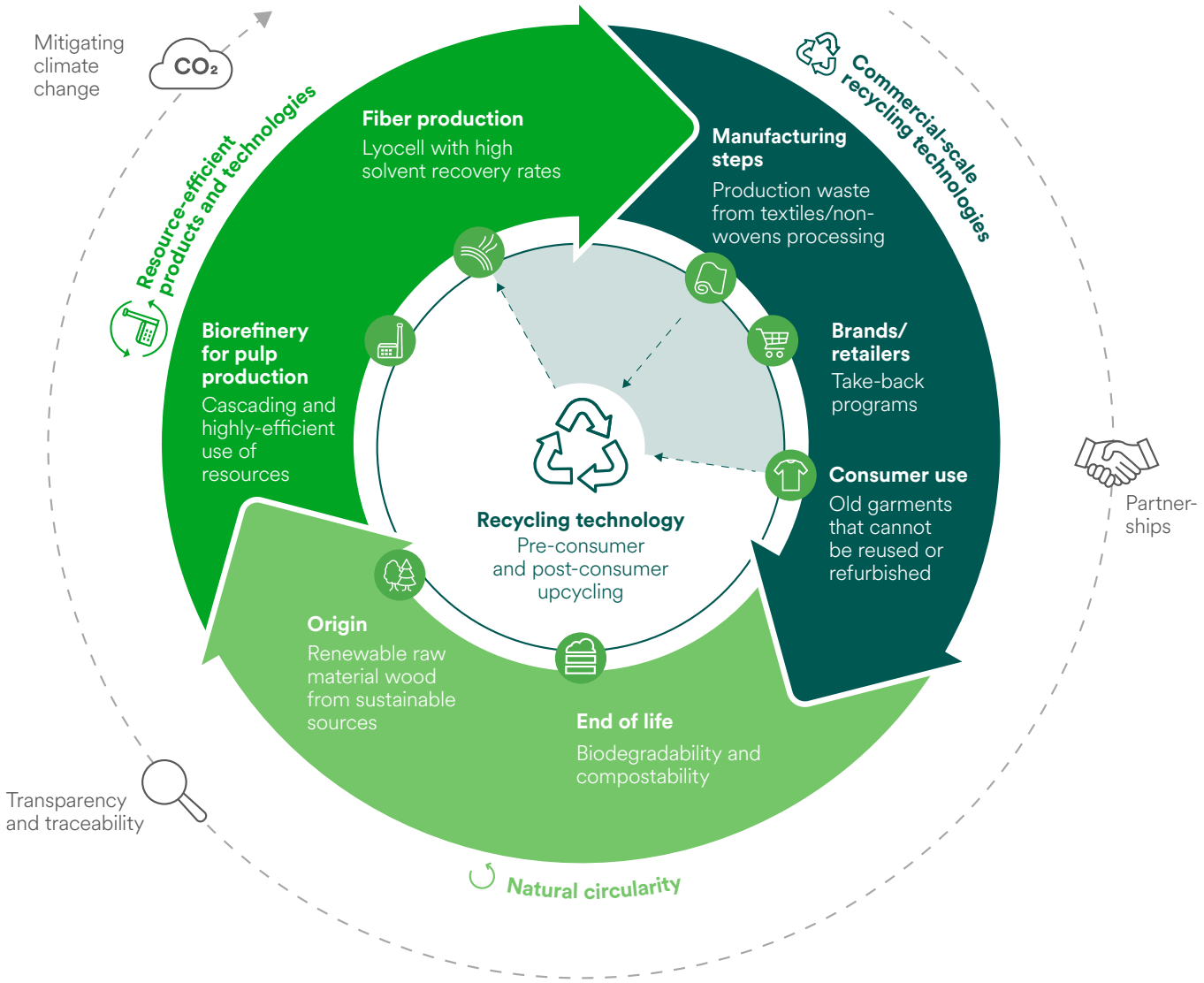
Lenzing's circular economy practices

To make its vision a reality, Lenzing follows six main practices that embed various elements of the circular economy into its business model.

They include:

- Natural circularity
- Resource-efficient products and technologies
- Developing commercial-scale recycling technologies
- Transparency and traceability of supply chains
- Climate change and circular economy
- Partnering for systemic change

Circular economy model of the Lenzing Group Figure 08



As shown in figure 8, the origin of Lenzing's renewable raw material wood lies in sustainably managed forests and plantations. The wood is processed into pulp in Lenzing's biorefineries, with the renewable energy produced being used to meet the energy needs for production and other processes at the site. Lyocell fiber production at Lenzing is a closed-loop, solvent-based production technology that allows more than 99.8 percent of the solvent to be recovered. The waste generated during certain manufacturing steps (e.g. production waste from garment making) can be used as raw material for other steps, reducing the need for new resources, avoiding waste and increasing resource efficiency. To address the enormous waste challenges facing the textile industry, Lenzing has developed a unique solution for recycling technologies called REFIBRA™ (for textiles) and Eco Cycle (for nonwovens). These technologies, in addition to virgin pulp, use cotton waste from brands/retailers and end-of-life garments that cannot be reused or refurbished as raw materials after consumer use. At the end-of-life stage, Lenzing fibers are compostable and biodegradable. This closes the material loop and aligns with the biological cycle. As complex global challenges such as the transition from a linear to a circular system require a collaborative approach, Lenzing enters into partnerships with several stakeholders with the clear goal of driving systemic change in the textile and nonwovens industry. To lay the foundation for credible sustainability performance, especially for the circular economy, it needs transparency. Close digital connections facilitate supply chain traceability and help to verify the origin of Lenzing fibers throughout the life cycle up to the final garment. By promoting the circular economy, Lenzing also contributes to addressing the global challenge of climate change. Lenzing strives to find synergistic solutions such as its biorefinery concept, which not only addresses circularity but also contributes to climate change mitigation at the same time.

Natural circularity

Natural circularity covers the biological cycle, which is based on two aspects: renewable origins and the biodegradability/compostability of natural materials. Lenzing's products are made from wood sourced from sustainably managed forests and plantations as described in the "Raw material security" chapter. Lenzing fibers are compostable and biodegrade at the end of their use[5]. Their safe disposal at the end-of-life stage into the natural environment enables the cellulose material loop to close in alignment with the biological cycle.

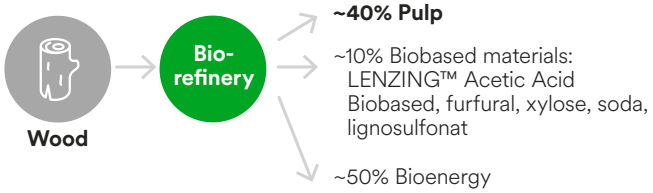
Resource-efficient products and technologies

Cascading use of biomass

The Lenzing Group operates two biorefineries: one in Lenzing (Austria) and one in Paskov (Czech Republic). As depicted in figure 09, Lenzing biorefinery technology converts wood into pulp, biobased co-products and energy. Lenzing markets the valuable co-products, like LENZING™ Acetic Acid Biobased, furfural, xylose, soda or lignosulfonate, to other industries, thereby making a major contribution to optimum utilization of the natural resources wood. As for energy, the biorefineries are energetically self-sufficient. The surplus renewable energy (steam and electricity) that is produced is supplied as renewable energy for on-site use in fiber production and other purposes. This is a prime example of the cascading use of biomass and 100 percent utilization of wood without generating any waste.

Highly efficient use of the raw material wood at the Lenzing Group's biorefineries
(in % from wood input)

Figure 09



Closed-loop production

Lenzing's lyocell process is a unique, closed-loop solvent-based production technology that allows the manufacturing of cellulosic fibers without chemical conversions. The process follows a basic dissolution concept and allows more than 99.8 percent of the solvent to be recovered and recycled. This avoids waste and ensures high resource utilization, while reducing water consumption and emissions.

Lenzing also sets standards for closing the loops even further in the traditional production of viscose and modal fibers. Carbon disulfide and hydrogen sulfide are recovered from the process, converted and returned to the production process as raw materials.

Management of production waste

There are several contexts in which waste is generated in facilities, such as the packaging of procured goods or within production processes. Lenzing follows a waste hierarchy and avoids waste wherever possible. For more information, please see the "Waste management" chapter.

Developing commercial-scale recycling technologies

Lenzing has developed a recycling technology called REFIBRA™ to address the enormous textile waste challenges facing the industry and society. This technology utilizes a substantial proportion of cotton waste as well as dissolving wood pulp as raw materials. Lenzing continued to offer TENCEL™ x REFIBRA™ branded lyocell fibers with up to 30 percent recycled content in 2021. Along with dissolving wood pulp, pulp from cotton scraps is used for the closed-loop commercial-scale production of lyocell fiber. This creates high-quality fibers with the same properties as fibers from virgin dissolving wood pulp. The fiber is available under the Recycled Claim Standard (RCS), certifying that all production processes in the entire supply chain have undergone the relevant steps to ensure the integrity of the final product.

The TENCEL™ x REFIBRA™ market presence was stepped up in 2021, with increasing collections and more than 50 brands already offering garments or products containing TENCEL™ x REFIBRA™. Some of these brands also use the option of closing the loop to return garment production waste to Lenzing as a raw material base for garments and home textile products made with TENCEL™ x REFIBRA™ fibers. The cooperation with brands has also been highlighted in "The Good Loop" campaign, in which three brand partners show their products made with TENCEL™ x REFIBRA™ fibers. To address the growing industry demand for "circular fashion" and carbon neutrality, Lenzing also recently expanded its carbon-zero TENCEL™ branded fibers with REFIBRA™ technology.

Recycling technology has also been introduced for nonwoven products. VEOCEL™ Lyocell fibers with Eco Cycle technology enable the use of recycled content in a broad range of hygiene applications that have the same fiber properties and fiber quality. Within the production process, one-third of the required pulp is recycled from cotton scraps used in garment production and post-consumer waste, while the remaining amount is taken from sustainably sourced wood.

5) All standard fibers from Lenzing are compostable and biodegradable in freshwater, marine and soil conditions. The compostability and biodegradability of final consumer textile and nonwoven products depend on the material composition (fiber blend) and processing in the value chain steps.

Lenzing is developing new applications to support circularity not only for textile and nonwovens, but also for other industries such as agriculture and packaging. For example, biodegradable vegetable nets for packaging can replace similar non-biodegradable products.

In line with its vision, "We give waste a new life. Every day", Lenzing strives to make textile waste recycling a common standard process like paper recycling. Lenzing has set a target and measures to make this vision a reality: it plans to offer viscose, modal and lyocell staple fibers with up to 50 percent post-consumer recycled content on a commercial scale by 2025. For more information, please see the "Sustainability targets, measures and progress" chapter.

Lenzing runs an active research and development project to further improve the utilization of post-consumer textile waste for the production of fully biobased and biodegradable fibers. Some important steps towards the broad, industrial-scale use of post-consumer cellulosic waste have been taken within this project and turned into patent applications.

To further speed up the technological development of textile recycling followed by an expansion of capacity for generating pulp from post-consumer waste, Lenzing began collaborating with Södra, another leading global pulp producer, in 2021. The goal is to recycle and process 25,000 tons of textile waste per year by 2025 at Södra's Mörrum site. Together with partners along the value chain, Lenzing aims to promote the issue of textile recycling and process 100,000 tons of textile waste by 2028. As one of the leading companies in the field of sustainability, Lenzing is committed to improving the state of the industry. Thus, as well as developing recycled materials to satisfy Lenzing's own circularity commitments, this joint project with Södra will enable substantial quantities of recycled pulp to be used by other wood-based cellulose fiber producers across the world. Lenzing is therefore contributing to the scaling of circularity and fibers with recycled content in the market.

"The cooperation with Södra is a major milestone towards achieving our ambitious climate and sustainability goals. We are proud to be able to follow this path with a competent partner. One company alone cannot solve the pressing issue of textile waste. It is proactive partnerships such as this that enable us to move forward and bring about real systemic change."

Christian Skilich, Member of the Managing Board of Lenzing

Transparency and traceability of supply chains

Transparency provides a foundation for credible sustainability performance, especially the circular economy that will be part of the upcoming EU legislation for supply chain due diligence. Gaining a deeper understanding of Lenzing's suppliers and downstream customers is critical for minimizing the Lenzing Group's overall environmental impact and putting it on the right track to achieve a low-impact, carbon neutral footprint by 2050. Traceability also gives customers and end users confidence. Close digital connections across the network help close the loops efficiently and holistically and facilitate the transition from a linear to a circular supply chain. More information on digitalization is provided in the "Digitalization & cyber security" chapter.

Climate change and circular economy

Lenzing has an approved science-based target (SBT) and will reduce the CO_2 emissions from its operations and supply chain in line with the Paris Agreement. Circularity and climate change are two sides of the same coin. Lenzing strives to find synergistic solutions such as the successful Lenzing biorefinery concept so that innovations and solutions to circular economy challenges can contribute to reducing climate related impacts. This is also true for Lenzing products with recycled materials, e.g. using the REFIBRA™ and Eco Cycle technologies, which have lower carbon footprints than fibers conventionally produced from virgin resources.

Partnering for systemic change

Collaboration is essential to the transition to a circular economy. Partnering for systemic change is one of the basic principles of Lenzing's "Naturally positive" sustainability strategy for jointly achieving targets with Lenzing's major stakeholders.

Policy Hub on the circular economy for the apparel and footwear industry

In 2019, Lenzing became a member of the Policy Hub on the circular economy for the apparel and footwear industry, which it has also co-chaired since May 2020. In 2021, the company actively contributed to the industry's understanding of barriers and challenges facing the circular economy in areas such as waste and recycling technologies, transparency, and sustainable product initiatives. Lenzing has also actively engaged with the public and EU policy makers in exchanging information on barriers and possible solutions for advancing circularity.

European Apparel and Textile Confederation (EURATEX)
EURATEX is the European Apparel and Textile Confederation, representing the interests of the European textile and clothing industry at the EU institutional level. Lenzing has contributed to EURATEX, as well as its latest project ReHubs, to further promote circularity in the textile industry.

ReHubs will enable the creation of a new European market of secondary raw materials, saving additional waste-related costs. These recycling hubs will create and spread knowledge about product recyclability and product design to improve cooperation between makers and buyers across the industry value chain.

By successfully overcoming R&D challenges, ReHubs will not only tackle the issue of landfill and incineration but will also provide an opportunity for Europe to strengthen its long-term autonomy regarding raw materials and provide a healthy recycling ecosystem across Europe. In addition, ReHubs will create new green jobs. Estimates indicate that around 20 jobs could be created for every 1,000 tons of textiles collected, sorted, and recycled, ultimately creating up to 120,000 jobs in the European Union[6].

Platform for Accelerating the Circular Economy (PACE)
The Lenzing Group promotes systemic change in the textile industry in another spin-off of the World Economic Forum, the Platform for Accelerating the Circular Economy (PACE). The vision of this initiative, now hosted by the World Resources Institute, is a circular economy that is designed to prevent waste and pollution, keep products and materials in use, and regenerate natural systems. Lenzing has contributed to the development of the Circular Economy Action agenda for Textiles, which was published in 2021. Lenzing's TENCEL™ REFIBRA™ technology has been showcased for "upcycling cotton and cellulosic waste".

Accelerating Circularity Project
Accelerating Circularity's mission is to design and implement systems in which textile waste is repurposed as a raw material, and is no longer incinerated or sent to landfill. With this model, materials will be constantly reused or recycled, and textile waste will itself become a valuable resource. Lenzing is pleased to be a Board representative of an organization that envisions a textile world that is restorative and regenerative by design; one that creates shared value, enhances equality, and promotes the well-being of communities. In addition to a founding partner for the project in the US in 2019, Lenzing also joined as a project partner for Europe in 2021.

Textiles 2030 (an initiative of Waste & Resources Action Programme, WRAP)
In August 2021, Lenzing was one of the pioneering signatories of the voluntary Textiles 2030 agreement. Textiles 2030 is WRAP's new expert-led initiative in the UK designed to limit the impact of clothes and home textiles on climate change. It represents a voluntary agreement that is funded by its signatories and the government. Signatories will collaborate on carbon, water and circular textile targets, as well as contribute to national policy discussions. With its manufacturing facilities in Grimsby in the United Kingdom, Lenzing is honored to take part in this initiative for proactively fostering circularity and systemic change in the textiles industry.

Circular Fashion Partnership (an initiative of the Global Fashion Agenda)
Circular Fashion Partnership is a cross-sectoral project led by Global Fashion Agenda. Fashion brands, manufacturers and recyclers collaborate to capture and reuse textile waste in Bangladesh. Lenzing is engaged in accelerating the transition to a circular system in the fashion industry.

Waste management

In a circular economy, today's waste is tomorrow's raw material. What is left over from one process is used as a raw material for another process, thus not only reducing the need for virgin resources on the input side, but also minimizing the amount of generated waste on the output side.

Similar to other environmental issues, Lenzing identifies the generation of waste from life cycle perspective and extends the assessment of impacts up and down the value chain. In 2021, Lenzing has standardized the approach to environmental aspects and impact assessment according to ISO 14001. This standardized approach will be further rolled out in the year 2022.

Within Lenzing, waste management is set out in its internal Waste Management Guideline, which was launched in 2018. The guideline was further developed in 2021 and resulted in a full consolidation of Group waste data. It is an integral part of Lenzing's environmental management system. Activities relating to waste management – e.g. the collection, separation, storage, transportation, and treatment of waste – are planned and implemented based on possible utilization as well as an understanding of their environmental impact and risks.

Further details on waste management are set out in the site waste management systems, which also concern external service providers. The company's approach to waste management uses a management hierarchy as its guiding principle. This means that Lenzing plans and prioritizes waste management as follows:

1. Prevention and reduction
2. Reuse and recycling
3. Energy recovery
4. Landfill

6) EURATEX, 2020. ReHubs – A joint initiative for industrial upcycling of textile waste streams & circular materials. https://euratex.eu/wp-content/uploads/Recycling-Hubs-FIN-LQ.pdf [Assessed January 14, 2022]

Wherever possible, waste is avoided or reduced, e.g. by modifying processes to increase material efficiency or by adopting good housekeeping and operational practices. Recyclable fractions of waste are separated. Unrecyclable fractions are disposed of in accordance with local legislation. Lenzing recovers energy from unrecyclable fractions in facilities such as incinerators wherever possible. Landfilling of waste is subject to strict national regulations. Hazardous waste is either treated or disposed of according to the applicable regulations. An overview of waste generation, broken down by disposal method and waste type, is shown in table 07.

Waste by type and disposal method Table 07

	2019	2020	2021	2019	2020	2021
	Hazardous waste (t)			Non-hazardous waste (t)		
Reused						
Recycled	2,910.01	196.17	450.14	75,454.64	65,857.37	50,829.81
Composted						
Recovered including energy recovery	69,454.24	52,189.11	37,094.85	29,392.44	32,834.33	35,126.01
Incinerated (mass burn)						
Deep well injection						
Landfill	2,724.04	2,261.53	36,678.98	13,882.40	12,650.64	13,535.16
On-site storage						
Other (to be specified by Lenzing)	225.99	48.05	0.22	316.02	377.90	828.13
Total waste	**75,314.29**	**54,694.86**	**74,224.19**	**119,045.50**	**111,720.23**	**100,319.11**

Total waste generated
(Total weight of waste generated in metric tons, and a breakdown of this total by composition of the waste) Table 08

	2019	2020	2021
Hazardous waste (t)	75,314.29	54,694.86	74,224.19
Non-hazardous waste (t)	119,045.50	111,720.23	100,319.11
Total waste (t)	**194,359.79**	**166,415.09**	**174,543.30**

As shown in table 08, compared to 2019 (as 2020 was a special year) both hazardous and non-hazardous waste decreased accounting to a reduction of total waste generation at 10 percent. Lenzing uses licensed contractors to dispose of waste. Audits of these service providers are conducted in site-defined intervals. Any contractor found to be non-compliant has its contract terminated. There were no cases of this happening in 2021.

Waste is categorized according to national legislation. In Europe, the end-of-waste criteria defined under the Waste Framework Directive may be applied to certain waste streams resulting in the de-classification of those waste streams when criteria are met. There may also be long delays in obtaining the related data and information when an external party, such as an authorized waste management company, determines the management option of a waste stream. All these factors may result in significant fluctuations in waste reporting from year to year.

End of life in the natural cycle: Biodegradability of LENZING™ fibers

Cellulosic fibers

Cellulose is a major component of plant biomass and one of the most abundant polymers produced in nature. It forms part of a closed natural material cycle that the ecosystems of the planet are well equipped to deal with. This cellulose cycle builds the basis for Lenzing's business model and provides opportunities to address some of the most challenging issues facing society, such as climate change or emerging circular economy options. Even if the carbon from the materials is released at the end of their life, it is renewable carbon and part of the natural cycle, ensuring that no additional fossil carbon enters the atmosphere.

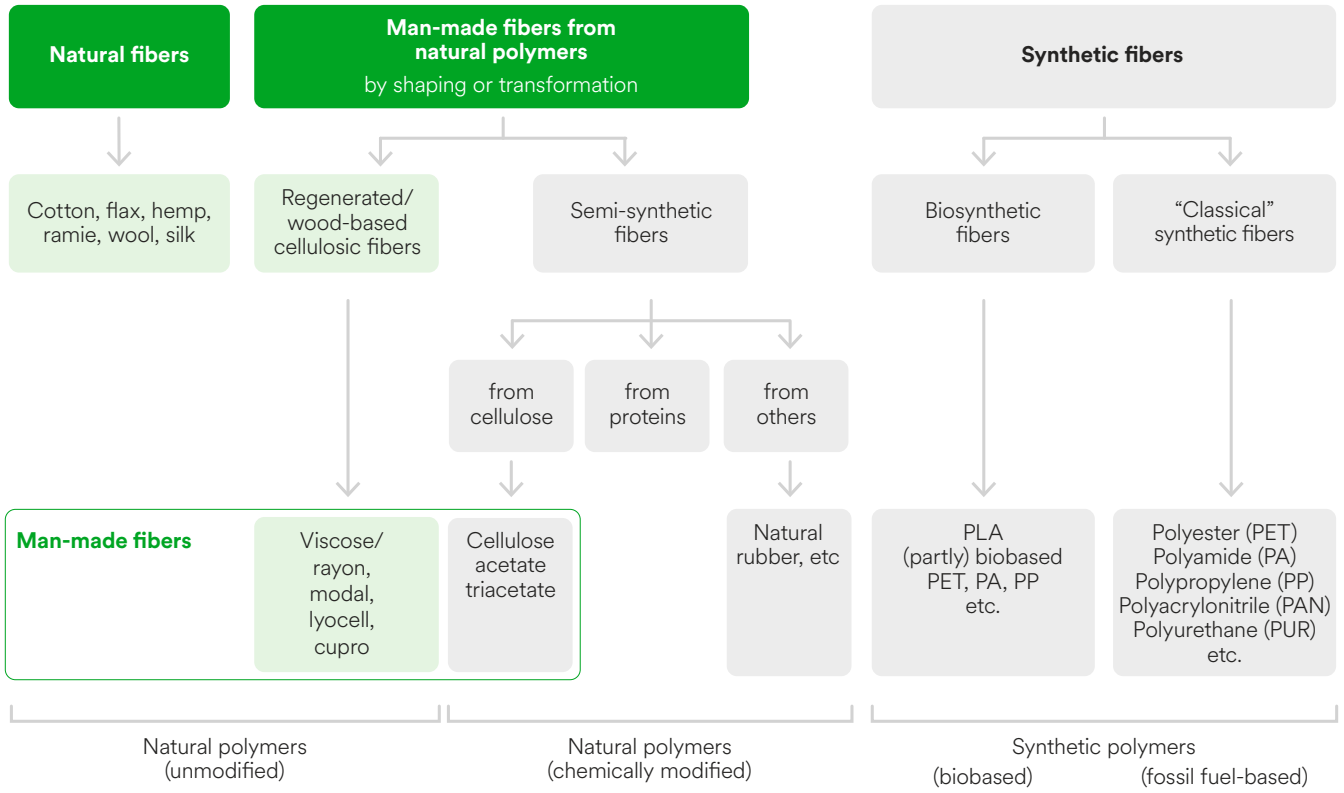
Standard fibers from Lenzing are produced from cellulose in an industrial process. The final fiber product consists of the chemically unmodified natural polymer cellulose. Figure 10 below shows that two groups of fibers consist of unmodified natural polymers: natural fibers, and regenerated/wood-based cellulosic fibers. Both groups of fibers are inherently biodegradable. Other fiber types can be difficult to biodegrade, such as conventional fossil-based synthetics, some of the biosynthetic fibers, and some semi-synthetic fibers made from chemically modified natural polymers. For a systematic overview of fiber biodegradation, see the "Biodegradable Polymers in Various Environments" chart compiled by the Nova Institute.

End of life of Lenzing's fibers

Looking at the end-of-life stage for products manufactured from Lenzing's fibers including clothing, home textiles, technical products, hygiene products and personal care products, there are several processing options:

- **Recycling:** Products made from wood-based fibers can in principle be recycled and used again for fiber production at Lenzing. This is shown by the example of Lenzing's fibers leveraging recycled post-industrial and post-consumer cotton waste within REFIBRA™ or Eco Cycle technologies on a commercial scale.
- **Compostability:** If recycling is not possible, some textile and nonwoven applications can be composted if all constituents are biodegradable. The BioSinn report (funded by the German Federal Ministry of Food and Agriculture) from the Nova-Institute lists such applications – including wet wipes or binding yarns. All LENZING™ fibers are compostable, fulfilling the requirements for compostability in terms of biodegradability, disintegration and absence of eco-toxicity.[7]
- **Anaerobic digestion:** Alternatively, for certain products it may be appropriate to use anaerobic digestion with energy recovery (biomethane production) in waste treatment. LENZING™ fibers are fully degradable in controlled anaerobic waste treatment conditions.

Fiber types on the world market[a] Figure 10



a) Modified from BISFA (International Bureau for Standardisation of man-made fibers), 2017. Terminology of man-made fibers. http://www.bisfa.org/wp-content/uploads/2018/06/2017-BISFA-Terminology-final.pdf [Accessed February 15, 2022]

7) Ellen MacArthur Foundation, 2017. A new textiles economy: Redesigning fashion's future, http://www.ellenmacarthurfoundation.org/publications, p. 21

- **Incineration:** If composting is not an option, the final products can be incinerated and the embedded energy recovered. Since the fibers consist of natural polymers, they are climate-neutral in terms of incineration, which means that only the amount of CO_2 initially stored in the plant is released. Either way, both composted materials and CO_2 provide input for plant growth, thereby closing the natural carbon cycle.
- **Landfill:** The least preferable option for materials' end-of-life is landfill, which is still a regular practice in many countries. While this option has to be phased out as soon as possible, Lenzing's cellulosic fibers can biodegrade without releasing microplastics or toxic substances if conditions in the landfill favor biodegradation.

BIODEGRADABILITY

The ability of a material to be broken down by micro-organisms (bacteria, fungi) into carbon dioxide, water, and biomass, or compost, so that it can be consumed by the environment.

COMPOSTABILITY

Capability of being biodegraded at certain temperatures (industrial: 58°C; home: 28°C) in soil under specified conditions and time scales.

External scientific approval of biodegradability

Results of experiments conducted by the University of California's prestigious Scripps Institution of Oceanography (SIO) in San Diego provide scientific proof that wood-based cellulosic fibers offer an effective, biodegradable substitute to fossil-based synthetic fibers. SIO has a global reputation for being one of the oldest, largest and most important marine research centers worldwide. In a study published in October 2021, scientists from the SIO confirmed that wood-based cellulosic fibers biodegrade in the ocean within a short period of time at the end of their life cycle. The research was the result of an independent project aimed at understanding the end-of-life scenarios for textiles and nonwovens discarded in the environment. The study compared the degradation processes of nonwovens made from fossil-based synthetic materials, such as polyester, with those of cellulosic materials, such as Lenzing's wood-based lyocell, modal and viscose fibers in specific scenarios – under various real oceanic conditions and controlled aquaria conditions. The results of these experiments are striking: while wood-based cellulosic fibers fully biodegraded within 30 days, the fossil-based fibers tested were practically unchanged after more than 200 days.

"Our goal is to raise widespread awareness of major challenges such as plastic pollution and persuade the industry to make the transition to wood-based, biodegradable TENCEL™, LENZING™ ECOVERO™ and VEOCEL™ fibers."

Robert van de Kerkhof, Member of the Managing Board

MICROPLASTICS

Small plastic particles of 5 mm or less in size – known as "microplastics" – are perceived to be a major pollution problem in freshwater bodies and the sea. While recent industry initiatives and legislation aim to promote the development of less polluting alternatives, Lenzing, as a producer of wood-based cellulosic fibers, laid the foundations for biodegradable products more than 80 years ago.

European Union Single Use Plastics Directive

According to the Directive (EU) 2019/904 (SUPD – single use plastics directive), which aims to reduce the impact of plastic products on the environment, natural polymers that have not been chemically modified do not fall under the "plastic" definition. The Commission guidelines on single-use plastic products in accordance with Directive (EU) 2019/904 clearly state that viscose and lyocell are not considered to be chemically modified and are therefore not classified as plastic. Also, the proven biodegradability of LENZING™ fibers shares the same aim of this Directive, i.e. avoiding plastic pollution. Consequently, the SUPD is a potential catalyst for nonwoven applications of LENZING™ fibers.

The Lenzing Group collaborates in industry and multi-stakeholder initiatives – including the Microfiber Consortium of the European Outdoor Group, the Cross Industry Agreement of the textile and detergent industries, and the "Textile Mission" project within the German research program on plastics in the environment ("Plastik in der Umwelt"). Lenzing provides fiber and textile intermediate materials for testing and developing new textile constructions, and gives feedback on drafts of reports and guidance documents.

The biodegradability of Lenzing's fibers was tested at the independent research laboratory Organic Waste Systems (OWS) in Belgium, one of the world's leading biodegradability and compostability testing companies. The assessment was performed in accordance with existing and applicable international standards, reflecting all relevant natural and artificial environments where biodegradation can take place (figure 11). Certificates from the certification organization TÜV Austria show that LENZING™ standard fibers biodegrade relatively rapidly in all natural environments, and in industrial waste treatment targeting biodegradation. This should not be seen as a means of waste disposal or as an excuse for littering, but as an additional safeguard to avoid pollution. Lenzing's fibers thus offer a sustainable solution to the plastics pollution problem. More details and components of testing and certificates as well as on biodegradability in general can be found in the "End of product use" focus paper.

Biodegradation of LENZING™ fibers in various environments[a] Figure 11

Speed of biodegradation: + (top) to − (bottom)

Environment	Temperature conditions	Biodegradability of LENZING™ fibers	Reference
Anaerobic digestion (thermophilic)	✓	✓	ASTM D5511 & ISO 15985
Industrial composting		✓	EN 13432, ISO 14855
Home composting	✓	✓	EN 13432, ISO 14855
Soil		✓	EN 13432, ISO 14855
Freshwater	✓	✓	EN ISO 14851
Marine water		✓	ASTM D6691

a) Modified from: EMAF, 2017, after B. de Wilde, 2013. Anaerobic digestion, industrial composting and home composting are controlled environments designed for waste management. The tests in soil, freshwater and marine water environments simulate the fate of litter in the respective environments.

Climate & energy

MANAGEMENT APPROACH

Material topic: Climate

Importance for Lenzing

- Global warming presents risks to society and material risks to companies all over the world
- Being a role model and innovation driver secures Lenzing's business success
- Combating global warming is important for Lenzing to secure raw materials

Opportunities

- Driving the transition to a fossil-free production through circular business model and innovation along the whole value chain
- Offering end consumers a truly sustainable option: textiles and nonwovens made from wood-based cellulosic fibers
- Future-proofing Lenzing's growth with the implementation of carbon neutral technologies and low-carbon products
- Becoming more resilient to the changing regulatory (e.g. tax) and business environment
- Strengthening credible sustainability leadership among all stakeholders, securing product differentiation and price premiums
- Collaborating with stakeholders and supply chain partners
- Attracting new and long-term impact investors

Risks

- Risks of wood unavailability due to forest degradation (diseases, pests, etc.) as a direct consequence of higher average temperatures
- Potential regulatory, technology, market and corporate reputational risks
- Lenzing cannot contribute to its customers' CO_2 targets if Lenzing's fibers no longer meet customers' definition of sustainable raw materials
- Any climate-related disruption in one of the production sites will influence the business model and its success

Guiding principles

- "Naturally positive" sustainability strategy with "Decarbonization" and "Partnering for systemic change" as focus areas
- Implementation of science-based target (SBT)
- Commitment to UN Fashion Industry Charter for Climate Action
- ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018 system certifications for the Lenzing Group
- Group Environmental Standard

Due diligence processes and (ongoing) measures

- Environmental management system according to ISO 14001:2015 (incl. risk assessment and internal audits to ensure effectiveness of the measures implemented)
- TCFD reporting framework
- Establishment of governance and steering committee
- Definition of roadmaps for group-level and site-level targets

Objectives

- Reduction of specific CO_2 emissions by 50 percent until 2030
- Net-zero CO_2 emissions by 2050

Important achievements/activities the reporting year

- Development and progress of group-level and production site-level roadmaps
- CDP Climate "A" rating
- Two additional new products have been launched with climate benefits
- Four production sites in the Lenzing Group use 100 percent renewable electricity from the grid (Lenzing, Heiligenkreuz, Paskov, and Mobile)
- Implementation of an internal carbon price

Responsible

- Chief Executive Officer
- Board member (commercial)

Supporting

- Corporate Communications
- Corporate Sustainability
- Global Controlling
- Global Purchasing
- Corporate Audit & Risk
- Global QESH
- Global Strategy and M&A
- Performance.Improvement.Technology
- Site Managers

MANAGEMENT APPROACH

Material topic: Energy

Importance for Lenzing

- Fiber and dissolving wood pulp production are energy-intensive processes, part of the carbon strategy and a cost factor

Opportunities

- The biorefinery concept enables Lenzing to produce surplus renewable energy
- Reducing primary energy consumption by increasing energy efficiency
- Substituting fossil-based energy sources

Risks

- Fossil-based energy and energy-intensive technologies carry potential regulatory, technology, market, and corporate reputational risks
- Implementation of regional and national emission trading schemes
- Energy shortage could compromise Lenzing's operations
- Financial impacts of potential cost increases in energy prices
- Inefficient energy conversion technologies have a potential impact on CO_2 emissions

Guiding principles

- "Naturally positive" sustainability strategy with "Decabonization" focus area
- Lenzing Group sustainability targets

Due diligence processes and (ongoing) measures

- Environmental management system based on ISO 14001:2015 (including risk assessment and internal audits to ensure effectiveness of the measures implemented)
- TCFD reporting framework
- Higg FEM
- EU BAT

Objectives

- Switching from fossil-based to renewable energy sources
- Energy consumption reduction
- Energy mix optimization by optimizing fiber production portfolio
- New technology development

Achievements/activities the reporting year

- Successful completion and commissioning of an air purification and sulfur recovery plant at the Lenzing site (Austria)
- Construction of the dedicated gas pipeline has started at the Nanjing site (China)
- Continuous improvement of energy consumption
- Large-scale photovoltaic project at the Lenzing site (Austria) is in development

Responsible

- Board members (for wood and pulp as well as operations)

Supporting

- Global Engineering – Utility and Infrastructure Engineering
- Global Purchasing
- Global QESH
- Performance.Improvement.Technology
- Site Managers

Lenzing has begun implementing its ambitious science-based target (SBT), which was approved in November 2019. The following section provides information about the implementation in a few key areas.

HIGHLIGHTS 2021

1. Development and progress of Group-level and production site-level roadmaps towards net-zero emissions
2. The Task-Force on Climate-Related Financial Disclosures (TCFD) has been implemented in the global organization and the ownership for key risks and opportunities have been defined
3. Improved climate change transparency and disclosure with CDP Climate – achieved leadership status with "A" rating
4. Supplier engagement continued with key chemicals suppliers
5. Two additional new products with climate change benefits were launched
6. Four production sites in the Lenzing Group now use 100 percent renewable electricity from the grid (Lenzing, Heiligenkreuz, Paskov and Mobile)
7. One production site (Nanjing, China) made progress towards transitioning from coal to natural gas
8. Successful completion and commissioning of an air purification and sulfur recovery plant in Lenzing (Austria) (to reduce scope 3 emissions)
9. A few pivotal projects were set up with dedicated responsibilities and budgets in 2020 and continued in the reporting year
   a. Technology innovation: project launch with academic partners to decarbonize heating demand by developing high-temperature heat pumps with renewable electricity that replaces fossil fuel use for heating needs
   b. In Lenzing (Austria), an on-site photovoltaic power generation project is under development. In addition, two new projects were in planning in 2021 and are currently in the decision-making stage.

Lenzing's responsibility and science-based target

In line with the Paris Agreement and the UN SDG 13, the Lenzing Group set an ambitious science-based target for reducing CO_2 emissions (scope 1, 2 and 3) by 50 percent per ton of product by 2030 compared to a 2017 baseline. Lenzing also aims to achieve net-zero CO_2 emissions by 2050 (scope 1 and 2).

This target has been scientifically verified and approved by the Science Based Target initiative, making Lenzing the first wood-based cellulosic fiber producer to have an approved science-based target. Since the target is science-based, Lenzing's approach to combating climate change is considered to be in line with the Paris Agreement. Lenzing's decarbonization strategy is therefore based on reducing its emissions, rather than offsetting them, i.e. compensating for CO_2 emissions elsewhere.

SCIENCE BASED TARGET INITIATIVE

The Paris Agreement was adopted by consensus at the 21st United Nations Climate Change Conference (COP21) in 2015. The agreement's aim is to combat climate change by keeping the increase in global temperatures compared to pre-industrial levels well below 2 degrees Celsius this century and to pursue efforts to limit the increase temperature even further to 1.5 degrees Celsius.

The Intergovernmental Panel on Climate Change (IPCC) published its new Special Report in 2018 giving more clarity on the carbon reductions required to keep the increase below 1.5 degrees Celsius. According to this report, global carbon emissions need to reach net zero by 2050.

The Science Based Target initiative (SBTi) is a collaboration between CDP, the United Nations Global Compact, World Resources Institute (WRI), and the World Wide Fund for Nature (WWF). The initiative defines and promotes best practices in science-based target setting and independently assesses companies' targets for consistency with the level of decarbonization required according to the latest science to keep global temperatures from increasing more than 2 degrees Celsius above pre-industrial temperatures.

Governance

A cross-functional project team was set up under the leadership of the Chief Executive Officer. The project management team includes a steering committee to enable alignment across all decision-makers and functions, expedite decisions, and ensure the involvement of different owners of capital projects, sites, and functions.

A dedicated global project manager is operationally responsible for facilitating the implementation process at Group level and supporting the functions and production sites globally.

To ensure engagement and empowerment, production sites and functions are responsible for developing and implementing roadmaps so that they can effectively manage their portfolios and specific agendas in the medium and long term.

Strategy, targets, and roadmaps

Lenzing's corporate strategy, sCore TEN includes a climate change target that serves as a milestone for the long-term science-based target and ensures that climate change is incorporated into the business strategy and decision-making.

To effectively achieve the science-based target, the global project manager has developed a high-level science -based target roadmap for the Group with potential site-level targets. These scenarios and site targets were aligned with the CEO, steering committee, and other decision-makers of key functions and regions. This has provided guidance and direction and facilitated the development of roadmaps by each production site and function.

With the support and facilitation of the global project manager, each site manager and the corresponding team have developed a site-specific roadmap to implement the agreed targets. This has ensured that the line function and team responsible for implementation takes ownership of the roadmap development and can therefore plan its effective implementation. The production sites have considered the facility context (e.g. production set-up, fuel mix), potential for improvement in different areas, site strategy, and the expectations of different stakeholders.

Integration in functions and projects

Research and Development: A project is being planned with academic partners to decarbonize heating demand by developing high-temperature heat pumps with renewable electricity to replace the use of fossil fuel for heating. This project has received the requisite financial support and resources. The operation will start in 2023.

All new product innovations are required to undergo sustainability evaluations to ensure the new products (e.g. TENCEL™ Lyocell Filament) offer benefits over conventional products by using life cycle assessments.

Operations: All production sites have been engaged to develop their targets and roadmaps. Please see the section on strategy, targets, and roadmaps for more information. Some emission reduction projects implemented globally during the reporting period include:

- In 2020, two production sites in Austria obtained 100 percent renewable electricity from the public grid for the first time. Since January 2021, the Paskov site (Czech Republic) has bought 100 percent renewable electricity from the public grid as well, as has the Mobile site (USA) since July 2021.
- The production site in China continued to transition its energy generation plant from coal to natural gas, which will substantially reduce the site's CO_2 emissions and improve Lenzing products' CO_2 footprint. The plant's start-up is planned for the second half of 2022.
- The Lenzing Group plans to build Upper Austria's largest ground-mounted photovoltaic plant on an area of around 55,000 m² in the south of the Lenzing site. The plant's output will amount to 5.5 MWpeak. Construction is expected to start in Q2-2022. In addition, two new projects are in planning and are currently at the decision-making stage.
- At the Lenzing site, an air purification and sulfur recovery project was also commissioned in the first quarter of 2021. In addition to increasing the recycling rate, there will be a reduction in scope 3 CO_2 emissions due to the avoidance of sulfuric acid purchases. Furthermore, the use of sulfur in the air purification plant will lead to a reduced use of natural gas at the site and thus to lower scope 1 CO_2 emissions.

Business management and sales: A process has been launched to identify and support the development of new product offerings with climate change benefits. See "Business value" section for more information.

Procurement and supplier engagement: Supplier engagement has been carried out with key chemical and pulp suppliers to reduce Lenzing's scope 3 emissions. These engagements and partnerships are intended to develop raw materials with lower GHG and other impacts. Lenzing focuses on maintaining long-term relationships, helping suppliers achieve improvements, and being part of their transitional journey by buying their green products.

Strategy, mergers and acquisitions: Every capital project, both brown and green field developments, has to align with the climate change strategy and targets. In this regard, some projects have been assessed for their benefits and contribution to climate change impact as part of the Managing Board's decision-making process. Internal carbon pricing for key projects is used to support this process.

Finance and controlling: In 2020, climate change metrics were integrated into the capital allocation and periodic management reporting process of the Group's operations. This continued in the reporting year.

Internal carbon price: In 2021, an internal carbon price (ICP) of EUR 75 per ton of CO_2 was implemented. The ICP comes on top of a regulatory carbon pricing in different Lenzing locations (e.g. EU ETS). It was applied in the 2021 strategic investment planning process for CAPEX projects of over EUR 2 million. The purpose of the ICP is to mitigate future carbon risks, trigger renewable fuels over fossils and support energy efficiency projects.

Monitoring and reporting

The CEO and steering committee monitor project progress regularly.

A group-wide TCFD process has been implemented to identify, prioritize, quantify, and mitigate climate change risks in operations and the supply chain.

To improve transparency and measure Lenzing's progress against key industry-leading disclosure platforms, Lenzing has submitted CDP climate disclosures and been rated "A" for its leadership-level performance.

A process has been created in the Finance and Controlling department to facilitate management reporting and align corporate priorities on key topics such as climate change with proper capital allocation. This process defines which projects require financing and thus removes obstacles to their timely implementation by supporting management's decision-making.

Business value

Creating traction for climate change target implementation has to be linked to business value via measures such as creating new revenue streams, launching new products, attracting new investors and long-term impact investors who will ensure sustainable growth and resilience for the company. The following initiatives have been accomplished.

Launch of new premium product – carbon-zero TENCEL™ fibers

In 2020, Lenzing successfully launched two specialty (lyocell and modal) fibers with low climate change impacts. These carbon-zero TENCEL™ branded fibers will help Lenzing's customers, especially brands and retailers to reduce their scope 3 emissions from raw material production and fulfill their scope 3 science-based target commitments. In the reporting year, this product portfolio has been expanded with two more new products (TENCEL™ x REFIBRA™ and VEOCEL™ Lyocell), to address the growing industry demand for "circular fashion" and carbon neutrality. The first carbon-zero TENCEL™ branded lyocell and modal fibers have continued to gain momentum among industry partners including fashion brands and mills. For more information, please see the "Net benefit concept" chapter.

Attracting new and impact investors

In 2019, Lenzing successfully positioned a bonded loan bound to its sustainability performance (MSCI rating). The success of the EUR 500 million hybrid bond issued is a vote of confidence in Lenzing by the capital market. In the reporting year, Lenzing improved it's sustainability performance according to the MSCI rating to "AA". Consequently, Lenzing saved some costs on its interest payments due to this performance improvement and this saved money will be donated to a social cause.

Lenzing's Climate Risks and Opportunities

Based on the ambition defined in 2020 of being a climate resilient company, Lenzing enhanced the process of implementing TCFD (Task-Force on Climate-Related Financial Disclosures) recommendations in 2021 by defining board and top-level management responsibilities for all identified climate related risks and opportunities.

The TCFD's recommendations provide guidance to companies on integrating climate risks and opportunities into financial and non-financial reports and eventually aligning climate risks with enterprise risk management. The TCFD issues their recommendations in four areas: (1) governance, (2) strategy, (3) risk management, and (4) metric and targets. Lenzing focused on risk management, metrics and targets in its 2020 analysis.

There are two different categories of risks underlying the TCFD recommendations: on the one hand, there are political, legal, technological and market risks, known as "transition risks". On the other, there are acute and chronic risks, known as "physical risks". Transitional risks arise from transitioning to a low-carbon economy (e.g. regulatory changes), whereas physical risks are environmental risks leading to negative acute or chronic impacts on a company (e.g. water scarcity or extreme weather events). The group-wide TCFD assessment process implemented in 2020 has been further developed with the goal of identifying, prioritizing, quantifying and mitigating climate change risks and seizing opportunities in Lenzing's operations and in its supply chain. To manage climate-related risks and opportunities, Lenzing established a high-level ESG committee with the Managing Board and heads of functions such as sustainability, business management, strategy, investor relations, controlling, and risk management.

Relevant risks and opportunities for Lenzing were qualitatively evaluated by using scenario analysis for short-term (1–2 years), mid-term (2–5 years), and long-term (5–30 years) consequences in order to estimate their potential financial impact and probability of occurrence. Lenzing then derived a KPI scorecard with indicators and targets on the key climate-related risks and opportunities based on the TCFD recommendation for metrics and targets.

In addition to implementing TCFD recommendations, Lenzing's significant efforts in disclosing climate, water and forest related risks and opportunities to the CDP platform that was finally honored by an "AAA" rating in 2021.

Beside the disclosure of climate related risks and opportunities to external (rating) organizations, Lenzing's focus is on the full integration of ESG topics in the Enterprise Risk Management Process.

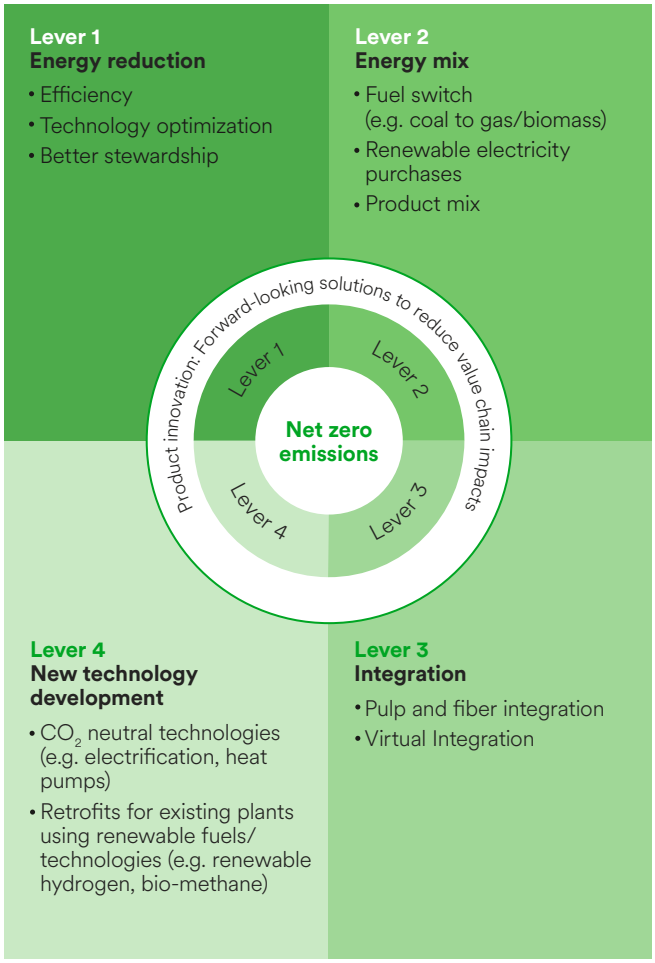
The following table describes key climate risks and opportunities and provides details of Lenzing's response and mitigation measures. A TCFD Index in the Annex of this report shows the link between the TCFD recommendations, the contents of this report, and other external publications such as CDP Climate.

Transition risks, physical risks, transition opportunities Table 09

Characterization	Risk/opportunity description	Lenzing's response
	Emerging regulations on carbon pricing	
Transition risks	Increasing regulation, especially on green taxation and carbon pricing, constitute a relevant risk for Lenzing. In the countries where Lenzing operates, carbon intensive processes and regulations on greenhouse gas emissions have already been implemented (energy efficiency improvements, regulated emission allowances) and stricter regulations that would increase the costs of greenhouse gas emissions are under development.	Lenzing is implementing stringent energy efficiency measures in order to reduce its potential exposure to green taxation. In 2019, Lenzing set a science-based target to reduce its greenhouse gas emissions (Scope 1, 2 and 3) by 50 percent per ton of pulp and fibers sold by 2030 (compared to a 2017 baseline). Lenzing is therefore mitigating the risks from emerging carbon pricing regulations. Lenzing is pursuing the vision of becoming the first net-zero player by 2050 through its decarbonization strategy.
	Increased biomass costs	
	Wood is the Group's most important natural resource for manufacturing bio-based fibers. Despite its sustainable sourcing policy and backward-integrated production, wood prices are at risk of increasing due to climate change, growing global biomass demand, and alternative land use. Growing competition for land use and natural resources is affecting long-term structural biomass prices.	In order to mitigate the risk of increasing biomass costs and improve supply chain security, Lenzing is building a modern dissolving wood pulp plant (DWP) with integrated plantation and forest operations in Brazil. The new plant will improve the Group's cost position, as it is designed to be sustainable and will set a milestone in Lenzing's strategy to achieve carbon neutrality.
	Reputational risk in the textile sector	
	The textile industry, where Lenzing's products are commonly used, is being scrutinized for its sometimes unsustainable and resource-intensive raw material consumption and production processes. Polyester and conventional cotton in particular face structural issues that could lead to negative media coverage and further stigmatize the sector, which could, in turn, influence the Group's revenue.	Lenzing responds to potential negative media coverage of the fashion and textile industry by proactively disclosing information on its business practices and environmental footprint. Lenzing works through certain communication channels to underline its contributions to a low-carbon economy and the net benefits created by its speciality products compared to average industry-standard products in the market.
Physical risks	**Chronic physical climate risks**	
	Climate models indicate that rising global mean temperatures will lead to increased chronic climate hazards. The Group's operations and supply chain will increasingly be impacted by extreme weather events, water scarcity, and other physical hazards. Increasing work-related heat stress could cause reduced work capacity, lower labor productivity and decreased economic output for Lenzing.	Lenzing's Group Policy for Safety, Health, and Environment (SHE) outlines a clear roadmap to ensure no accidents cause harm or damage to people or the environment. Lenzing is conducting case studies to mitigate the potential implications of rising mean temperatures for labor productivity including details of technical, organizational, and personal impacts.
Transition opportunities	**Increased demand for low-emission products and product innovation**	
	As consumer needs and preferences shift toward low-emission products, the development and expansion of low-emission goods and services is expected to have substantial growth potential. Lenzing applies life cycle-based thinking, sustainable sourcing, efficient use of biomass, and partnerships with stakeholders along the value chain in order to contribute to more sustainable consumption and production patterns. All these factors mean that Lenzing's products offer net benefits.	Lenzing has embarked on an ambitious growth strategy to benefit from expected higher demand for responsibly resourced/low-emission products. Lenzing plans to invest more than EUR 1 billion in new lyocell fiber production and dissolving wood pulp facilities in the coming years. The investment plans will help Lenzing to further reduce its Group-wide carbon emissions and enhance the security of the Group's raw material supply. Sustainability will be the key driver of construction and operation in all projects. Lenzing is also evaluating each innovation for sustainability improvements.
	Decarbonization strategy de-risks operations	
	The Lenzing Group considers rapid decarbonization to be a major business opportunity to de-risk its operations, build resilience, launch products with less climate impact, and harvest energy efficiency gains. Lenzing will substantially reduce its greenhouse gas emissions in the coming years through a number of corresponding measures (decarbonization strategy) and science-based targets (50 percent reduction of greenhouse gas emissions per ton of product by 2030 compared to 2017). Furthermore, Lenzing aims to reach net-zero greenhouse gas emissions by 2050.	Lenzing's science-based target has been approved by the science-based target initiative, making Lenzing the first wood-based cellulosic fiber producer to have an approved science-based target. Lenzing's decarbonization strategy is based on reducing its emissions, not offsetting them. To reach the target, Lenzing set up a cross-functional steering committee to make necessary decisions under the leadership of the Group's CEO. Lenzing's greenhouse gas abatement activities will involve a series of measures to reduce carbon emissions both within its operational boundaries and along its supply chain.

Levers to meet science-based target

Levers to meet science-based target Figure 12



Lenzing will deploy different levers based on technical feasibility for scope 1 and 2 emissions. They can be broadly grouped under four categories (see figure 12). Innovation is the Lenzing Group's core competence and allows it to launch new products that reduce climate-related impacts on the downstream value chain. Those avoided emissions are currently outside the scope of the science-based target methodology, so Lenzing will not claim them as part of the company's target achievement. However, the following levers are key to achieving the defined target:

- The first lever addresses energy efficiency. Relevant measures include replacing inefficient pumps, optimizing current technologies, planning efficiently, and further reducing losses to save energy. Better stewardship ensures the efficient running of equipment with strict maintenance scheduling and immediate responses to malfunctions and leaks. Additionally, energy efficiency improvements will be supported by cross-learning and taking advantage of synergies across the Lenzing sites and among industry peers.
- The second lever concerns fuel. Reducing and avoiding the use of fossil fuels by switching from high-carbon fuels to low-carbon or carbon-neutral fuels (scope 1) as well as scaling up the procurement of renewable grid electricity (scope 2) will make a major contribution to target fulfillment.
- Third, Lenzing is seeking future growth via integrated pulp and fiber production facilities. "Integrated" means that pulp and fiber production are combined at one and the same site. This has two effects: it provides renewable bioenergy for fiber production and also saves energy by avoiding pulp drying and pulp transportation. This will ensure economic growth while reducing Group CO_2 emissions. Other opportunities will be explored, including virtual integration, i.e. using surplus renewable electricity produced at one production site at another site in a different location.
- The fourth lever focuses on developing technologies to decarbonize heat generation. As most of the energy for fiber production has to be supplied in the form of steam, the decarbonization of heating will present the biggest challenge for Lenzing. Electrification-based solutions will therefore play an important part. For example, a heat pump based on renewable electricity can partially switch the power source for generating heat from fuel to electricity. Similarly, alternative fuels have to be developed, such as hydrogen produced with renewable electricity or bio-methane generated from organic waste.

In order to reduce scope 3 emissions, Lenzing is engaging with suppliers such as pulp and chemicals producers and transportation service providers. Lenzing has stepped up its dialog with suppliers according to a collaborative approach. This dialog is part of the EcoVadis-based supplier sustainability assessment tool, which helps to understand the targets and progress that suppliers achieve annually. In addition, Lenzing periodically conducts discussions with key suppliers to find different options and approaches.

Avoided emissions: Forward-looking solutions and value chain contributions

The Lenzing Group is also committed to reducing emissions all along the value chain. Table 10 shows in detail how Lenzing's forests and wood products are contributing to climate protection along the value chain. For a comprehensive list of contributions across the entire value chain, please see the Lenzing website – Decarbonization.

Wood and pulp sourcing is at the root of Lenzing's business model. This part of the value chain harbors important climate change risks, on the one hand, as well as large mitigation opportunities through carbon removal and the replacement of fossil-based materials, on the other.

In addition to CO_2-abatement activities to reduce direct and supplier emissions, Lenzing will contribute to the decarbonization of its customers by actively developing products that reduce their value chain emissions.

How forests and wood products work for climate change mitigation Table 10

Topic relevant to climate change	Details	Lenzing Group contribution
CO_2 sequestration in sustainably managed forests	Sustainably managed semi-natural forests and forest plantations absorb more carbon in trees and harvested wood products, thus acting as a net sink over the long term. Forest areas and carbon stocks are increasing in Europe.	Wood sourcing from sustainably managed forests, managing own forest plantations, active engagement with pulp suppliers for improvements, and other stakeholder activities (e.g. research at K plus WOOD)
Substitution of raw materials that have large climate impacts	Fibers with smaller carbon footprints in their manufacturing process and life cycle	Substituting large-footprint synthetic or natural fibers with small-footprint Lenzing fibers
Adaptation of forests to climate change	Share of beech in Europe is increasing, but its uses are limited. Adaptation via higher species diversity can be faster in managed forests.	Economic valorization of beech wood for dissolving wood pulp production in Lenzing (higher value added than fuel wood use)
CO_2 emissions from deforestation	Ensure that no deforestation occurs in the supply chain	Lenzing's wood and pulp policy, forest certificates (FSC®, PEFC), transparency through CDP Forest, implementing Canopy pathway, ranked with dark green shirt in the CanopyStyle initiative

Stakeholder engagement and policy interventions

Lenzing strongly believes that its own efforts should be complemented by engaging with industry stakeholders and civil society as collaboration is required to bring about systemic change in addressing the climate crisis. Lenzing signed the UN Fashion Charter in 2018 and is an active member of its working groups to develop solutions to industry challenges. Lenzing has also supported World Resource Institute (WRI) and Apparel Impact Institute (AII) efforts to develop a high-level roadmap for the apparel and footwear industry.

A supportive policy framework and incentives are needed to realize measures such as fuel switching. Natural gas is currently more expensive than coal in many parts of the world. Sustainable biomass fuels are not sufficiently available in the required amounts. Similarly, renewable grid-based electricity is not widely and economically available in many parts of Asia. To advance low-carbon solutions, a level playing field is required such as global carbon pricing and the elimination of fossil fuel subsidies. Industry and local governments should ramp up efforts to generate more renewable electricity in order to supply current facilities and cater for future growth.

UN Fashion Charter

The Fashion Industry Charter for Climate Action under the auspices of UN Climate Change is a broad stakeholder movement in the textiles, clothing, and fashion industry aimed at achieving a holistic commitment to climate action. Signatories commit to climate targets and ultimately to fully decarbonize the fashion industry value chain in alignment with the Science Based Target initiative.

The original targets were to achieve net-zero greenhouse gas emissions no later than 2050 and reduce emissions by 30 percent by 2030. These targets were updated in November 2021 to limit the increase in global average temperature to 1.5°C above pre-industrial levels, as the IPCC recommended and in line with Science Based Target initiative[8]. An initial report, the "Climate Action Playbook"[9], published in 2020 highlights major greenhouse gas reduction opportunities in fiber production, the fashion industry's main raw material.

Lenzing was a founding member of the initiative and has continued to make an active contribution to the working group on raw materials, sharing its longstanding experience in the production of sustainable wood-based fibers and assessment of environmental impacts through life-cycle analyses (LCA). The working group has finalized a report called "Identifying Low-Carbon Sources of Cotton and Polyester"[10], which was published in early 2021. The report contains an overview of existing LCA studies and identifies opportunities for improvement by switching energy sources, changing technology, and innovating. A second part on man-made cellulosic fibers is in progress.

8) https://unfccc.int/news/fashion-industry-steps-up-climate-ambition-with-renewed-charter [Accessed 10 December 2021]
9) https://unfccc.int/documents/250059 [Accessed 15 February 2022]
10) https://unfccc.int/sites/default/files/resource/UCC_Cotton_Pet_report.pdf [Accessed 15. December 2021]

World Economic Forum (WEF)

As a partner of the World Economic Forum, the Lenzing Group supports various initiatives, including the ambition of the Alliance of CEO Climate Leaders to mitigate the effects of climate change. As a member of the "Shaping the Future of Advanced Manufacturing and Production" platform, Lenzing promoted the blockchain project that was initiated together with TextileGenesis™ to trace fibers from their origin to the final garment sold in fashion brand stores at various stakeholder meetings in Davos and at the Sustainable Development Impact Summit of the World Economic Forum.

Lenzing also serves on the Steering Committee of the Nature Climate Solutions Alliance, a multi-stakeholder group convened by the World Economic Forum and the World Business Council for Sustainable Development (wbcsd), whose aim is to scale up affordable natural solutions for climate change mitigation to help meet the goals of the Paris Agreement. It plans to raise ambitions to expedite voluntary action, encourage compliance in the markets, and strengthen the narrative of natural climate solutions for business and governments.

Roadmap to Zero

Lenzing contributed to the development of the "Roadmap to Zero" publication, which aims to catalyze industry action against climate change with proven approaches and measures. This document was prepared by the World Resources Institute (WRI) along with the Apparel Impact Institute (AII), a spin-off of Sustainable Apparel Coalition (SAC), which identifies, funds, scales, and measures the apparel and footwear industry's proven environmental impact solutions[11].

Renewable Carbon Initiative

Lenzing was one of the eleven leading companies from six countries, that founded the Renewable Carbon Initiative (RCI) in September 2020 under the leadership of nova-Institute (Germany). The aim of the initiative is to support and speed up the transition from fossil carbon to renewable carbon for all organic chemicals and materials. In the first year the number of members has increased to over 30 and now includes companies such as Beiersdorf (Germany), BASF (Germany), Cosun Beet Company (The Netherlands), Givaudan (Switzerland), Henkel (Germany), IFF (USA), LanzaTech (USA), NESTE (Finland), Unilever (UK), Uniper (Germany) and UPM (Finland). The Renewable Carbon Initiative aims to herald the end of the fossil age for all organic chemicals and materials by 2050. The concept of renewable carbon, which is essential for materials, is gaining more attention and traction – including on the political side (e.g. "Sustainable Carbon Cycles" communication paper from the European Commission). Lenzing will continue to be an active member of the RCI, with a particular focus on further greening up the textile and nonwoven businesses.

11) https://apparelimpact.org/ [Accessed 15 February 2022]

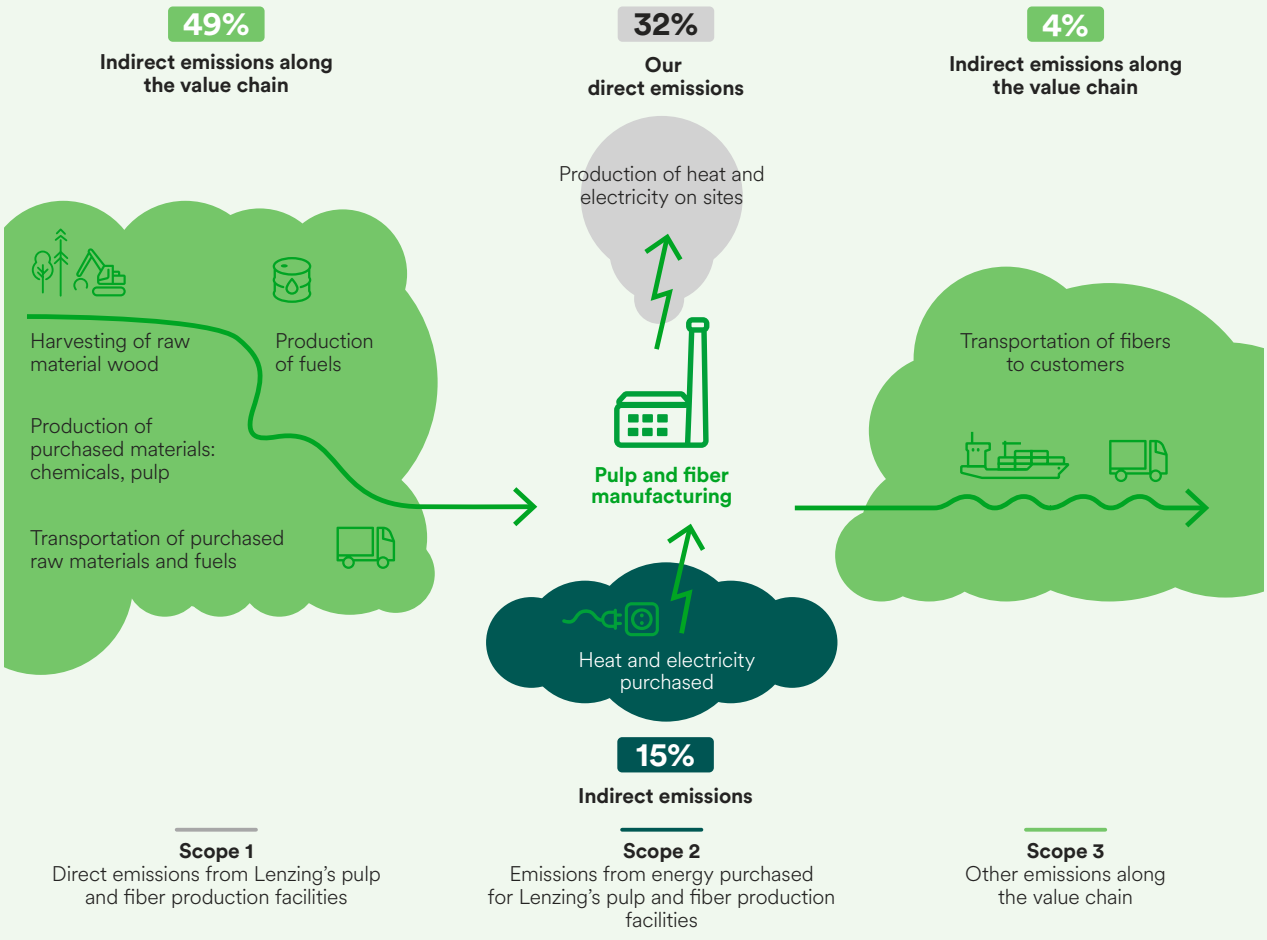
Lenzing Group's current carbon footprint

LENZING'S SCOPE 1, 2 AND 3 EMISSIONS

The GHG Protocol classifies emissions into three scopes: Scope 1 emissions cover all direct emissions from a company's activities or activities under their control, including fuel combustion on site, e.g. from burning coal and own vehicles. Scope 2 emissions cover indirect emissions from electricity and heat purchased and used by the company. Scope 3 emissions are defined as all other indirect emissions from the organization's activities occurring from sources that it does not own or control and covering emissions along the value chain[12], for example, purchased goods and services such as chemicals and logistics.

Lenzing Group's carbon footprint

Figure 13



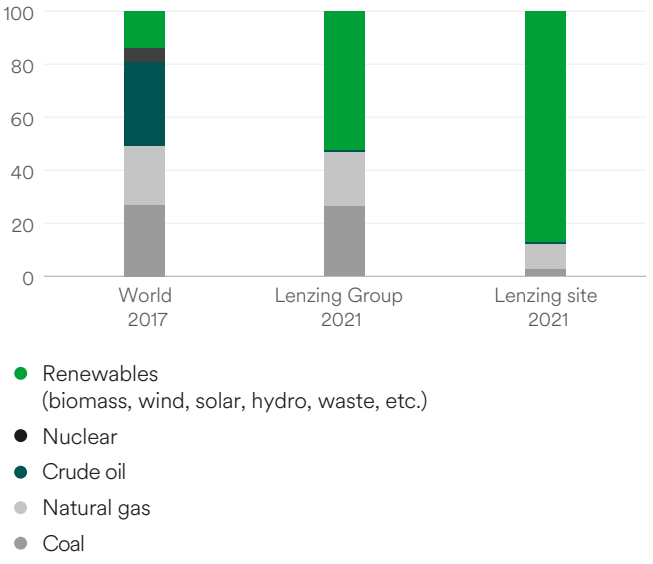
12) https://ghgprotocol.org/sites/default/files/standards_supporting/FAQ.pdf [Accessed 15 February 2022]

Despite Lenzing's business model, which is firmly rooted in the use of wood from sustainable forests and plantations that sequester carbon, the company does not assume that this alone is enough, given the current climate science. A company can claim carbon neutrality while continuing its own high-carbon activities as long as it offsets its carbon emissions. Thus, Lenzing goes further by drastically reducing the current fossil-based emissions from its own production and supply chain and innovating new technologies for further decarbonization to pave the way towards carbon neutrality by 2050. The Group advocates this bold approach to its industry rather than being complacent about the inherent climate advantage of the wood-based fibers business model.

Fuel sources used in the Lenzing Group Table 11

Lenzing, Austria	Biomass and waste, natural gas, coal
Heiligenkreuz, Austria	Natural gas, biomass and biogas
Paskov, Czech Republic	Biomass and biogas, natural gas
Grimsby, UK	Natural gas
Mobile, USA	Natural gas
Nanjing, China	Coal, natural gas
Purwakarta, Indonesia	Coal, natural gas

Energy sources of the world, Lenzing Group and Lenzing site Figure 14



Sources: World Energy Outlook 2018, Lenzing AG. Includes own energy consumption and energy from providers, excluding grid power, which is a minor fraction of total scope 1 and 2 energy consumption in the Lenzing Group. The production sites in Paskov, Grimsby, Mobile, and Heiligenkreuz do not use coal as a fuel source in their own operations, whereas the Asian sites, i.e. Nanjing and Purwakarta, predominantly use coal.

The production volume of pulp and cellulosic fibers is directly linked to the amount of consumed energy and, hence, emissions related to energy use. In 2020, the COVID-19 pandemic and correspondingly challenging market environment forced temporary shutdowns of production lines or even whole sites, which led to a significant decrease in primary energy consumption (table 12). In 2021 production volumes were back on pre-crisis level – Total primary energy consumption was on the same level as 2019, but share of renewable fuels increased slightly. Specific energy consumption index improved by 0.7 percent compared to 2019.

In 2021, compared to 2019, absolute scope 1 emission decreased slightly, absolute scope 2 emissions stayed the same and scope 3 emissions decreased. In 2021, CO_2 intensity for scope 1, 2 and 3 has slightly increased compared to 2019, mainly because of less pulp volumes sold to the market.

Primary energy consumption of the Lenzing Group

Table 12

Million GJ	2014	2019	2020	2021
Primary energy consumption[a]	43.10	42.26	37.97	42.45
Fossil primary energy	23.39	22.21	18.30	21.78
Renewable primary energy	19.71	20.05	19.67	20.67
Specific primary energy consumption[b] (index in percentage based on GJ/t, 2014 = 100 %)	100 %	98.1 %	97.3 %	97.4 %

a) Lenzing discloses both direct and indirect energy consumption. According to the Greenhouse Gas Protocol, scope 1 relates to energy consumed directly by the Lenzing Group and Scope 2 concerns energy purchased from energy suppliers and from the public grid. Primary energy here includes all forms of energy such as electricity and steam. All energy sources such as fossil (coal, oil, natural gas) and renewable (biomass, waste fuels, hydro, wind, etc.) were included.

b) Specific indicators are reported per unit of production. This applies to all specific indicators in this report, except for CO_2 emissions.

Greenhouse gas emissions of the Lenzing Group

Table 13

Million metric tons CO_2 eq.	2017 (baseline year)	2019	2020	2021
Direct emissions, scope 1	1.16	1.10	0.88	1.08
Indirect emissions, scope 2	0.63	0.53	0.50	0.53
Total scope 1 & 2 GHG emissions[a]	**1.78**	**1.64**	**1.38**	**1.61**
Indirect emissions, scope 3[b]	1.89	1.90	1.46	1.82
Total scope 1 & 2 & 3 GHG emissions	**3.67**	**3.54**	**2.84**	**3.43**
Total biogenic CO_2 emissions, scope 1		**1.86**	**1.52**	**1.90**
Greenhouse gas emissions intensity[c]				
Specific emissions, scope 1 & 2 (tons CO_2 eq. per ton product sold)	1.67	1.44	1.40	1.47
Specific emission index, scope 1 & 2 (index in percentage based on t CO_2 eq./t, 2017 = 100 %)	100 %	86.1 %	83.6 %	88.0 %
Specific emissions, scope 3[b] (tons CO_2 eq. per ton product sold)	1.77	1.68	1.54	1.66
Specific emission index, scope 3[b] (index in percentage based on t CO_2 eq./t, 2017 = 100 %)	100 %	94.5 %	86.4 %	93.8 %
Specific emissions, scope 1 & 2 & 3[b] (tons CO_2 eq. per ton product sold)	3.45	3.12	2.94	3.14
Specific emission index, scope 1 & 2 & 3[b] (index in percentage based on t CO_2 eq./t, 2017 = 100 %)	100 %	90.4 %	85.0 %	91.0 %

a) Includes both scope 1 and 2 emissions of all greenhouse gases (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3), expressed as CO_2 equivalents. Scope 1 emissions are calculated based on emission factors from the EU Emission Trading System and scope 2 emissions are calculated according to a market-based method. Scope 2 emissions according to the location-based approach are 0.56 mn tons CO_2 equivalents in 2021.

b) Recalculation of scope 3 emissions from 2017 to 2021 based on updated data from market pulp suppliers.

c) Intensity indicators (i.e. specific CO_2 emissions) are reported based on pulp and fiber sold as in SBT

Raw material security

MANAGEMENT APPROACH

Material topic: Wood and pulp sourcing

Importance for Lenzing

- Wood is the most important raw material for Lenzing

Opportunities

- Wood as a natural and renewable raw material offers expanded business perspectives
  - As a replacement for fossil-based products
  - Due to its contribution to climate change mitigation through carbon sinks in forests and wood products, and substitution of fossil-based product
- Wood is an alternative to agricultural products (e.g. cotton)
- Using wood from sustainably managed forests supports biodiversity

Risks

- Sourcing of environmentally and socially controversial wood and pulp
- Can be linked to deforestation
- Loss of biodiversity in poorly managed forest ecosystems
- Potential reputation loss is a threat to business
- Sourcing can be impacted by climate change
- Climate and market impact on wood and pulp availability, price and quality

Guiding principles

- Centrally managed wood and pulp procurement
- Strict Wood and Pulp Policy
- CanopyStyle Initiative
- Global Supplier Code of Conduct
- Preference for long-term contracts and direct contacts

Due diligence processes and (ongoing) measures

- Regular audits on forest certification standards (FSC®, PEFC)[13]
- Internal audit management system
- Wood and Pulp certification according to FSC® and PEFC standards
- Additional third-party verification as part of the CanopyStyle Initiative and through internal supplier audits

Objectives

- Ensure compliance with customer sourcing policies
- Assessment of sustainability performance of the Lenzing Group's most relevant suppliers
- Partnership with pulp suppliers on sustainability
- Sustainable management of plantations in the LD Celulose joint venture

Achievements/activities in the reporting year

- 100 percent of wood suppliers assessed according to the FSC® Controlled Wood criteria
- CDP Forests "A" rating
- EcoVadis Platinum status for the Lenzing Group
- Continuation of afforestation and social impact project in Albania
- Dark green shirt for the second time in Canopy's Hot Button Report
- PEFC Chain of Custody certificate for fiber production sites in SPV (Indonesia), Nanjing (China), Mobile (USA)
- Sustainability performance of pulp suppliers was surveyed in a comprehensive questionnaire
- Integration of plantations managed by LD Celulose (Brazil) into the Lenzing Group
- Transportation of some inbound materials changed from road to rail to improve carbon footprint

Responsible

- Member of the Managing Board (Pulp)

Supporting

- Corporate Sustainability
- Global QESH

13) FSC® (FSC-C041246), PEFC (PEFC/06-33-92)

Procurement management

Wood purchasing, pulp purchasing, and chemicals purchasing are handled by three different teams within the Lenzing Group (Wood Procurement, Pulp Trading GmbH, and Global Purchasing). Lenzing aims to minimize purchasing risks such as major price fluctuations and supply bottlenecks through reliable, long-term supply relationships and active supplier management.

Supplier selection and evaluation is based on environmental, social, and governance standards (ESG) as well as economic criteria.

The most important materials procured are (in order of annual procurement volume): wood, dissolving wood pulp, caustic soda, sulfuric acid, sulfur, carbon disulfide, sulfur dioxide, and magnesium oxide.

All of the Lenzing Group's suppliers must comply with the Lenzing Global Supplier Code of Conduct. Wood and pulp suppliers additionally comply with Wood and Pulp Policy. In the policy Lenzing gives preference to suppliers compliant with FSC® or PEFC standards.

Supplier assessment

All suppliers are evaluated for sustainability in the production chain. Lenzing conducts regular audits as well as specific evaluations of both new and established suppliers for sustainability including compliance with environmental and safety standards. Suppliers are interviewed regularly and evaluated under environmental and safety aspects with the support of external experts. A final assessment is then conducted. It affects the overall supplier assessment and constitutes a major criterion for long-term cooperation with suppliers. Past supplier assessments have found no violations of environmental, social, or ethical standards that could have led to the cancellation of existing supplier contracts.

Lenzing's most relevant suppliers are those that have an increased risk due to their size and volume. They represent 80 percent of global purchasing volume including dissolving wood pulp but excluding wood. The EcoVadis online tool is used to evaluate these non-wood suppliers. Evaluations of the non-wood suppliers found no violations of environmental, social or ethical standards that could have led to the termination of existing supply contracts in the reporting year.

Wood suppliers are evaluated using a due diligence system based on FSC® Controlled Wood criteria.

All wood suppliers – in 2021, more than 500, many of them private owners – in all sourcing countries are assessed once a year against FSC® Controlled Wood and PEFC Controlled Sources criteria. All of the pulp suppliers are certified by the leading forest certification schemes and supply Lenzing with certified or controlled pulp.

After reduced production in 2020 pulp production was back on normal level although COVID-19 pandemic continues to have a substantial impact on the market.

Strategic dissolving wood pulp suppliers are evaluated periodically. In 2021, no on-site audits were conducted due to the COVID-19 pandemic. The sustainability performance of pulp suppliers was investigated using a comprehensive questionnaire covering aspects such as procurement standards, supply chain and supply areas, engagement and GHG emissions, amongst others. The results of the survey will be used to identify the key sustainability issues and guide Lenzing's future supplier engagement activities.

In addition, Lenzing assessed the maturity of its own procurement management system and processes to gain a shared understanding of what is needed to further integrate sustainability criteria into its procurement and supplier management processes. Workshops took place with several departments to reach a common ground on upcoming legal requirements (e.g. German Supply Chain Act) and stakeholder expectations related to supply chain sustainability and due diligence. Based on the results of the maturity review and the internal discussions about future requirements, Lenzing is now developing the next steps to further improve supplier sustainability performance.

Sustainable sourcing of wood and dissolving wood pulp

Wood and dissolving wood pulp are Lenzing's most important raw materials. The Lenzing Group assumes responsibility by focusing on sustainable sourcing covered by certifications, responsible consumption, and the highly efficient use of these valuable resources. Lenzing sources wood and dissolving wood pulp from semi-natural forests and plantations (as defined by the Food and Agriculture Organization of the United Nations[14]), not from natural or ancient and endangered forests.

Precise figures for the absolute volumes of wood purchased and dissolving wood pulp sourced are not provided for confidentiality reasons. As an indicative estimate, total fiber sales of nearly 1 million tons require a pulp input of around the same amount. The amount of wood required for the production of this dissolving wood pulp cannot be stated exactly, especially given all the different processes and species that Lenzing's suppliers use. Assuming a dissolving wood pulp yield from wood of 40 percent, a rough estimate for the total wood input would be 2.5 million tons (dry matter), spread between Lenzing's own production and the dissolving wood pulp purchased.

14) Carle, J., and Holmgren, P. (2003). Working paper 79. Definitions Related to Planted Forests. In: Food and Agriculture Organization of the United Nations (2003). Forest Resources Assessment Program Working paper series. Available at:http://www.fao.org/forestry/25853-0d4f50dd8626f4bd6248009fc68f892fb.pdf [Accessed 15 February 2022]

Wood as a natural and renewable raw material plays an important role in replacing fossil-based products and helps mitigate climate change through carbon sinks in forests and wood products. For more information on climate effects of and on wood and pulp sourcing, see the "Climate & energy" chapter – especially "Avoided emissions", and the "Wood and Pulp" focus paper.

Lenzing Group's Wood and Pulp Policy

In its Wood and Pulp Policy, Lenzing is committed to procuring wood and dissolving wood pulp exclusively from non-controversial sources.

Controversial sources include wood derived from:

- illegal logging or the trade in illegal wood or forest products
- the destruction of high conservation values in forestry operations, including ancient and endangered forests, and endangered species habitats
- plantations established after 1994 through significant conversion of natural forests or conversions to non- forest use
- the introduction of genetically modified organisms in forestry operations
- the violation of traditional, community and/or human rights
- any violation of the ILO[15] Core Conventions as defined in the ILO Declaration on Fundamental Principles and Rights at Work.

Regular risk assessments, audits, on-site visits, and independent third-party certification of sustainable forest management programs ensure compliance with the policy and Lenzing's commitment to no-deforestation.

If Lenzing discovers that it has sourced wood or dissolving wood pulp from controversial sources, it will first engage with the supplier to encourage practices consistent with Lenzing's Wood and Pulp Policy. If the response is unsatisfactory, the supplier will be delisted with a reasonable lead time. Very few such cases have occurred in recent years. There were none in 2019, three in 2020, and one in 2021. For more information, please see "Wood and dissolving wood pulp certifications".

Societal aspects, especially human rights

Lenzing's Wood and Pulp Policy also refers to societal aspects, especially human rights, in wood sourcing covered by the wood certification systems used by Lenzing, FSC® and PEFC. Together with national laws and the Lenzing Code of Conduct they ensure that traditional, community, and civil rights are observed, and that labor conditions meet ILO Core Conventions[16].

Wood and dissolving wood pulp certifications

Lenzing's wood procurement management system ensures that all wood is sourced from legal and sustainably managed sources.

Certification status of Lenzing operations – Chain of custody

Table 14

Site	Country	Main products	FSC® CoC	PEFC CoC
Lenzing	Austria	Viscose, modal, lyocell, dissolving pulp	•	•
Paskov	Czech Republic	Dissolving pulp	•	•
Purwakarta	Indonesia	Viscose	•	•
Nanjing	China	Viscose, modal	•	•
Heiligenkreuz	Austria	Lyocell	•	n. a.
Grimsby	United Kingdom	Lyocell	•	n. a.
Mobile	USA	Lyocell	•	•
Prachinburi	Thailand	Lyocell	In progress	n. a.

15) International Labour Organization (ILO)
16) https://www.ilo.org/asia/decentwork/dwcp/WCMS_143046/lang--en/index.htm [Accessed 15 February 2022]

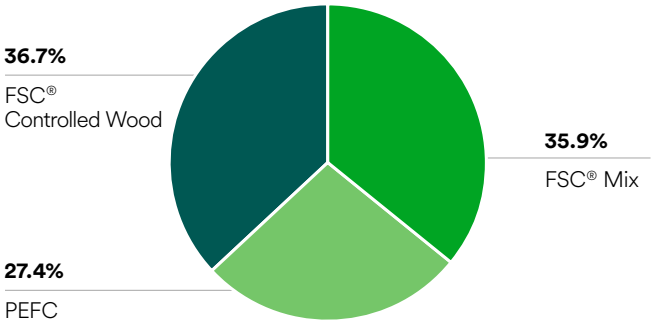
Lenzing demonstrates that the wood sourcing complies with its high standards through verification based on FSC® and PEFC certification systems (figure 15). More than 99 percent[17] of wood and dissolving wood pulp used by the Lenzing Group is either certified by FSC® and PEFC or inspected in line with these standards (figure 15). Also, the last CanopyStyle verification audit report, which was published in the second half of 2020, confirmed low risk of sourcing from ancient and endangered forests, which is the best possible category.

The following figures show the certification status of all wood or pulp input into Lenzing's fiber production, whether obtained directly through own procurement for in-house dissolving wood pulp mills or indirectly through dissolving wood pulp suppliers. All Lenzing Group production sites are FSC® CoC (Chain of Custody) certified. The group certification for PEFC CoC currently covers five sites. Purwakarta, Nanjing and Mobile have successfully been added due to growing market interest in certified fibers and customers expectations (see table 14).

PEFC is mainly used for wood sourced from Central Europe, based on strict, rigorously enforced national forestry laws. FSC® certification of forests is not widespread in this region. Therefore, most wood sourced is procured with a PEFC certificate and receives FSC® Controlled Wood status at Lenzing sites after a due diligence process. The Lenzing site has held the PEFC Chain of Custody certification as its main certificate for more than a decade. Since 2016, this has been complemented by an FSC® CoC (Chain of Custody) certificate that covers all Lenzing production sites. All wood input to the Lenzing Group is either certified or controlled by the FSC® certification system (figure 16).

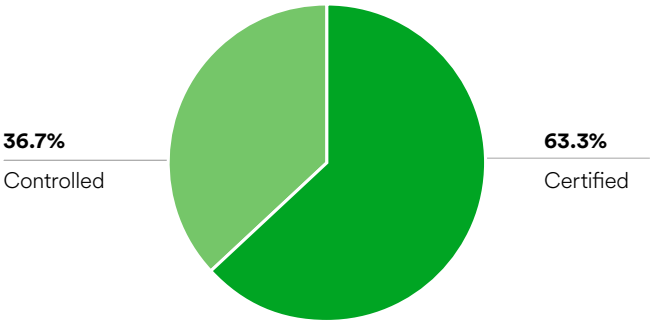
The decrease in certified wood input and increase of controlled wood in 2021 was due to necessary supply adjustments.

Certification status in the Lenzing Group 2021 Figure 15



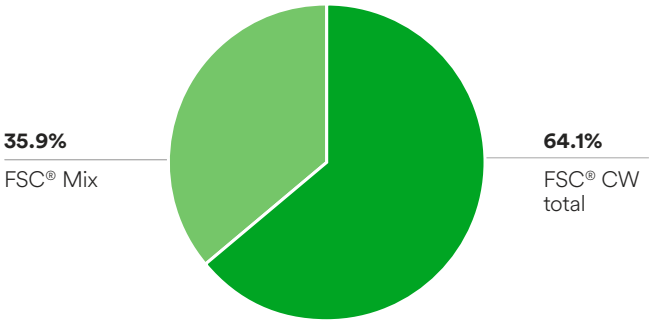
Certification status of total wood input at Lenzing fiber production sites via own and purchased dissolving wood pulp. Basis: dissolving wood pulp by weight.

Certification status in the Lenzing Group 2021 Figure 16



All pulp and wood input (> 99 %) is either certified or controlled through the FSC® system. "Certified" is the sum of "FSC® Mix" and "PEFC" and represents the amount of pulp available to make fibers with the corresponding Chain of Custody certificate.

FSC® certification status in the Lenzing Group 2021 Figure 17



"FSC® CW Total" is all controlled wood, FSC® Controlled Wood, plus PEFC certified wood that has been accepted as FSC® Controlled after the Lenzing due diligence process. The share of FSC® Mix represents the amount of pulp supplied with an FSC® Mix Chain of Custody certificate.

Pulp suppliers can hold more than one forest related certificate. Most of the pulp suppliers located in North America also carry certification from the Sustainable Forest Initiative (SFI), which is also a national member of and fully endorsed by the global PEFC certification scheme.

For detailed explanations of the certificates and controlled wood, see the "Wood and Pulp" focus paper in its most recent version.

Since forestry operations in Central Europe are generally small-scale, many small forest owners harvest wood for additional income and do not participate in a certification process. Therefore, Lenzing needs to procure reliable but limited quantities of such

17) Non-certified wood was used for R&D purposes and was submitted to a due-diligence process according to Lenzing's Wood and Pulp Policy.

wood other than that certified to FSC® or PEFC. This category of wood is inspected in line with these standards. Strict forestry laws and enforcement in Central Europe also require all forest owners to pursue sustainable management. The Lenzing Wood and Pulp Policy and Supplier Code of Conduct are part of all wood purchasing activities and are presented to potential suppliers before the start of a business relationship. Only if these conditions are accepted, deliveries can be made to Lenzing.

Wood procurement faces annual surveillance/recertification audits of the FSC® and PEFC systems. In 2021, the certification body was changed to ensure continuous impartiality to the third-party-verifications. SCS Global Services (with Headquarters in California, USA) was the appointed company.

The Lenzing due diligence system for wood and pulp procurement includes regular formal audits. However, ongoing, day-to-day, informal, personal contact between Lenzing's procurement team and suppliers is even more important. Supplier contracts can be terminated in response to severe sustainability findings. This has happened occasionally in the past when suppliers failed to remedy certain issues. No such cases occurred in 2019. In 2020, three contracts were suspended due to findings. Two were later re-activated after the issues were resolved. One supplier was delisted. In 2021, one supplier was suspended and later reactivated after checking and confirmation of compliance.

Regional wood supply in Europe

The Lenzing site (Austria) mainly uses beech wood plus small amounts of other hardwoods and spruce, whereas the Paskov plant (Czech Republic) mainly uses spruce. Lenzing is committed to the cascading use of wood, and primarily makes use of timber generated from small trees through thinning and sections of large trees that are unsuitable for high-grade products, such as furniture or construction.

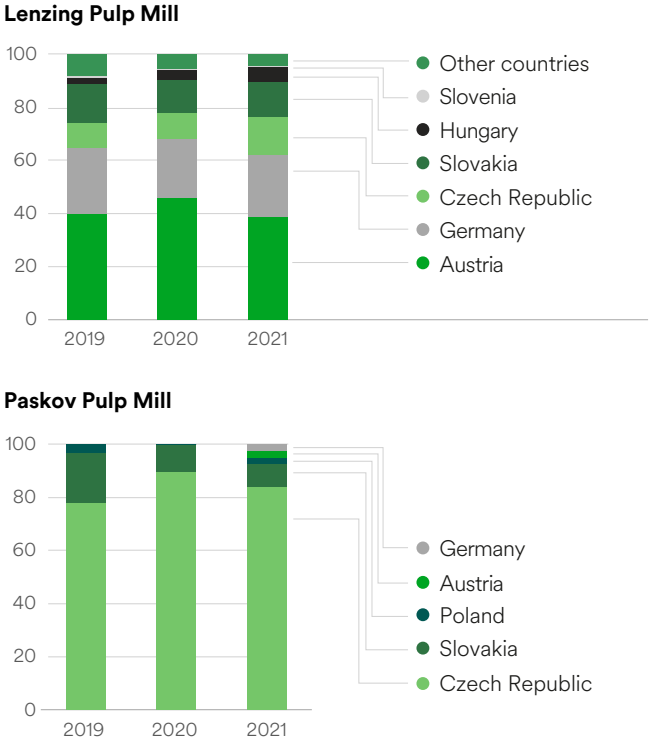
The percentage of broadleaf forest, especially beech, is increasing[18] in wood-sourcing countries as forests are being returned to a more natural mix of tree species, contributing to climate change resilience. The area devoted to spruce cultivation is decreasing, although stocks are still increasing in most sourcing countries due to low felling rates. Exceptions in recent years were caused by natural disturbances such as storm events and subsequent bark beetle outbreaks. Utilization of beech wood to manufacture fibers provides relatively high value creation versus wood use for energy generation, making it an important economic factor for the regeneration of forests with more deciduous species. This transition is also crucial for adapting forest ecosystems in Central Europe to climate change through greater species diversity[19,20].

Sustainability criteria have long been an important factor in supplier selection. As Austria, Germany, the Czech Republic and Slovakia have strong political commitments to sustainable forestry, their state-owned forests are an important source of wood for Lenzing sites and cover more than 20 percent of wood purchases.

In order to ensure short transportation distances and short delivery times, almost all the wood required originates regionally, meaning, either from the country where the pulp is produced or from directly neighboring countries. Regional[21] wood accounted for 98 percent of the supply for the Lenzing site from 2015 to 2017. Due to sourcing issues caused by updated FSC® risk assessments in some Central European countries, the regional supply rate temporarily decreased to 91.5 percent in 2019. In 2020, it was 94.4 percent, and in 2021 95.3 percent. For the Paskov site, the regional supply rate increased to 100 percent since 2019.

Wood sourcing for Lenzing Group's own pulp mills in Lenzing (Austria) and Paskov (Czech Republic)
Beech and spruce by country, 2019–2021.
"Other countries" for Lenzing sites are France, Switzerland, and Poland.

Figure 18



Regional wood supply originates from the country where the pulp mill is situated and from neighboring countries from which wood can be transported directly without crossing a third country.

Wood from Poland was exclusively sourced with FSC® certificates. For underlying figures, please see the Annex.

18) Schwarzbauer, P., and Wittmann, F. (2018). Basic Indicators for the Sustainability of European Forestry. In: Lenzinger Berichte 94 (2018), 1–13. Available at: www.lenzinger-berichte.com [Accessed 15 February 2022]
19) Niedermair, M., Lexer, M. J., Plattner, G., Formayer, H. and Seidl, R. (2007). Österreichische Bundesforste AG. Klimawandel und Artenvielfalt. Wie klimafit sind Österreichs Wälder, Flüsse und Alpenlandschaften? Available at: https://www.bundesforste.at/fileadmin/publikationen/studien/Klimastudie_WWF.pdf [Accessed 15 February 2022]
20) FOREST EUROPE 2020. Adaptation to Climate Change in Sustainable Forest Management in Europe,Liaison Unit Bratislava, Zvolen, 2020.
21) Regional wood supply originates from the country where the pulp mill is situated and from neighboring countries from which wood can be transported directly without crossing a third country.

Dissolving wood pulp in the Lenzing Group

Processing wood into fibers requires a special quality of pulp called dissolving wood pulp. The Lenzing Group's current dissolving wood pulp capacities are 320,000 tons at the Lenzing site and 285,000 tons at the Paskov site. In 2021, the Lenzing Group's own dissolving wood pulp accounted for 65.2 percent (2020: 62.4 %, 2019: 61.8 %) of the planned dissolving wood pulp volume required for the planned fiber production. Sufficient quantities of wood are purchased for this purpose. In addition to its own dissolving wood pulp production, Lenzing procures dissolving wood pulp in the global market, mostly under long-term supply contracts. The Lenzing Group's long-term strategy is to increase its own dissolving wood pulp capacities to 75 percent of its planned fiber production requirements.

By far the biggest step in Lenzing's strategic approach to strengthen its dissolving wood pulp position was taken in December 2019, when the company announced plans to build a 500,000 ton dissolving wood pulp mill in the state of Minas Gerais (Brazil). It started to implement this investment in a joint venture with the Brazilian Dexco (formerly, Duratex) group. Lenzing holds a 51 percent stake, while Dexco has a 49 percent stake. The expected industrial capital expenditure (CAPEX) in the joint venture will be approximately USD 1.38 bn.

The new production facility was designed with sustainability in mind. It will be among the most productive and energy-efficient facilities in the world, meet the European Union's Best Available Technology (BAT) standard[22], and export more than 50 percent excess bioelectricity generated on-site as renewable energy into the public grid. The produced pulp can be 100 percent FSC® certified and will be totally chlorine-free (TCF). This site is scheduled to start up in the first half of 2022.

In 2021, the Lenzing Group procured pulp from the following suppliers (in alphabetical order):

Countries of Lenzing Group's pulp suppliers (in 2021) Table 15

Supplier	Country
AustroCel Hallein GmbH	Austria
Celulosa Arauco y Constitución S.A.	Chile
Cosmo Specialty Fibers Inc.	USA
Georgia-Pacific LLC	USA
International Paper	USA
Lenzing AG	Austria
Lenzing Biocel Paskov a.s.	Czech Republic
Phoenix Pulp and Paper PCL	Thailand
Rayonier Advanced Materials	USA
Sappi Ltd.	South Africa, USA
Södra Skogsägarna ekonomisk förening	Sweden

For the locations of the pulp supplying factories, see the map on the website. Eucalyptus, pine and spruce represent the predominant wood species used by Lenzing's partners. However, beech, birch, ash, maple as well as other hardwoods and softwoods are also processed. The actual tree species vary depending on the region and quality conditions. Regardless of the species, all of the wood originates from sustainable forest operations that are certified or controlled according to the leading forest certification schemes. An extended list of tree species in 2021 can be found in the Annex. Lenzing ensures that the bleaching process of all purchased pulp is totally chlorine-free (TCF) or elemental chlorine-free (ECF).

Local wood supply in Brazil

In preparation for the pulp factory construction, the LD Celulose joint venture secured FSC®-certified plantations[23] covering over 44,000 hectares to provide the necessary biomass. Around 70,000 hectares of plantation will be managed once full production capacity is reached. These plantations operate completely in accordance with the guidelines and high standards of the Lenzing Group for sourcing wood and pulp as well as the requirements of the leading certification schemes.

22) Suhr, M., Klein, G., Kourti, I., Gonzalo Rodrigo, M., Giner Santonja, G., Roudier, S., and Delgado Sancho, L. (2015). Best Available Techniques (BAT) Reference Document for the Production of Pulp, Paper and Board. In: P. O. o. t. E. Union (Ed.), EUR – Scientific and Technical Research series. Luxembourg: European Commission, EUR 27235 EN – Joint Research Centre

23) FSC® license code: FSC-C006042

The forest unit responsible for supplying LD Celulose's wood is in Triângulo Mineiro in the State of Minas Gerais. The area that is being transformed into the LD Celulose forest unit has been used for cattle raising, intensive agricultural activities, and eucalyptus forestry since the 1970s. No native (primary) forest will be converted. The plantations are more than 800 km from the region that comprises the Amazon rainforest.

Key aspects that compelled Lenzing to enter into a joint venture with Dexco in Brazil were its track record and reputation for environmentally responsible forest management, its tradition of respect for the environment, its experience in responsible and productive forest management, and its extensive knowledge of the Brazilian Forestry Code, which is one of the most stringent in the world. Lenzing makes a point of only working with certified and controlled wood sources to ensure supply chain sustainability. This commitment is being maintained at LD Celulose with Dexco's forest management expertise.

The Dexco Forest Management Plan was adopted, which is responsible for ensuring compliance with Forest Stewardship Council (FSC®) certification criteria. The FSC® certificate provides the assurance that LD Celulose's forest management work takes account of aspects such as respect for the rights of indigenous people, the wellbeing of the professionals who work in the forest and local communities, the reduction of environmental impact, and the promotion of native forest conservation and restoration efforts. Lenzing cooperates with NGOs, such as Canopy, to assess the sustainability of its wood supply chain. All these measures ensure that wood sourcing is in line with Lenzing's Wood and Pulp Policy and grounded in sustainable practices.

Currently, and until the pulp mill is in operation, timber harvested from the plantation is sold to the market as logs for saw mills, chips for particle board, and biomass fuel for drying processes.

Stakeholder activities in wood and pulp procurement

CDP Forests

In 2021, the Lenzing Group contributed to all three areas (climate change, forests and water security) of the Carbon Disclosure Project (CDP). It received a triple "A" score for tackling climate change as well as acting to protect forests and water security. Only 14 companies worldwide were recognized with a triple "A" for environmental leadership in all three categories. Through its significant demonstrable actions in these areas, Lenzing has taken a leading position on corporate environmental ambition, action, and transparency. For the first time, Lenzing reported on its activities in Brazil. The efforts to ensure legal compliance and to ensure that activities (e.g. leasing of new areas for plantations) do not contribute to deforestation in Brazil were examined. Transition risks were included and published in the risk reporting. Data were collected and extensively reported on the activities in Brazil, ensuring a share of certified or controlled wood input greater than 99 percent.

The CDP Forests Rating confirms that the production of Lenzing's wood-based cellulose fibers does not contribute to deforestation – through a combination of a strict wood sourcing policy, forest certification and a dedicated collaboration with the CanopyStyle initiative.

CARBON DISCLOSURE PROJECT: TRIPLE "A" RATING

"We are very proud to have even topped our excellent ratings from the previous year. The triple "A" rating shows that we are already on a very good path with our sustainability strategy, and it encourages us for the future to remain true to this path and to continue developing it in order to realize a CO_2-neutral future as soon as possible", says Cord Prinzhorn, CEO of the Lenzing Group. "The textile and non-woven industry has to change and we strongly believe that we cannot be complacent about the inherent climate advantage of wood-based cellulosic fibers. This is why we have set ourselves ambitious sustainability targets and are making huge investments in order to meet them," says Prinzhorn.

Forest Europe, European and national forest strategies

The Forest Europe political process was initiated in 1990 by the Ministerial Conference on the Protection of Forests in Europe, which comprises 46 states, to promote sustainable forest management in Europe. A set of indicators grouped into six different criteria was developed to measure the sustainability performance of European forests and set targets for improvement[24]. Current efforts focus on climate change adaption[25], water protection, and biodiversity[26]. As a major buyer of wood in Europe, the Lenzing Group supports these targets, which aim to ensure the continued and improved function of forests in their ecosystems while maintaining the long-term availability of wood as a raw material.

The European Forest Strategy is currently in development. Lenzing contributed to an open consultation in 2021, calling for a consistent approach to regulation in the forest sector, and highlighting the forest-based bioeconomy as an important source for renewable carbon for materials within the European Green Deal.

24) Madrid Ministerial Declaration. 25 years together promoting Sustainable Forest Management in Europe, 7th Forest Europe Ministerial Conference, Madrid 2015. Available at: https://foresteurope.org/wp-content/uploads/2016/11/III.-ELM_7MC_2_2015_MinisterialDeclaration_adopted-2.pdf [Accessed 15 February 2022]
25) FOREST EUROPE 2020. Adaptation to Climate Change in Sustainable Forest Management in Europe, Liaison Unit Bratislava, Zvolen, 2020
26) https://forestbiodiversity.eu/ [Accessed 15 February 2022]

The Austrian Bioeconomy Strategy
The Austrian Bioeconomy Strategy was published in 2019[27]. The current phase calls for the development of an action plan. Lenzing is represented in the bioeconomy platform and provided input on the strategy and the development of the action plan from 2019 to 2021 through workshops and an online consultation. The action plan aims to balance the need for mobilizing timber as a raw material for the bioeconomy with assuring and improving the vitality and resilience of forests through adequate forest management. The strategy is prominently placed in the government working program and its implementation is assured.

The underlying studies have already shown a gap between increasing demand for renewable resources for materials and energy on the one hand, and the possible supply on the other hand, which is mainly limited by the available land area. One area of the action plan of particular relevance to Lenzing is therefore the continued development of the biobased circular economy involving the recycling of biobased materials, to which Lenzing will contribute accordingly.

In 2021, the development process of the Bioeconomy Strategy was linked to the Circular Economy Strategy. A catalog of actions is expected in early 2022.

Canopy
Lenzing cooperates with the NGO Canopy and maintains a continuous dialog with members of the CanopyStyle initiative to ensure responsible wood sourcing and protect the world's ancient and endangered forests from ending up in textiles and fibers.

Canopy publishes the Hot Button Report, an annual ranking of all wood-based cellulosic fiber manufacturers based on their wood and pulp sourcing performance, transparency and innovation. Today, more than 455 global brands with combined annual revenues of over USD 791 billion guide their sourcing towards "green shirt" producers[28]. Thus, this demand is a driver of change. In recent years, Lenzing has shown continuous improvement in all of these criteria: Lenzing's Wood and Pulp Policy has been aligned with the CanopyStyle initiative for years, and since 2020, geographical locations of pulp suppliers have been publicly disclosed in more detail (see website and table 17). Regarding alternative ("next generation") cellulose sources, Lenzing is the first company to produce and market lyocell fibers on a commercial scale using pre-consumer cotton scraps and post-consumer garments with Lenzing's patented REFIBRA™ technology. For more information, please see the "Developing commercial-scale recycling technologies" chapter. Furthermore, Lenzing takes an active part in the Zero Discharge of Hazardous Chemicals (ZDHC) initiative and proactively advances the track- and traceability of its fibers within the value chain. In 2021, Lenzing established a guiding document for the implementation of its internal process of continuous improvement in minimizing its wood sourcing risks.

In Canopy's latest Hot Button Report, published in October 2021, Lenzing received a dark green shirt for the second time and improved its score from 30.5 buttons in 2020 to 31 in 2021, continuing its long record of top rankings.

In addition to activities related to its own supply chain, Lenzing supports conservation solutions in other regions, such as afforestation in Albania and the USA. Also Lenzing has a record to express political support for the protection of ancient and endangered forests in Canada (Broadback Forest Quebec, Vancouver Island) and this year also Indonesia (Leuser Ecosystem). Moreover, Lenzing has contributed to a recent feasibility study for a project on specific protection activities for endangered species in Austria.

Greenhouse Gas Protocol: Update on carbon removals and land sector initiative
The Greenhouse Gas Protocol has launched a process to develop new standards or guidance on how companies should account for the following activities in their greenhouse gas inventories: carbon removal and sequestration, land use, land use change and bioenergy. One starting point for the initiative is the criticism of carbon neutrality for bioenergy and emissions from biogenic sources. In Lenzing's view, sustainably managed forests and plantations are key elements for climate change mitigation through carbon sequestration in the forest, harvested wood products, and replacement of fossil-based materials that have high carbon footprints. Moreover, sustainably managed semi-natural forests are the most successful way to protect biodiversity and enable people to enjoy the benefits of forests in the form of recreation or micro-climate benefits ("ecosystem services"), for example.

The outcome of these ongoing considerations will have a decisive impact not only on the wood-based fiber industry, but on the entire wood-based bioeconomy. Lenzing has signed up for the review group to comment on the draft guidance, and for the pilot trial of the draft guidance, both of which are planned in the first half of 2022.

27) https://www.bmk.gv.at/themen/innovation/publikationen/energieumwelttechnologie/biooekonomiestrategie.html [Accessed 15 February 2022]
28) https://hotbutton.canopyplanet.org/ [Accessed 31 January 2022]

Sustainable chemicals sourcing

The most important chemicals used – amounting to approximately 85 percent of the overall purchase volume – are caustic soda (NaOH), carbon disulfide (CS_2), sulfuric acid (H_2SO_4), sulfur (S), sulfur dioxide (SO_2), softening agents, flame retardants, modifiers, N-methylmorpholine N-oxide (NMMO), titanium dioxide (TiO_2), and zinc sulfate ($ZnSO_4$). Figures for chemical sourcing are not provided for confidentiality reasons.

Supplier assessments using the sustainability criteria provided in the EcoVadis tool are outlined in the Sustainability Report 2017, page 63. The target of assessing 80 percent of the most important suppliers (by purchasing value) was reached in 2019. New targets are in development. Nevertheless, additional suppliers continue to be assessed (table 16). Global Purchasing has developed its pool of suppliers on the basis of sustainability. The overall EcoVadis Score achieved by the Lenzing Group's suppliers (52.8) is much better than the average EcoVadis Score (43.8).

Number of suppliers responding to EcoVadis questionnaire since the introduction of the assessment in 2017 Table 16

2017	82
2018	93
2019	102
2020	152
2021	163

Regionality[a] of purchased chemicals Table 17

	Regionally purchased	Not regionally purchased
2019	91 %	9 %
2020	95 %	5 %
2021	94 %	6 %

a) Regionally: same country and neighboring countries.

80 percent of all purchased chemicals are sourced from fewer than 60 suppliers. Relationships with these suppliers are highly stable. Around 90 percent of the chemicals are sourced regionally for the Lenzing Group as a whole (table 17).

Transport and logistics

As Lenzing implemented its decarbonization strategy, the company shifted the transportation of some inbound materials from road to rail transport and shipping to improve its CO_2 footprint. This means that the transportation of sulfur purchased from one supplier was shifted from road to rail, with a volume of approximately 400 tons starting in November 2020 and approximately 15,000 tons per year in the following years.

Lenzing's wood logistics system moves large quantities of material and is therefore highly cost-optimized. Continuous improvement in this area also minimizes emissions from logistics by favoring train transport wherever possible.

Ship to Zero campaign – carbon neutral shipping
Lenzing piloted carbon neutral shipping in October 2021, collaborating with Good shipping during COP26. The joint goal of several companies was to achieve a 4,000 tons CO_2 reduction, equivalent to a journey from Rotterdam to Glasgow by ship. Lenzing's contribution involved reducing 50 tons of CO_2.

High Performer Award from the EPA Smart-Way® Transport Partnership[29]
This award was given for the second time to the site in Mobile (US). SmartWay Partners submit efficiency and air quality performance data to the US Environmental Protection Agency (EPA) annually. EPA aggregates and divides the data into five ranked performance ranges. SmartWay High Performers are partners whose efficiency and/or air quality performance falls within the top-ranked performance range. Around five percent of the participating shippers (Lenzing's site in Mobile is categorized as a shipper) are designated as High Performers.

New software for Wood Purchasing ensures greater transparency and facilitates logistic process
There are many process steps between the felling of a tree to the delivery of wood to the plant in Lenzing (Austria). The wood must be labeled, its traceability along the entire supply chain must be ensured, and around 80 rail wagons and 80 trucks must be directed to Lenzing's site every day. All this requires an elaborate Europe-wide logistics process and special software that guarantees the smooth flow of information between the individual stations.

In order to make contract management, wood trading and purchasing, logistics and control simple and transparent, the decision was made to switch to a new special software system. In 2019, the first milestone was reached with the implementation of electronic bill delivery.

Another very important milestone will be contract management, which will have its "go-live" in March 2022. This involves the electronic creation of contracts, including electronic approval and signature, as well as the associated document management. This milestone will make future work much easier and more transparent, and is an important step towards a paperless office for the wood purchasing department.

29) SmartWay High Performers: Shippers | SmartWay | US EPA, https://www.epa.gov/smartway/smartway-high-performers-shippers

Biodiversity & ecosystems

MANAGEMENT APPROACH

Material topic: Biodiversity & ecosystems

Importance for Lenzing

- Manifold biodiversity and healthy ecosystems are essential to humanity
- Climate change, pollution and transformation of land use are strongly linked to biodiversity
- The World Economic Forum identifies biodiversity loss and natural resource crises as two of the top five existential threats to the economy, people, and planet in the long term
- Global biodiversity loss has recently become the focus of the sustainability debate in many industries, including the textile and nonwoven sector
- Requirements for measures to improve biodiversity will likely evolve in the development of the European Union Biodiversity Strategy
- As wood is the most important raw material for Lenzing, the main potential negative impacts on biodiversity may arise from increased utilization of wood resources
- Biodiversity can be impacted by textile and nonwoven products' end-of-life due to non-degradable materials such as plastic leaking into the environment

Opportunities

- The protection of biodiversity and ecosystems plays a crucial role in climate change mitigation
- Maintaining and improving the function of forests in their ecosystems while ensuring the long-term availability of wood as a raw material
- Cellulosic materials offer a biodegradable alternative to plastics, helping to reduce the impact of lost materials on ecosystems, water and soil

Risks

- Loss of biodiversity in poorly managed forest ecosystems
- The loss of biodiversity could also lead to a significant change in available wood species for fiber production
- Worst case scenarios consider potential breakdowns of entire forest ecosystems at the regional level and correspondingly high volatility in wood prices

Guiding principles

- Strict Wood and Pulp Policy
- Centrally managed wood and pulp procurement
- CanopyStyle Initiative
- Global Supplier Code of Conduct
- Global Code of Business Conduct
- Group Environmental Standard
- Sustainability strategy "Naturally positive"
- Lenzing Group Sustainability targets

Due diligence processes and (ongoing) measures

- Lenzing addresses biodiversity preservation through one of two approaches, depending on the global region:
  - Sustainable forest management is applied in the Northern hemisphere by Lenzing's wood and pulp suppliers in Europe and North America
  - Plantation forestry is conducted mainly in the Southern hemisphere by Lenzing's pulp supplier in South Africa and by the new pulp plant in Brazil
- Using wood from sustainably managed semi-natural forests supports biodiversity
- When sourcing from plantations, considerable efforts are made to set aside conservation areas to protect and maintain biodiversity
- By implementing circular thinking and high environmental standards in Lenzing's operations, procurement and innovations, the company minimizes the impact on ecosystems
- Lenzing has been working for many years with NGOs, customers and partners along the downstream value chain to raise public awareness of biodiversity and take active measures to preserve it

Objectives

- Contributing to the preservation of biodiversity and forest ecosystems
- Ensuring that pulp and wood are not supplied from endangered forests and deforestation, in order to avoid biodiversity loss and other ecosystem impacts
- Collaborating with stakeholders in the value chain and beyond in a systemic approach
- Engaging with leading industry standards and guidelines (e.g. Textile Exchange, Science-Based Targets initiative)

Achievements/activities in the reporting year

- The Lenzing Group has joined the Advisory Group of Textile Exchange Biodiversity Benchmark
- Lenzing proactively participates in conservation projects to protect the world's ecosystems
- CDP forests, climate change, and water security: triple "A" rating
- Lenzing achieves the highest Hot Button category, the dark green shirt, for the second time
- Lenzing participates in the Circular Fashion Partnership
- Biodegradability of LENZING™ fibers confirmed by renowned marine research institute at the University of California, San Diego – effective alternative against environmental pollution from plastic waste

Responsible

- Member of the Managing Board (Pulp)
- Senior Director Purchasing Wood
- Vice President Commercial Affairs Pulp

Supporting

- Pulp Trading (PTG)
- Corporate Sustainability

Biodiversity and Lenzing's business: Impacts and dependencies

Biodiversity is defined in a recent report by IPCC and IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services)[30] as "the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part". Human livelihood and wellbeing depends in many ways on the contributions from living organisms and ecosystems. Without safe-guarding biodiversity and ecosystems, there is no prosperity for future generations. There are strong links between climate change, land use, pollution and biodiversity.

The World Economic Forum identifies biodiversity loss and natural resource crises as two of the top five existential threats to the economy, people, and planet in the long term (5–10 years)[31]. Global biodiversity loss has recently moved into the focus of the sustainability debate in many industries, including the textile and nonwoven sector.

According to the IPBES, pressures on nature leading to loss of biodiversity and ecosystem functions are categorized into five groups (IPBES 2019[32] cited after SBNT 2020[33]):

1. Land/water/sea use change
2. Resource exploitation
3. Climate change
4. Pollution
5. Invasive species

In the context of global biodiversity loss, the textile and apparel industry has recently become more aware of its contribution to this problem[34,35]. The focus is on the agricultural production of natural fibers and pollution issues related to fiber production and textile processing, although wood sourcing from forests is also seen as a potential cause of biodiversity loss. Products have potential impacts at the end of their useful life due to waste pollution in land and water ecosystems, especially via non-biodegradable materials that are leaked into the environment.

Lenzing as a leading cellulose fiber manufacturer is focusing on three areas: its wood and pulp sourcing, production processes, and products' end of use, in order to address biodiversity loss.

Wood is the most important raw material for Lenzing. The main source of potential impact from the Lenzing Group's operations and supply chain is therefore connected to land use by forestry. Lenzing also mainly depends on biodiversity and the proper functioning of forest ecosystems that provide the raw material of wood. Negative effects on biodiversity can arise from the intensified utilization of forests. On the other hand, the positive effects of sustainable forest management on biodiversity and ecosystems are well known and can be further explored and implemented.

30) IPBES-IPCC 2021: Scientific outcome of the IPBES-IPCC co-sponsored workshop on biodiversity and climate change
31) WEF Global Risk Report 2021
32) IPBES 2019: Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. https://ipbes.net/global-assessment
33) Science-based targets for nature. Initial guidance for businesses. 2020.
34) Textile Exchange, Biodiversity Insights Report 2021. https://mci.textileexchange.org/biodiversity/insights/
35) Global Fashion Pact, Transforming the industry. 2020. https://thefashionpact.org/wp-content/uploads/2020/10/038906e111abca13dce4c77d419e4f21.pdf

Additional potential impacts on water, soil, and air can arise from production facility emissions. At the end of the value chain of textile and nonwoven products, biodiversity impacts can arise from non-degradable plastics entering the environment.

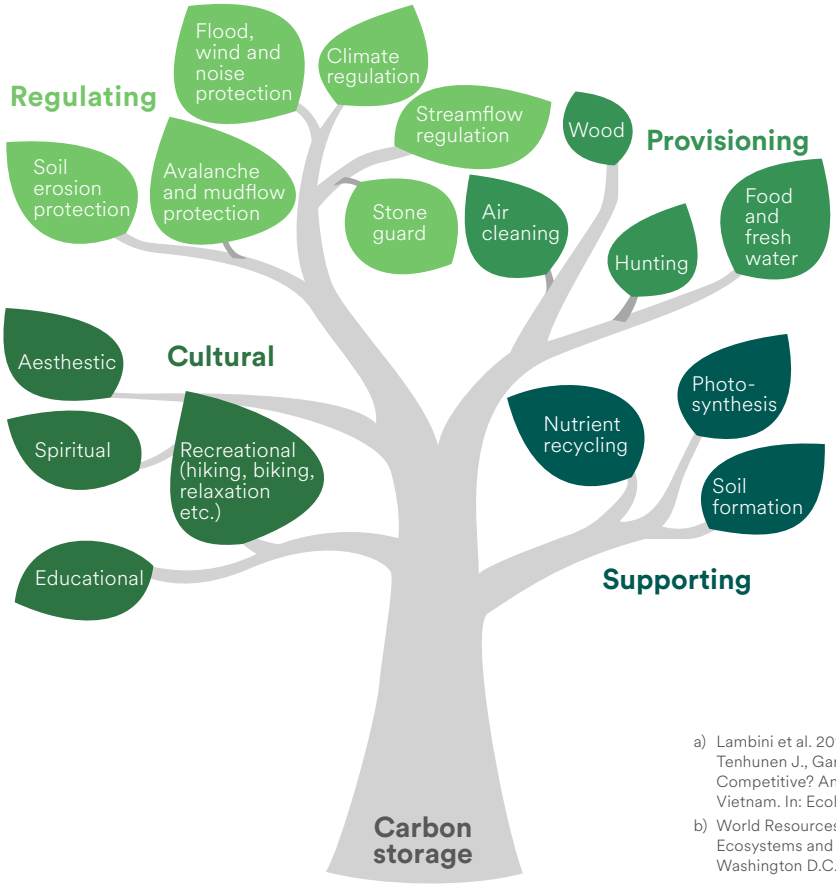
Ecosystem services: For society, forests are more than just raw material providers

The concept of ecosystem services[36] is used to describe the links between the natural environment, e.g., forests, economic activities, and society. Multi-stakeholder initiatives, such as the Natural Capital Coalition or industries such as the Kering Group in their Environmental Profit and Loss Accounting, and governments[37] promote the concept as a holistic view of these interdependencies.

Forests provide much more than just raw material for production. Apart from their beauty and recreational value, they fulfill a multitude of environmental functions and are essential for climate regulation. People benefit from ecosystem goods and services. Not all ecosystems' benefits to people can be measured in monetary terms. It is therefore important to include other values as well, such as health, social or conservation values. For this and other reasons, a new term has recently been introduced to expand the concept of "ecosystem services" with "nature's contribution to people"[38]. As both terms are still used in this debate, and "ecosystem services" is better known to many stakeholders, and continues to be used in this publication.

The sustainable management of forests ensures that the different ecosystem services provided are maintained and protected together with the supply of material to allow the wood-based industry to cater to societal needs. Figure 19 provides an overview of the functions of forest ecosystems associated with the provisioning of wood.

Functions of forest ecosystems[a,b] Figure 19



a) Lambini et al. 2018: Lambini C. K., Nguyen T. T., Abildtrup J., Pham Van D., Tenhunen J., Garcia S. (2018). Are Ecosystem Services Complementary or Competitive? An Econometric Analysis of Cost Functions of Private Forests in Vietnam. In: Ecological Economics, Vol. 147, pp. 343–352

b) World Resources Institute, 2005: MEA – Millennium Ecosystem Assessment (2005): Ecosystems and Human Wellbeing: Synthesis. World Resources Institute. Island Press, Washington D.C.

36) World Resources Institute, 2005: MEA – Millennium Ecosystem Assessment (2005): Ecosystems and Human Wellbeing: Synthesis. World Resources Institute. Island Press, Washington D.C.
37) Forest Europe 2016b, Work program
38) IPBES-IPCC 2021: Scientific outcome of the IPBES-IPCC co-sponsored workshop on biodiversity and climate change

Assessment: State of Lenzing's influence and dependencies on biodiversity and ecosystems

The Lenzing Group uses two different types of forestry for its wood sourcing, depending on the global region: sustainable and multi-functional forest management is applied in the Northern hemisphere by Lenzing's wood and pulp suppliers in Europe and North America. Plantation forestry with high sustainability standards is conducted mainly in the Southern hemisphere by Lenzing's pulp supplier in South Africa and by the new pulp plant in Brazil.

Biodiversity and ecosystem status monitoring in the Lenzing Group are performed in the global regions via two different approaches.

In Europe, biodiversity is monitored at a national level according to the Forest Europe Criteria. Results are published regularly in the European overview[39,40]. Recent reports paint a mixed picture of success and issues still to be resolved. The measures to be taken are better understood thanks to intensive research activities.

For the Brazil operations, a long-standing monitoring program on plantation levels is conducted by Lenzing's joint venture partner Dexco (formerly Duratex), which began in the 1970s with the establishment of the first plantations. LD Celulose, Lenzing's Brazilian legal entity, continues this program at its managed plantations. Data is gathered every six months to cover seasonal variations, and reported annually. Pulp suppliers apply their own monitoring schemes.

Attempts to quantify impacts from land use on biodiversity usually consist of two components: the quantity of land (forest) area used, and the intensity of use. The estimation of land area used for Lenzing's wood sourcing is part of the initiated "Biodiversity concept" project. Variations in data availability and data quality can arise depending on the forest type, the land ownership, the sourcing area and the supply chain position (wood or pulp sourcing to Lenzing).

Quantity of forest area used for Lenzing's wood sourcing: data availability and quality Table 18

Lenzing sources	Forest type	Land use intensity	Data/estimates	(Expected) data quality
Wood	Plantation	High	Known (see table 21)	high
Wood	Semi-natural	Low to medium	Estimates needed based on regional statistical data	medium
Pulp (pulp supplier sources wood)	Plantation	High	Estimates possible	medium
Pulp (pulp supplier sources wood)	Semi-natural	Low to medium	Rough estimates	low

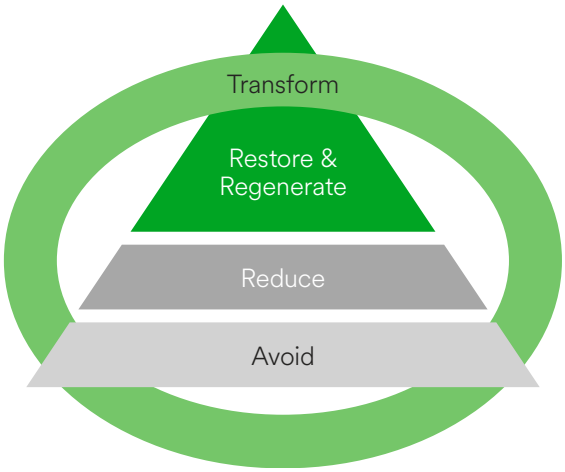
39) Forest Europe 2015, and 2020: State of Europe´s Forest 2015. Ministerial Conference on the Protection of Forests in Europe, June 2016., and 2020, State of Europe´s Forest 2020. https://foresteurope.org/publications/

40) Indicators of sustainable forest management in Austria reports from 2017 and 2020. https://info.bmlrt.gv.at/themen/wald/walddialog/dokumente.html, Czech Republic and Slovakia forest reports: Ministry of Agriculture of the Czech Rebublic, Information on Forests and Foresty in the Czech Republic by 2017 (English), Zpráva o stavu lesa a lesního hospodářství České republiky v roce 2020 (Czech). Ministry of Agriculture and Rural Development of the Slovak Republic, Report on the Forest Sector of the Slovak Republic 2020.

Biodiversity and ecosystem improvement: targets and actions

To respond to the pressures on nature by taking positive action, the Science Based Targets for Nature initiative introduced the Action Framework with five key types of actions: "Avoid – Reduce – Restore and Regenerate – Transform" in its Initial Guidance for Business (2020)[41]. This scheme was also adopted by the Textile Exchange Biodiversity Benchmark.

The AR³T framework of Science-based targets for nature (SBTN 2020)[a] Figure 20



a) Science-based targets for nature. Initial guidance for businesses. 2020

Framework of actions for nature, from SBTN (2020)[a] Table 19

Avoid
Prevent impact from happening in the first place: prevent the impact entirely

Reduce
Minimize impacts, but without necessarily eliminating them

Restore
Initiate or accelerate the recovery of an ecosystem with respect to its health, integrity, and sustainability, with a focus on permanent changes in its state

Regenerate
Take measures designed to increase the biophysical function and/or ecological productivity of an ecosystem or its components within existing land uses, often with a focus on a few of nature's specific contributions to people (e.g. regenerative agriculture often focuses on carbon sequestration, food production, and nitrogen and phosphorus retention)

Transform
Take measures contributing to system-wide change, notably to alter the drivers of nature loss, e.g. through technological, economic, institutional, and social factors and changes in underlying values and behaviors

a) Science-based targets for nature. Initial guidance for businesses. 2020

SBTN's framework for action and Lenzing's approach Table 20

Category of action	Reference	Lenzing's approach
Avoid	Wood and Pulp Policy	Lenzing explicitly commits in the procurement criteria of the Wood and Pulp Policy not to cause deforestation
Reduce	Sustainability Target 2	To offer viscose, modal and lyocell staple fibers with up to 50 percent post-consumer recycled content on a commercial scale by 2025
Restore	Sustainability Target 6	To implement a conservation solution of 20 ha in Albania in combination with a social impact project by 2024
	Sustainability Target 7	To implement conservation solutions on 15,000 ha at the new pulp site in Brazil by 2030
Regenerate & Transform	Sustainability Target 8	To engage in further conservation, biodiversity protection, and restoration activities in regions where forests are at risk or should be improved by 2025

41) Science-based targets for nature. Initial guidance for businesses. 2020

Targets

In the presentation of Lenzing's biodiversity and ecosystem related targets and measures at this point in time, the AR³T framework is considered a useful sorting scheme. That said, the development of a comprehensive and systematic approach to biodiversity and ecosystems is planned for the Lenzing Group, in line with Sustainability target 8 (see table 20).

Several targets have been derived from the Sustainability strategy and the sCore TEN strategy, containing elements that positively influence biodiversity and ecosystem services or nature's contributions to people.

Actions

Avoid: biodiversity due diligence via sustainable sourcing

Wood and dissolving wood pulp are Lenzing's most important raw materials. The Lenzing Group assumes responsibility by focusing on sustainable sourcing. Lenzing only sources wood and dissolving wood pulp from semi-natural forests and plantations (as defined by the Food and Agriculture Organization of the United Nations[42]). Moreover, it does not source materials from natural or ancient and endangered forests.

Lenzing Group's Wood and Pulp Policy

In its Wood and Pulp Policy[43], Lenzing is committed to procuring wood and dissolving wood pulp exclusively from non-controversial sources. In order to protect the world's remaining ancient and endangered forests as well as the biodiversity and ecosystems' integrity within these forests, Lenzing is committed to avoiding the use of wood and pulp containing wood sourced from regions such as the Canadian and Russian Boreal Forests, Coastal Temperate Rainforests, tropical forests and peatlands of Indonesia, the Amazon and West Africa.

Regular risk assessments, audits, on-site visits, and independent third-party certification of sustainable forest management programs ensure compliance with the policy and Lenzing's commitment to no-deforestation.

Forest certificates

Lenzing's wood procurement management system ensures that all wood is sourced from legal and sustainably managed sources. Lenzing demonstrates that wood sourcing complies with its high standards through verification based on FSC® and PEFC certification systems. All wood and dissolving wood pulp used by the Lenzing Group is either certified by FSC® and PEFC or controlled in line with these standards (figure 15 in the "Raw material security" chapter).

The forest certificates held by the Lenzing Group cover general criteria for biodiversity and forest ecosystem protection according to international standards. Additional criteria can be found in the national standards which vary between countries. For example, the percentage of area set aside for conservation varies between countries and even regions within countries.

For details on wood and pulp certification, see the "Raw material security" chapter.

CanopyStyle Initiative

Lenzing collaborates with the NGO Canopy and many brands and retailers involved in the CanopyStyle initiative. The recent CanopyStyle verification audit was conducted in 2019, and the final audit report was published in the second half of 2020; it confirmed Lenzing is at low risk of sourcing from ancient and endangered forests. In the latest Hot Button Report (2021) from Canopy, Lenzing was again awarded a "dark green shirt", which represents the best performance category.

Due diligence system in wood and pulp procurement

Regardless of whether the wood used comes from certified or controlled sources, Lenzing wants its stakeholders to be assured that it originates from sustainable sources. Thus, Lenzing uses a due diligence system based on the FSC® Controlled Wood requirements[44] to check that 100 percent of the purchased wood and pulp complies with national legislation and Lenzing's Wood Sourcing Policy.

For more details, please see the "Wood and Pulp" focus paper.

Reduce: via circular economy approaches and climate targets

The aim here is to use fewer inputs from natural resources, and to minimize the impact of greenhouse gas emissions and pollution.

Resource use

Lenzing is committed to the cascading use of wood. This means that different qualities of wood are utilized for different applications in a hierarchy of their value. Lenzing uses of timber generated from small trees through thinning and from parts of large trees that are unsuitable for high-grade products, such as furniture or construction. Wood chips that are a by-product of saw mills are also used.

Lenzing's biorefinery processes produce dissolving pulp as the main product, as well as several co-products and renewable energy. This results in 100 % utilization of the wood without any waste. More value can be created from fewer natural resources. For details, see the "Responsible production" focus paper.

42) Carle, J., and Holmgren, P. (2003). Working paper 79. Definitions Related to Planted Forests. In: Food and Agriculture Organization of the United Nations (2003). Forest Resources Assessment Program Working paper series. Available at: http://www.fao.org/forestry/25853-0d4f50dd8626f4bd6248009fc68f892fb.pdf [Accessed 15 February 2022]

43) https://www.lenzing.com/fileadmin/content/PDF/08_Corporate_Governance/Richtlinien_und_Kodizes/EN/Wood_Pulp_Policy_EN.pdf [Accessed 15 February 2022]

44) Lenzing Group FSC® certificate, https://info.fsc.org/details.php?id=a0240000005soyMAAQ&type=certificate

Recycling fibers and textiles reduces the input of virgin raw materials such as wood. Well-developed technologies can also reduce the consumption of other inputs such as chemicals and energy. This is true for Lenzing products made with recycled materials, e.g. via the REFIBRA™ or Eco Cycle technology, both of which have lower carbon footprints than fibers conventionally produced from virgin material. For details, see the "Circularity & resources: Commercial-scale recycling technologies" chapter.

Climate targets

Climate change and biodiversity can be viewed as two sides of the same coin. Climate change drives biodiversity loss, while the loss of biodiversity accelerates climate change. In the same way, healthy ecosystems can also contribute to regulating the climate. For instance, wood as a natural and renewable raw material plays an important role in replacing fossil-based products and helps mitigate climate change through carbon sinks in forests and wood products. For more information on the climate effects of and on wood and pulp sourcing, see the "Climate & energy" chapter – especially "Avoided emissions", and the "Wood and Pulp" focus paper. Thanks to its climate strategy and science-based targets in line with the Paris Agreement and UN SDG 13, Lenzing is on the road to reducing CO_2 emissions. For more details, see the "Climate & energy" chapter.

Lenzing contributed content and reviews to the SBTi Roadmap to zero Apparel Guidance in 2021[45].

Pollution prevention

In accordance with the strategic focus area "Greening the value chain", the Lenzing Group has targets and programs in place to reduce emissions affecting water and air. For example, closed loop water and chemical cycles are implemented. Lenzing follows the Changing Markets roadmap for the man made fibers industry. All sites have been assessed through the ZDHC scheme.

Restore: forest conservation and restoration

Lenzing supports conservation solutions in other regions not related to its own supply chain, such as afforestation in Albania and the USA. Additionally, Lenzing is also engaged to address protection of ancient and endangered forests in Canada (Broadback Forest Quebec, Vancouver Island) and Indonesia (Leuser Ecosystem) on political level.

Albania

AFFORESTATION AND CONSERVATION PROJECT IN ALBANIA

Albania's forest areas are among those in greatest need of improvement in Europe. New forest management approaches were recently implemented by the government to address environmental problems and fulfil the current needs of society with respect to the sustainable use of natural resources.

The Lenzing Group initiated a forest conservation project in Albania in 2018. It aims to support the development of rural areas in Albania in the broader region of Shkoder (Ana e Malit) and Diber (Peshkopi) by using natural resources sustainably and fostering alternative income sources for communities. The project with a focus on sustainable forestry also progressed successfully in 2021.

Actions in 2021

Afforestation

In the course of the reforestation measures, more than 18,000 trees have now been planted in Ana e Malit (Shkodra region), with the cooperation of around 150 members of the local Forest and Pasture Users Association. Thus, by the end of 2021, the first 10 hectares were reforested, with the remaining 10 hectares due to be completed in 2022 and 2023. In addition, the project area was expanded: at the beginning of 2022, another 2 hectares will be reforested in the community of Puka, which is a great success for the project.

Tree nursery

Together with the NGO Eco-Social-Farm, the construction of a tree nursery began in 2021 in order to provide seedlings locally for future reforestation projects in the region on the one hand, and to secure a long-term income for the social inclusion organization on the other. For sustainable anchoring, a new well was constructed to ensure the seedlings' irrigation.

Training

Despite the challenging COVID-19 situation, ten training courses were held. More than 400 local forest users have so far been trained in forest management, fire prevention and safety. This was possible mainly because the project team responded flexibly to the prescribed measures; for example, training sessions were moved outdoors whenever possible or were conducted in compliance with protective measures (social distancing, masks).

Forestry School

Cooperation with the Shkodra Forestry School continues. The highlight in 2021 was the provision and installation of a new IT infrastructure, which was made possible by the project and the school cooperation with the Austrian HTL Shkodra. In addition, the students were involved again in planting in the reforestation area to gain practical insights and experience. Thanks to the partner organization Connecting Natural Values and Partners (CNVP), a three-day forestry excursion in Albania was also made possible, with the same goal: to give the students an understanding of the practice of forestry and thus improve their job prospects.

Challenges in 2021

Due to an ongoing drought and heat affecting the region, walnut trees were struggling in particular. There was still some risk of forest fires, albeit lower than in Greece, for example.

45) 21_WorkingPaper_RoadmapNetZero_.pdf (apparelimpact.org)

Reforestation – OneTreePlanted

Lenzing supported the 'Earth Day Campaign' 2019, including the restoration of the Yosemite National Park in California, USA. With the support of this initiative, One Tree Planted was able to plant 115,000 trees in total across more than 354 hectares (875 acres). On behalf of Lenzing 16,141 trees were rooted into the earth, which replaces some of the area destroyed during the California wildfires. This not only restored the land, but also positively impacted wildlife habitat and protected species. The area will serve as a community recreation area with no consumptive activities, hence further protecting and reducing the risk of land erosion problems such as landslides, flooding and fire risks. In 2020 and 2021, the support for One Tree Planted continued. The social media marketing campaign "Make it feel right" for the TENCEL™ brand is connected to funding for OneTreePlanted. In the reporting year, for each pledge made on social media, a tree was donated, thus contributing to reforestation.

In 2020, some 10,000 trees were planted. In 2021, 33,025 trees were planted, mainly in California and Colorado, and in Haiti. This amounts to a total of 59,166 trees since 2019. In the reporting year, Lenzing earned the Tree Badge Award for participating in the Million Tree Challenge with nine other organizations that support tree planting.

Biodiversity in Lenzing's own plantations in Brazil

Plantation forestry can reduce deforestation pressure on natural (primary) forest areas by providing wood at very high yields per unit area as an alternative to sourcing it from natural forests. FSC® certification entails management criteria to protect biodiversity[46], as determined in detail in the national standards. Management practices include a certain percentage of reserved conservation areas.

In the joint venture project with Dexco (formerly Duratex) in Brazil, wood will be sourced from FSC®-certified plantations of over 44,000 hectares. The managed area belongs to the Cerrado biome and is located around 800 kilometers from the Amazon region. LD Celulose's forests are in areas that have been converted to agriculture several decades ago. Large areas nearby are generally used for planting soy and coffee or grazing livestock. The trees are mainly eucalyptus species, with a small proportion of pine recently phased out. A breeding and clone selections program is continuing to improve the yield and robustness of the trees. LD Celulose does not use genetically modified organisms (GMOs). These plantations operate fully in accordance with the guidelines and high standards of Lenzing for sourcing wood and pulp. During the planning, the intense utilization of wood resources and the potential negative effects on biodiversity were part of the risk analysis. In order to avoid these risks, LD Celulose work with conservation programs and also follow the FSC® standards.

Conservation areas

The land under LD Celulose's management contains a proportion of conservation area dedicated to biodiversity protection according to legal requirements and FSC® standards. Brazilian environmental law determines the maintenance of Permanent Preservation Areas (APPs) and Legal Reserve (LR) areas. APPs are specific areas of vegetation such as ciliary forests, areas of vegetation adjacent to water courses, and areas of vegetation on slopes. Legal Reserve areas meet the obligation to preserve at least 20 percent of a property in a rural area. At this stage, 14,623 hectares are protected areas (table 21). In terms of conservation units that are outside the managed areas but close to the LD Celulose planting area, Páu Furado State Park is some 30 kilometers from the plantation. At this distance, the conservation unit is not impacted by LD Celulose's activities.

LD Celulose's forestry unit is supervised by ecology and environmental specialists who were also responsible for identifying a High Conservation Value Area (HCVA) in the area managed by LD Celulose containing Pseudopaludicola facureae, a species of frog found only in this region of Minas Gerais. The forestry unit constantly works to identify any areas that need to be classified as HCVA to ensure the protection of animal and plant species. See the "Wood and Pulp" focus paper for more details.

Monitoring

To ensure that our plantation management maintains compliance with the requirements of the Brazilian Forest Code, LD Celulose has a framework of internal and external processes. The internal GIS team collects satellite imagery on an annual basis and evaluates the location, size and status of the Legal Reserve areas (LRs) and APPs on the managed land. The data is also provided to the field teams in the form of maps. Furthermore, periodic field audits by our environmental specialists ensure that the quality of LRs and APPs is maintained.

LD Celulose is aware of the diversity of flora and fauna found in its forest areas. There are ongoing biodiversity monitoring projects where data on local biodiversity and the potential expansion of invasive species is monitored. Dexco started its biodiversity research projects in its managed areas in the 1970s. LD Celulose has continued to monitor fauna and flora in the areas that have remained under its management and those directly influenced by the mill site through partnerships with universities[47], in addition to internal programs. These programs are carried out annually in the dry and rainy seasons and aim to monitor possible impacts on local biodiversity. The programs are also required by the Brazilian environmental agency. Approximately 204 species of flora and 450 species of fauna were identified in the forest management units of LD Celulose. Among these species, the presence of animals such as the Maned Wolf and the Giant Anteater, which are characteristic of the region, is particularly noteworthy. There have been no significant impacts on biodiversity to date.

46) FSC® Global Development GmbH (2014). FSC® and Plantations. FSC®'s position on plantations. Available at: https://ic.fsc.org/en/news-updates/id/1351 [Accessed 15 February 2022]

47) Duratex Annual Report 2018. Available at: https://www.dex.co/Relatorio-Anual-2018/en/index.html [Accessed 15 February 2022]

Table 21 provides an overview of land use in the area managed by LD Celulose. The productive area which is not currently certified is not yet planted with trees and is expected to be certified in due time.

Quantitative description of areas managed and influenced by LD Celulose Table 21

	2020		2021	
	ha	%	ha	%
Total area	66,101	100	71,631	100
Forest/plantation area	50,325	76	54,081	75
Owned	–		–	
Leased/managed	50,325	76	54,081	75
Protected	13,153	20	14,623	20
FSC® area	43,835	66	43,835	61
Infrastructure	2,623		2,927	

Measures for biodiversity and ecosystem enhancement
In the responsible management practiced by LD Celulose, techniques are employed that aim to protect biodiversity as well as soil and water quality. Examples of these measures are:

- **Minimum cultivation:** For soil conservation, LD Celulose uses the minimum cultivation technique, which consists of keeping the remaining plant material at the harvest site to form layers of soil protection and ensure the cycling of nutrients.
- **Nutritional recommendation:** LD Celulose performs soil analyses to determine the requisite fertilizer recommendation to maintain soil fertility.
- **Connectivity:** to improve connectivity of the Permanent Preservation Areas and legal reserves, LD Celulose carries out mosaic planting, establishing ecological corridors that aim to connect the fragments of native forest. Such connectivity allows animals and plants to migrate between different conservation areas, and form a sufficiently large connected number of individuals to ensure a stable population. This measure is a voluntary activity beyond the legal and certification related requirements.
- **Preservation and monitoring of riparian forests:** These forest areas along waterways contribute to the maintenance of water quality and the quantity of water available. This happens because the riparian forests retain sediments and nutrients carried by the rain, preventing water pollution and silting in the water bodies. In the Brazilian legislation, riparian forests are protected as they are considered Permanent Preservation Areas. LD Celulose, in turn, defines all Permanent Preservation Areas in its forest management units and also monitors these riparian forests.

Regenerate: Enhance ecosystem quality in managed forests
Sustainably managed semi-natural forests in Europe and other parts of the Northern hemisphere are multifunctional in that they provide not just timber but also many ecosystem services such as water regulation or protection against natural disasters, while maintaining biodiversity at the same time.

The Lenzing site (Austria) mainly uses beech wood plus small amounts of other hardwoods and spruce, whereas the Paskov plant (Czech Republic) mainly utilizes spruce.

The percentage of broadleaf forest, especially beech, is increasing[48] in wood-sourcing countries as forests are being returned to a more natural mix of tree species, contributing to climate change resilience. The area devoted to spruce cultivation is decreasing, although stocks are still increasing in all sourcing countries due to low felling rates. The utilization of beech wood to manufacture fibers provides relatively high value creation versus wood use for energy generation, making it an important economic factor for the regeneration of forests with more deciduous species. This transition is also crucial for adapting forest ecosystems in Central Europe to climate change through greater species diversity[49,50].

Biodiversity protection has long been an objective of sustainable forest management. For semi-natural forests in Central Europe, forestry laws have been implemented since the 19th century in order to balance the demand for wood sourcing with nature conservation and the ecosystem services provided by forests. This approach has been at the core of a forester's job description and an important part of the corresponding training for a long time.

48) Schwarzbauer, P., and Wittmann, F. (2018). Basic Indicators for the Sustainability of European Forestry. In: Lenzinger Berichte 94 (2018), 1–13. Available at: www.lenzinger-berichte.com [Accessed 15 February 2022]
49) Niedermair, M., Lexer, M. J., Plattner, G., Formayer, H. and Seidl, R. (2007). Österreichische Bundesforste AG. Klimawandel und Artenvielfalt. Wie klimafit sind Österreichs Wälder, Flüsse und Alpenlandschaften? Available at: https://www.bundesforste.at/fileadmin/publikationen/studien/Klimastudie_WWF.pdf [Accessed 15 February 2022]
50) FOREST EUROPE 2020. Adaptation to Climate Change in Sustainable Forest Management in Europe, Liaison Unit Bratislava, Zvolen, 2020.

As an overarching political process for the European Union and beyond, the Forest Europe political process was initiated in 1990 by the Ministerial Conference on the Protection of Forests in Europe, which comprises 46 states, to promote sustainable forest management in Europe. A set of indicators grouped into six different criteria was developed to measure the sustainability performance of European forests and set targets for improvement[51]. Current efforts focus on climate change adaption[52], water protection, and biodiversity[53]. As a major buyer of wood in Europe, the Lenzing Group supports these targets, which aim to ensure the continued and improved function of forests in their ecosystems while maintaining the long-term availability of wood as a raw material. Requirements for intensified biodiversity measures will likely come out of the European Union Biodiversity Strategy and Forestry Strategy in the process of development. Lenzing contributed to the Open Consultation on the Forest Strategy in 2021. Publications on biodiversity in managed versus unmanaged forests in Europe, and the effects of some national strategies have been reviewed in the scientific literature of recent years. The level of species richness varied in the comparisons depending on the region and taxonomic group, but differences were rather small[54]. For an overview of studies from the countries relevant for the Lenzing Group's wood supply, please see the "Wood and Pulp" focus paper.

As the Lenzing site pulp mill obtains more than 35 percent of its wood from Austrian forests, the state of Austria's forests is especially important for the sourcing situation. In Austria, forest biodiversity is monitored regularly according to a Biodiversity Index[55]. Recent outcomes are reported in the "Indicators of sustainable forest management 2020"[56] from the multi-stakeholder organization "Walddialog", as a contribution to the Forest Europe indicators and targets process. Biodiversity in Austrian forests will be the focus of the upcoming governmental biodiversity strategy from 2020 onwards. As a consequence, an increase in the shares of protected and strictly protected areas is expected. For example, every type of forest defined by ecological science is going to be represented in natural forest protected areas ("Naturwaldreservate").

One important wood supplier to the Lenzing site (Austria), is the state forest company Österreichische Bundesforste (ÖBf AG, Austrian Federal Forests). Managing 10 percent of the national territory and 15 percent of Austria's woodland, ÖBf is the largest ecosystem manager, forest managing company and owner of hunting and fishing licenses. Sustainability forms the guiding principle for all ÖBf activities. The ÖBf team for ecological landscape management is developing individual nature conservation plans for each of the 120 ÖBf-forest units for example, in addition to the existing forest management plans[57]. These include specific measures to protect endangered species and increase biodiversity under local conditions, which are integrated into daily forest management work. Furthermore, ÖBf is also cooperating with the NGO umbrella organization Umweltdachverband, for example in a project for "Biodiversity and multifunctional management in forests". This project's goal is to establish practical, regionalized guidance for biodiversity and ecosystem regeneration[58,59]. The pilot project is being conducted in an important wood sourcing region for Lenzing.

51) Madrid Ministerial Declaration. 25 years together promoting Sustainable Forest Management in Europe, 7th Forest Europe Ministerial Conference, Madrid 2015. Available at: https://foresteurope.org/wp-content/uploads/2016/11/III.-ELM_7MC_2_2015_MinisterialDeclaration_adopted-2.pdf [Accessed 15 February 2022]
52) FOREST EUROPE 2020. Adaptation to Climate Change in Sustainable Forest Management in Europe, Liaison Unit Bratislava, Zvolen, 2020
53) https://forestbiodiversity.eu/ [Accessed 15 February 2022]
54 Paillet et al. 2010: Paillet Y., Bergès L., Hjältén J., Odor P., Avon C., Bernhardt-Römermann M., Bijlsma R.J., De Bruyn L,. Fuhr M., Grandin U., Kanka R., Lundin L., Luque S., Magura T.,Matesanz S., Mészáros I., Sebastià M.T., Schmidt W., Standovár T., Tóthmérész B., Uotila A., Valladares F., Vellak K., Virtanen R.,(2010) Biodiversity differences between managed and unmanaged forests: meta-analysis of species richness in Europe. Conservation Biology 24, 101–112
55) Geburek, T., Büchsenmeister, R., Englisch, M., Frank, G., Hauk, E., Konrad, H., Liebmann, S., Neumann, M., Starlinger, F. and Steiner, H. (2015). Biodiversitätsindex Wald – Einer für alle! In: Biodiversität im Wald. BFW Praxisinformation 37, pp. 6–8
56) https://info.bmlrt.gv.at/themen/wald/walddialog/dokumente/indikatorenbericht-2020.html
57) https://www.bundesforste.at/die-bundesforste/naturschutz/biodiversitaet/oekologisches-landschaftsmanagement.html
58) https://eu-umweltbuero.umweltdachverband.at/inhalt/biodiversitaet-bei-multi-funktionaler-waldbewirtschaftung
59) https://www.bundesforste.at/leistungen/naturraum-management/foerderprojekte/biodiversitaet-und-multifunktionale-bewirtschaftung-im-wald.html

Transform: Stakeholder activities in biodiversity and ecosystems

TEXTILE EXCHANGE (TE) BIODIVERSITY BENCHMARK

Textile Exchange Biodiversity Benchmark was launched on December 2, 2020. The benchmark is part of the TE Corporate Fiber and Materials Benchmark (CFMB) Program and is connected to TE's "Climate+" strategy. The role of the benchmark is to address biodiversity loss and support improvements in the industry's sphere of influence through knowledge-sharing. The methodology for companies to set targets for nature is being developed through the Science-Based Targets Network (SBTN). It has taken an initial big step by surveying companies about integrating biodiversity into their business strategies and operations, making commitments, setting targets, and aligning with the Sustainable Development Goals (SDGs)[60].

In 2021, Lenzing contributed as a member of the advisory group, providing input to the tool development and its own input to the benchmark. The "Biodiversity insights Report 2021"[61] provides "a first global baseline for the apparel and textile industry" regarding the awareness of its impacts on biodiversity. It describes approaches to actions in business integration, transparency, materiality, implementation, monitoring and evaluation, as well as corporate reporting.

CDP Forests

The Lenzing Group contributed to the Carbon Disclosure Project (CDP) in the areas of Climate, Forest and Water Security in 2021 and received a triple "A" score. Only 24 companies worldwide have an "A" rating for forests. Through its significant demonstrable actions in these areas, Lenzing has taken a leading position on corporate environmental ambition, action, and transparency. The CDP forest score confirms that the production of Lenzing's wood-based cellulosic fibers avoid contributing to deforestation, by combining a stringent wood sourcing policy, forest certification, and dedicated commitment to the CanopyStyle Initiative.

Wood K plus

Many Austrian companies, including Lenzing, and scientific bodies have joined forces in the "Kompetenzzentrum Holz". It is a leading research institute in wood and wood-related renewable resources in Europe. One workstream of Wood K plus for Lenzing is sustainability in wood sourcing. In 2021, the focus shifted to biodiversity, including support for the work for the Textile Exchange Biodiversity Benchmark, and a master's thesis on the assessment of biodiversity impacts in textile fiber production by LCA methods was commissioned. The results are expected in early 2022.

60) Biodiversity Benchmark (Beta) Survey Guide. Textile Exchange , 2020. https://textileexchange.org/wp-content/uploads/2020/11/Textile-Exchange_Biodiversity-Benchmark-Survey-Guide-2020-.pdf [Accessed 15 February 2022]

61) Textile Exchange, Biodiversity Insights Report 2021. https://mci.textileexchange.org/biodiversity/insights/

Sustainable innovations

MANAGEMENT APPROACH

Material topic: Sustainable innovations & products

Importance for Lenzing

- Sustainable innovations are at the heart of Lenzing's sCore TEN strategy and ensure the future success of the company

Opportunities

- Meeting market and stakeholder expectations
- Differentiating factor
- Being prepared for new challenges
- Being a pioneering company
- Building new cooperation and networks
- Challenge the status quo

Risks

- Loss of leadership in innovation carries potential regulatory, financial, market and corporate reputational risks

Guiding principles

- sCore TEN strategy
- "Naturally positive" sustainability strategy with "Sustainable innovations" focus area
- Life cycle thinking
- Net-benefit concept

Due diligence processes and (ongoing) measures

- Project management system PRO² (product & application innovation and process & technology innovation) as part of Lenzing business processes
- Management review (ISO 9001:2015)

Objectives

- Securing economic growth
- Leadership in technology, innovative net-benefit products and applications and new business models
- Differentiation from competitors and competing products
- Networking and cooperation with relevant partners (companies, associations, NGOs and academia)

Achievements/activities in the reporting year

- Launch of hydrophobic LENZING™ Lyocell Dry fibers for sustainable nonwoven solutions
- Launch of TENCEL™ Modal with Indigo Color Technology and TENCEL™ Lyocell Matte as sustainable fibers for the denim industry
- Cooperation with Orange Fiber – TENCEL™ Limited Edition fibers containing a certain share of orange pulp
- Cooperation between Södra and Lenzing started in the field of textile recycling
- Further scientific proof of the marine biodegradability of LENZING™ fibers by Scripps Institution of Oceanography
- Advancing the renewable carbon concept as a member of the Renewable Carbon Initiative[a]
- 1,487 patents and patent applications filed across 190 patent families and 52 countries
- Close cooperation between innovation centers and other internal departments
- Numerous R&D partnerships with customers, companies, universities, and institutes (national and international)
- Partner of new Christian Doppler Laboratory for a recycling-based circular economy

Responsible

- CEO
- VP Research & Development

Supporting

- Global Business Management Nonwovens and Textiles
- Global Strategy and M&A
- Performance.Improvement.Technology (including Head of Global Technology)
- Global Engineering
- Operations

a) Home – Goals and Vision of the Renewable Carbon Initiative (renewable-carbon-initiative.com)

Sustainable innovations represent one of the strategic focus areas of Lenzing's "Naturally positive" sustainability strategy. Lenzing is committed to bringing cellulose based solutions to the market that offer consumers sustainable alternatives without compromising on quality and performance. These innovations constitute a cross-functional issue that intersects with most of the other strategic focus areas and is therefore reflected in many of Lenzing's activities.

Sustainable innovations include substantial efficiency improvements in existing technologies and technological breakthroughs that lead to net-benefit products. Lenzing innovation also includes driving systemic change through forward-looking solutions, future-proof business models, and a multitude of collaborative activities.

The central hub and innovation center at Lenzing is the Research and Development (R&D) department at the company's headquarters in Lenzing (Austria). At the end of the reporting year, 222 staff (2020: 212; 2019: 213) were working here on various innovation projects, in most cases in close cooperation with other departments. This interconnectedness is also reflected by the fact that staff from R&D regularly transfer to other departments and often follow the R&D projects to their conclusion. Another distinctive feature is the extensive infrastructure. The center includes pilot plants and laboratories that use small-scale processes to better understand the landscape of the subsequent value chain.

R&D expenditures, calculated according to the Frascati method (minus funding received), decreased from EUR 34.8 mn in 2020 to EUR 31.6 mn in 2021 (2019: EUR 53.2 million). The reason for this overall decrease is that the investment in new pilot plants has been largely completed, resulting in only minor CAPEX costs. However, the operative R&D expenditures increased, underlining Lenzing's commitment to driving sustainable innovation. The R&D expenditure corresponds to 1.5 percent of the Group's revenue. The 1,487 patents and patent applications (in 190 patent families) that Lenzing holds in 52 countries worldwide are another indication of the Lenzing Group's innovativeness. The focus for new patents is clearly on sustainable innovations such as the forward-looking solutions of LENZING™ Web Technology and TENCEL™ Luxe or textile recycling.

Sustainability drives innovation

MANAGEMENT APPROACH

Material topic: Sustainable materials and life cycle assessment (LCA)

Importance for Lenzing

- Basis to evaluate the ecological performance and substantiating environmental claims of products
- Enormous interest among the general public and stakeholders in sustainable materials and products
- Transparency is essential for fostering trust and building long-term partnerships
- Integrating different perspectives, understanding global trends, and mitigating risks and impacts

Opportunities

- Strengthening market position in sustainable net-benefit products and specialty fibers
- Communicating sustainability benefits of Lenzing's products
- Involvement in creating future standards for environmental communication (product environmental footprint, product category rules, etc.)
- Gaining expertise in life-cycle thinking to proactively demonstrate sustainable development
- Supporting current and future customers in achieving their sustainability targets

Risks

- "Greenhushing" – producing sustainable materials/products but not being able to communicate
- Loss of reputation from not being transparent
- Growing competition and loss of leadership
- Potential regulatory, technology, market, and corporate reputational risks

Guiding principles

- sCore TEN strategy – customer intimacy
- Partnering for systemic change as part of the "Naturally positive" sustainability strategy
- Sustainability Policy
- Group Policy for Safety, Health and Environment
- Group Environmental Standard
- Wood and Pulp Policy
- Branding Strategy
- Higg FEM

Due diligence processes and (ongoing) measures

- LCA update involving independent party
- Alignment with Material Sustainability Index (MSI) of the Sustainable Apparel Coalition (SAC)

Objectives

- Commitment to systemic approaches by applying life-cycle thinking
- Use of life cycle assessment to support decision-making in business
- Achieving sustainability vision of making sustainable fibers available to the growing world

Achievements/activities in the reporting year

- Completion of LCA update for standard and specialty fiber portfolio
- Launch of low-carbon-footprint fiber products with corresponding offsets of remaining emissions
- Improvements in ESG rankings, such as MSCI, EcoVadis
- Strategic growth projects fully on track: in Brazil and Thailand
- Lenzing's fibers listed as "preferred fibers" in Textile Exchange's Preferred Fiber Report
- Lenzing contributed to Textile Exchange's Corporate Fibers and Materials Benchmark Program (CFMB) and took part in the Biodiversity Benchmark
- Completion of Textile Exchange's MMCF Producer Transparency Questionnaire to provide information about the sustainability performance at group and production site level
- Lenzing contributing to leading multi-stakeholder initiatives
- Broad range of third-party certifications

Responsible

- VP Global Nonwoven Business
- VP Global Textile Business
- VP Global Purchasing

Supporting

- Corporate Sustainability
- Global QESH
- Research & Development

Sustainability acts as guiding principle for innovation and product development. Every process, product, or application innovation is evaluated in terms of sustainability from the very beginning. At Lenzing, sustainable thinking drives innovation. Key considerations include the life cycle perspective and the net-benefit principle over the entire value chain, which are implemented in the project management tools used by the company.

Lenzing's innovation portfolio addresses key topics for the future. Sustainable innovations and proactive partnerships form the basis for Lenzing's strategic efforts to green the value chain. Sustainability targets for air emissions, water emissions, pollution, climate protection, and the circular economy are the cornerstones of Lenzing's responsible entrepreneurship and act as innovation drivers.

Green Frontrunner: New Technologies for Sustainable Growth

With the newly created "Green Frontrunner" program, the Austrian Research Promotion Agency (FFG) supports Austrian companies in order to strengthen their leadership in technology in an international context. The program not only focuses on the expansion of technology and innovation leadership, but also places a strong emphasis on active contributions to climate and environmental protection. As Lenzing is engaged in several activities (as described above) that fit perfectly with the scope of this program, a project proposal was elaborated and submitted. This work was also used to structure the company's ongoing activities and boost its interdisciplinary approach.

Lenzing is one of the few companies to receive the highly coveted "Green Frontrunner" funding for a project. Entitled "Green Frontrunner – New Technologies for Sustainable Growth", the project encompasses several technology topics related to the reduction of emissions in pulp and fiber production. The project will make a significant contribution to achieving Lenzing's goal of being CO_2-neutral by 2050, whilst at the same time expanding production. Technologies with various degrees of maturity will be examined – some will be implemented rather quickly, whilst others will offer new possibilities on a long-term horizon.

An example of future technology solutions to be addressed within the project is carbon capture and utilization, i.e. the use of CO_2 as a building block for (basic) chemicals. Corresponding possibilities for reducing CO_2 will be evaluated within the project.

The sustainable production processes (and the R&D infrastructure) are the foundation for the development of new fibers that offer both sustainability and performance. These fibers serve as raw materials for the textile and nonwoven chains and are often developed together with value chain partners or other stakeholders. As new fibers are mainly tailored to special application fields, this goes hand in hand with the development of the respective applications.

Wood and oranges: A fruitful combination

To promote sustainable innovations, Lenzing also cooperates with other partners in the value chain to speed up the development time. One example is Orange Fiber, an Italian company that has patented a pulp production process for citrus by-products. The aim of this cooperation is to give new life to waste such as orange peels and to generate more transparency in the textile and fashion industry.

After intensive development work a first batch of specialty fibers with a content of a minor amount orange pulp was successfully produced at the pilot plant in Lenzing. The new fiber was presented together with Orange Fiber in July 2021. Based on the obtained fibers a fabric collection was developed, which Orange Fiber will present to the market. Further experiments to increase the orange pulp content are ongoing. The launch of the TENCEL™ Limited Edition fibers underlines Lenzing's pioneering role in developing highly sustainable production processes and in bringing sustainable innovations to the market – together with innovative partners such as Orange Fiber.

Hydrophobic cellulose fibers for sustainable nonwovens

The development of a hydrophobic lyocell fiber widens the fiber portfolio of Lenzing and allows the replacement of synthetic fibers by a biodegradable cellulosic fiber, thus offering an alternative to conventional synthetic fibers in the context of the SUPD (EU single use plastics directive). In addition, the cellulosic fibers show enhanced softness and therefore are beneficial for future product developments in applications touching the skin like hygiene products or wipes. Furthermore, the hydrophobic behavior of the cellulosic fiber leads to a different behavior towards lotions allowing to adjust lotion amounts and formulations, thus widening the options of nonwovens producers, especially when looking into 100 percent cellulosic options.

The change from conventional wipe blends containing up to 80 percent synthetic fibers (for the carded-spunlace process) to 100 percent cellulosic fibers leads to some changes in the wipe performance. This needs to be addressed to successfully achieve the transition to 100 percent cellulosics wipes with the required (and accustomed) product performance. In this area, development work has focused on achieving sufficient strength and opacity as well as softness and bulk density.

100 percent cellulosic flushable wipes

For years now, flushable wipes have been applied in various fields. The SUPD further heightens the need to offer 100 percent cellulosic wipes with sufficient strength and products that are flushable for safe and convenient disposal. As the usage of flushable wipes has increased over the years, the definition of flushability has become stricter and primarily depends on the pressure of wastewater treatment associations worldwide. Therefore, Lenzing has worked on gaining a fundamental understanding of the relevant fiber properties and final product performance. Based on this work, Lenzing is the first (wood-based) fiber manufacturer to obtain fine-2-flush certification from WRC as well as from IWSFG, demonstrating that lyocell fibers are a suitable ingredient for flushable wipes.

In addition to flushable material, further progress has been made in developing high-strength wetlaid products, which have been presented to customers. As the wetlaid technology offers access to 100 percent cellulosics using a large proportion of wood pulp, the interest in wipes based on this technology has increased over time. Lenzing's development work focusing on optimizing strength and productivity has been of considerable interest to customers.

LENZING™ Web Technology

Every day, millions of hygiene products and wipes worldwide end up in garbage and sewage. Most consist of up to 80 percent polyester or other fossil, non-biodegradable materials. LENZING™ Web Technology is a patented system developed by Lenzing to offer a biodegradable and compostable alternative: LENZING™ Web Technology is a direct spinning process involving the integration of filaments directly into a nonwoven fabric. The process allows a wider adjustment of the filament diameter and lower basis weight fabrics compared to conventional nonwoven technologies. The combination of all these advantages creates a new technology platform that underpins a broad product range offering an enormous variety of surface textures and greater dimensional stability than conventional nonwoven technologies can achieve.

The project team is fully focused on getting the technology and its products ready for the market. In collaboration with partners from the nonwoven marketplace, fully biodegradable products and applications are being developed and the pilot line at the Lenzing site will be upgraded to produce initial commercial volumes for test markets. The highly innovative nature of this development was also acknowledged with the award of the State Prize for Innovation in 2020. This is the highest award presented by the Republic of Austria to an Austrian company and its employees, who contribute significantly to the sustainable economic development of the country through their innovative problem-solving skills.

Net-benefit concept

Lenzing's net-benefit concept guides and shapes all major decisions.

Lenzing's net-benefit products offer positive impacts and benefits to the environment, society, and value chain partners that exceed those of most competing alternatives in the market. Net-benefit products take a life cycle perspective and thus include both upstream and downstream value chain processes. Customers can replace resource-intensive and polluting products with Lenzing's alternatives, thereby improving their product footprint and reducing supply chain risks.

The three strategic principles of the "Naturally positive" sustainability strategy and the underlying focus areas are combined in the net-benefit concept.

Products and technologies with a net benefit

Carbon-zero TENCEL™ and VEOCEL™ branded fibers
Lenzing launched new carbon-zero TENCEL™ branded lyocell and modal fibers for application in the textile industry, and added the first nonwoven carbon-neutral lyocell fibers under the VEOCEL™ brand in 2021. The new fibers are CarbonNeutral® product certified in accordance with the CarbonNeutral Protocol – the leading global framework for carbon neutrality.

The fibers help to lower carbon emissions across the supply chain. Four key levers – energy reduction, use of renewable energy, new technology innovation, and supplier engagement – are deployed to achieve Lenzing's carbon net-zero target for the long term. The three pillars of "Reduce", "Engage", and "Offset" actively contribute to lowering the product's carbon footprint by reducing emissions as far as the current technological and economic conditions allow. But also by engaging with supply chain partners to reduce their emissions, and offsetting the share of the remaining unavoidable emissions. This will decrease periodically as a result of improvements thanks to the further implementation of other pillars. These products have the lowest CO_2 footprint in their (fiber) category and can therefore contribute to the fulfillment of the customers' SBT. For more information on Lenzing's commitment and practices to mitigating climate change, please see the "Climate & energy" chapter.

LENZING™ ECOVERO™ viscose fibers and VEOCEL™ specialty viscose fiber with Eco Care technology
LENZING™ ECOVERO™ branded viscose (for textiles) and VEOCEL™ specialty viscose fiber with Eco Care technology (nonwovens) show a 50 percent reduction in greenhouse gas emissions and water impact compared to generic viscose (according to Higg MSI scores[62]).

62) Higg MSI: This number was calculated using the Higg Material Sustainability Index (Higg MSI) tools provided by the Sustainable Apparel Coalition. The Higg MSI tools assess impacts of materials from cradle-to-gate for a finished material (e.g. to the point at which the materials are ready to be assembled into a product). However, this figure only shows impacts from cradle to fiber production gate.

TENCEL™ Modal with Eco Color technology
Fibers with this technology incorporate pigment during fiber production and thus help avoid conventional energy-intensive dyeing steps. A fabric made from this product has 60 percent lower CO_2 emissions than conventionally dyed fabrics[63].

Lenzing fibers with recycled content – REFIBRA™ or Eco Cycle technology
In line with Lenzing's circular economy vision, "We give waste a new life. Every day", the current generation of innovative fibers, manufactured on a commercial large scale, use pre-consumer cotton scraps, post-consumer garments, and wood from sustainably managed forests as a raw material. The cotton material is recycled into pulp which is blended (up to 30 percent) with dissolving wood pulp to produce high-quality lyocell fibers for textile and nonwovens applications. This technology diverts tons of cotton scraps and post-consumer garments from entering landfills or incineration. They are produced with high levels of resource efficiency. By Lenzing's own calculations, Lenzing fibers with recycled content require 95 percent less water to produce and have a lower land use than conventional cotton. For more information on Lenzing's approaches towards a circular economy, please see the "Circularity & resources" chapter.

TENCEL™ Luxe filaments
The TENCEL™ Luxe branded lyocell filament aims to become a key milestone for eco-couture fabrics in the premium luxury market. The closed-loop lyocell production process ensures minimal environmental impact due to low process water and energy use and raw materials consumption. TENCEL™ Luxe branded filaments produced with the Eco Filament technology avoid conventional yarn spinning, which is energy-intensive and predominantly based in regions that rely heavily on fossil-based electricity. For example, at the industry level, spinning processes contribute to 28 percent of the total CO_2 emissions of the textile value chain (excluding use phase)[64].

LENZING™ Web Technology
The LENZING™ Web Technology is an innovative R&D development technology platform that allows a wide range of novel sustainable nonwoven materials to be produced from the raw material wood. The patented nonwoven web formation process – Lenzing holds more than 25 patent applications – starts with dissolving wood pulp and produces a directly formed cellulosic nonwoven fabric made of 100 percent continuous lyocell filament. This technology enables fiber and nonwoven production in only one step and sets new standards for the efficiency, circularity, and ecological sustainability of cellulose nonwoven fabrics. The flexibility of this technology and possible integration with other nonwoven technologies will enable the development of a wider range of new cellulosic materials and composite structures for highly engineered end use applications.

Pulp
Dissolving wood pulp is the raw material for Lenzing's fibers and produced in the company's own biorefineries[65]. Lenzing's biorefinery process ensures that 100 percent of wood constituents are used to produce dissolving wood pulp for fiber production, biorefinery products, and bioenergy. All pulp produced at Lenzing pulp production sites, including the future pulp production facility in Brazil, is totally chlorine-free. The biorefineries at the Lenzing and Paskov sites help the Group shrink its carbon footprint and consequently also enable Lenzing's customers to obtain low-carbon products. For more information, please see the "Raw material security" chapter.

Lyocell
Lyocell fibers from Lenzing are derived from renewable wood and produced in a closed-loop process, which transforms wood pulp into cellulosic fibers with high resource efficiency and low ecological impact. This solvent-spinning process recycles process water and reuses the solvent at a recovery rate of more than 99.8 percent. Lenzing's lyocell fibers show around 50 percent less greenhouse gas emissions than generic lyocell (according to Higg MSI scores).

Modal
Modal fibers from Lenzing are produced using an integrated production process in which the raw material pulp is manufactured at the same site as the fiber itself. 100 percent of the raw material beechwood is converted into cellulose and other biobased biorefinery products. Beech forests grow naturally without the use of chemical fertilizers or artificial irrigation. The pulp production is energetically self-sufficient while supplying a significant amount of bioenergy for the entire fiber production process at the production site. Lenzing's modal fibers therefore generate around 80 percent less greenhouse gas emissions in production than generic modal fibers (according to Higg MSI scores).

LENZING™ Acetic Acid Biobased
Lenzing's biorefinery technology converts wood into pulp, energy, and biobased biorefinery products. One of the biobased biorefinery products is LENZING™ Acetic Acid Biobased, which has an 85 percent smaller carbon footprint than conventional fossil-based acetic acid. LENZING™ Acetic Acid Biobased causes significantly lower greenhouse gas emissions than average production worldwide, according to a study conducted by an independent Life Cycle Assessment (LCA) consultant.

63) Terinte, N., Manda, B.M.K., Taylor, J., Schuster, K.C. and Patel, M. (2014). Environmental assessment of coloured fabrics and opportunities for value creation: spin-dyeing versus conventional dyeing. In: Journal of Cleaner Production 72, pp. 127–138
64) 2018 Quantis Report „Measuring Fashion"
65) In addition to its own dissolving wood pulp production, Lenzing procures dissolving wood pulp in the global market.

Process innovations drive efficiency and sustainability

Process innovations focus on improvements to pulp and fiber production processes. Lenzing is constantly working on resource efficiency, occupational safety, process stability, and quality. Ongoing developments in pulp production aim to enhance the biorefinery concept, thereby optimizing wood consumption. Another issue is the reduction of sulfur emissions through technological improvements and aftertreatment systems.

The foundation for sustainable innovations is the use of highly sophisticated production processes for pulp (including biorefinery products) and fibers (viscose/modal and lyocell). Process innovations focus on the further improvement of these processes.

The current focus is on boosting biorefinery integration at Lenzing's pulp sites and therefore on increasing the usage of the raw material of wood. Several projects related to pulp production deal with the closure of loops (e.g. selective sulfur dioxide absorption, increased caustic soda recovery) and the reduction of wastewater (e.g. sulfate in pulp and fiber production). Increasing energy efficiency and reducing CO_2 emissions are other topics of growing importance.

Activities in this field go beyond regular continuous improvements and aim to seek innovative solutions to reach the ambitious goals set by Lenzing via the science-based target (SBT). In order to achieve maximum impact, pulp and fiber production are increasingly being assessed together to find interactions and synergies. A concrete example in this regard relates to reducing the energy requirement for evaporating aqueous systems by using membrane processes. These processes can be used for both pulp and fiber production, thereby demonstrating the Group's holistic approach in the field of process innovations.

CLEAN TECHNOLOGY INVESTMENTS IN THE LENZING GROUP

State-of-the-art lyocell plant in Thailand (under construction)

Lenzing's lyocell technology is based on a closed-loop process that transforms dissolving wood pulp into cellulosic fibers with high resource efficiency and low ecological impact. The process has a solvent recovery rate of more than 99.8 percent, which lowers water and chemical use. The lyocell plant under construction in Thailand is the world's biggest-capacity plant with improved efficiencies due to economies of scale and process innovation within the Lenzing Group. The state-of-the-art lyocell fiber production is an effective answer to the growing demand for fiber while at the same time offering a highly sustainable fiber material. The expansion of clean technology within the Lenzing Group reflects the company's commitment to improving the ecological footprint of the global textile industry.

Air purification and sulfur recovery plant in Lenzing (Austria)

The new air purification and sulfur recovery plant not only optimizes the company's self-sufficiency for sulfur and enhances its process reliability, but also improves its environmental performance as part of a forward-looking strategy. Applying this state-of-the-art technology improves exhaust emission values and reduces fossil fuel use by generating steam, which, in turn, is converted into electricity. As a result, it also supports the energy self-sufficiency of the company's production plant at the Lenzing site while reducing its annual CO_2 emissions by 15,000 tons. The new plant began operation in 2021 and represents an important contribution to implementing the Group's sustainability strategy and clean technologies.

Continuous improvement

As part of a reorganization drive in the reporting year and as an umbrella for all continuous improvement activities, Lenzing has institutionalized its continuous improvement approach and set up a dedicated performance improvement team. In the course of the year, the team has become an integral part of the continuous improvement activities for the entire company. The technology team was integrated to provide holistic improvements, in addition to enhancing organizational methods. A product owner team for data science was established in order to drive data driven improvements across the company. To reflect its purpose and identity, the team was renamed "Performance. Improvement & Technology" with the following purpose statement: "We catalyze improvement and innovation; through collaboration we bring our shared purpose and values to life." Key success factors for becoming a respected and trusted partner to other departments and sites were purpose driven leadership practices that empower colleagues in different departments, providing the intrinsic motivation for improving performance.

EU BAT

All Lenzing sites in the EU, including one viscose plant, two lyocell plants and two pulp plants, met or exceeded the applicable EU BAT performance standards in 2021, which are set out in several EU best available technology reference documents, i.e. these plants comply with the regulations associated with the BATs. Compliance with EU BATs is the basis for the issuance and review of environmental and operating permits for the plants and is continuously monitored by the competent authorities in the EU Member States. Compliance monitoring is also carried out in accordance with BAT requirements relating to management, monitoring program, reporting, etc.

Therefore, compliance with EU BAT cannot be invoked outside the EU. All Lenzing production sites outside the EU, with the exception of one viscose plant in Indonesia, therefore have the EU Ecolabel for best-in-class performance. In line with the sustainability target, the viscose site in Indonesia aims to achieve the EU Ecolabel in 2023 (targets 1 and 5). The production site in Thailand will begin preparations for EU Ecolabel certification once it is up and running.

The company is also continuously working on improvements in other business areas. Lenzing is fully committed to the roadmap of the multi-stakeholder Zero Discharge of Hazardous Chemicals (ZDHC) initiative. All three viscose sites started reporting to the ZDHC gateway in 2021, putting the sustainability goal of achieving Level A on track.

EU Ecolabel criteria Table 22

EU Ecolabel criteria	Limit
Man-made cellulose fibers criteria	
Pulp: wood sourcing	Sustainable forestry: > 25 % e.g. FSC®, PEFC or equivalent schemes. Legal forestry: the rest
Pulp: bleaching agent	Elemental Cl free
Pulp: OX on finished fiber	≤ 150 ppm
Pulp: sourcing	50 % input from mills with energy or chemicals recovery
Staple fiber: sulfur emission to air	30 g/kg
Chemicals and processes criteria	
Restricted substance	Spin finishes: 90 % of the component substances readily biodegradable
Substitution of hazardous substances	Should satisfy restrictions concerning certain hazard classifications

The EU Ecolabel was established by the European Commission in 1992. It is an environmental quality label awarded to products and services that have a lower environmental and health impact than comparable goods throughout their entire lifetime. Products bearing the EU Ecolabel are therefore among the most environmentally friendly in the industry. Independent experts, scientists and NGOs devised the guidelines and criteria for awarding the EU Ecolabel in collaboration with the EU member states. The criteria are determined scientifically and consider the entire product life cycle. Regular revisions ensure that the criteria reflect new developments and that assessments remain current. The EU Ecolabel criteria for textile products were recently updated. For the Lenzing Group, this means that strict criteria have to be met in pulp and fiber production, both with regard to emissions released into the air and water as well as the handling of chemicals. The Lenzing Group can provide viscose, modal, and lyocell fibers with EU Ecolabel.

Chemical management

A group-wide chemical management process is currently under development, with customization provided by an external IT consultant. It includes a hazard and exposure assessment for each chemical product in order to demonstrate its safe use for workers and the environment. The process was established in 2020 and will be rolled out to all the sites in stages to ensure all Group sites follow the same approach.

MANAGEMENT APPROACH

Material topic: Chemicals & toxicity

Importance for Lenzing

- Chemicals are among the most important raw materials for pulp and fiber production
- Minimizing usage via good operational practices
- Control of environmental impact
- Safe use of chemicals/safe chemical processes
- Occupational and community safety and health
- Product liability

Opportunities

- Compliance with stakeholder expectations (e.g. Zero Discharge of Hazardous Chemicals)
- Opportunity to reduce impact on Lenzing scope 3 CO_2 footprint via good supplier motivation efforts

Risks

- Negative health and environmental impacts
- Regulatory changes and changing classification of chemicals
- Negative environmental and social impacts can lead to reputational damage

Guiding principles

- Heartbeat for Safety and Health initiative
- SHE Policy
- Higg FEM 3.0
- Group Environmental Standard

Due diligence processes and (ongoing) measures

- Environmental management system according to ISO 14001:2015 (including risk assessment and internal audits to ensure the effectiveness of the measures implemented)
- EcoVadis supplier assessment
- Regular Global SHE meetings with management review
- Integral part of internal communication (SHE-topics prioritized)

Objectives

- Compliance with a uniform environmental standard "One Lenzing"
- Assessment of the sustainability performance of the Lenzing Group's most relevant suppliers
- Continuous improvement of recovery rates
- Group sustainability targets

Achievements/activities in the reporting year

- Safety & Health KPIs
- Emission KPIs
- Lenzing contributing to leading multi-stakeholder initiatives (ZDHC, SAC, EU-BAT)
- Number of EcoVadis-evaluated suppliers increased
- Overall EcoVadis score of Lenzing Group suppliers higher than the average EcoVadis score
- Project launch to buy "green caustic soda" produced using green energy

Responsible

- Global Purchasing
- Global QESH
- Site managers

Stakeholder activities

Zero Discharge of Hazardous Chemicals (ZDHC)
The Zero Discharge of Hazardous Chemicals (ZDHC) multi-stakeholder collaboration initiated a special focus and task teams for wastewater, sludge, solid waste, and air emissions in the textile industry. Lenzing has been part of the Man-Made Cellulosic Fibers (MMCF) task team on wastewater, sludge/solid waste, and air emissions since 2018. In 2020, Lenzing adopted the published ZDHC guidelines on wastewater, air emissions, and responsible fiber production for man-made cellulose fiber manufacturers. In 2021, Lenzing started the ZDHC Gateway reporting in accordance with the wastewater guideline in its viscose operations in Purwakarta (Indonesia), Nanjing (China), and Lenzing (Austria). In 2022, Lenzing will start the Gateway reporting on air emissions, while continuing to take part in the task team in revising the guidelines and developing further guidelines for other MMCF materials.

Product quality & safety

MANAGEMENT APPROACH

Material topic: Product assurance

Importance for Lenzing

- Impact on user health and safety along the value chain
- Product responsibility and customer satisfaction are key to the Lenzing Group's long-term success and business growth

Opportunities

- Leading the market in terms of best product consistency, application performance, and service
- Achieving business and sustainability targets by monitoring and improving manufacturing processes

Risks

- Impact on health and safety of users
- Losing market position due to increasing competition or new technologies

Guiding principles

- Lenzing's sCore TEN strategy
- Group Policy for Safety, Health and Environment
- Lenzing Group's ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 certifications
- Global Code of Business Conduct
- Global Supplier Code of Conduct
- Clean and Hygiene Guideline

Due diligence processes and (ongoing) measures

- QESH process management including risk assessments and internal audits to ensure the effectiveness of the measures and standards implemented
- Certification management (e.g. Standard 100 by OEKO-TEX®, food contact compliance, etc).
- Continuous monitoring, interpretation and foreseeing the impact of business-specific regulations and requirements, new certifications and standards requirements depending on the applications of the products and the customers by Global Product Safety & Regulatory
- Ingredient risk analysis and regulatory compliance management in Lenzing products throughout the product lifecycle
- Product claim verification and support of new product claims validation
- Introduction of product technical validation protocol for new product lines
- Development of holistic Management of Change (MoC) process
- Introduction of customer satisfaction survey tooling and process

Objectives

- Quality leadership
- Strengthening specialty/premium fiber sales, sales of pulp, biorefinery and co-products business

Achievements/activities in the reporting year

- Collaboration along the entire value chain to support customers and brands
- Roll-out of the Clean and Hygiene guideline across all sites
- Creation of a new role in the Global Technical Marketing department as a point of contact on sustainability issues along the textile value chain
- Roll-out of automated quality performance reports and visualizations providing real-time information to the Lenzing community
- Performed formal compliance reviews and risk assessments for the certification portfolio and ingredients
- Maintained and improved company-wide regulatory standards and procedures
- Optimization of customer service processes to improve the customer experience

Responsible

- Global QESH
- Global Technical Marketing and Development

Supporting

- Global Business Management (Textiles and Nonwovens)
- Global Business Management (Pulp and Wood)
- Global Engineering
- Performance.Improvement.Technology
- Global Technical Marketing Development
- Research & Development
- Customer Service

Lenzing operates a quality management system based on ISO 9001:2015. It forms the basis for all work processes and reinforces efforts to achieve complete customer satisfaction.

All Lenzing fiber products undergo health and safety testing. However, the ultimate responsibility for consumer health is borne by the companies that manufacture finished products from Lenzing fibers.

The Product Safety and Regulatory Affairs team (part of Global Quality Environment Safety and Health) ensures that raw materials incorporated into final products are thoroughly checked and are appropriate for the specific application.

Product Safety and Regulatory Affairs ensures that Lenzing is up to date with changes to applicable standards and regulations. The classification (Classification, Labeling and Packaging, CLP Regulation) of titanium dioxide powder, which is used as a dulling agent in some fibers, was communicated to Lenzing's nonwoven customers in order to discuss the potential need for product changes. Various external factors prevented the continuation of the activities reported in last year's sustainability report to transition all the remaining fiber finish components from animal to vegetable origins.

Quality improvements

Lenzing has continued to achieve major quality improvements in the reporting year, including significant improvements to spinning faults and contaminations in Lenzing's Lyocell and Viscose factories. COVID-19-related disruptions and pulp availability challenges continued to have an impact on the quality performance of some factories which could not maintain the 2020 quality performance. Nevertheless, a net improvement on quality performance is achieved and is reflected in the quality-related KPIs for the entire group.

In 2021, the total number of complaints for the fiber business was lower indicating the effectiveness of the quality improvements implemented in both product and service quality areas. Lenzing is confident that all of its products perform well in their respective applications.

As a follow-up to the Heartbeat for Quality initiative, a new Fiber Quality strategic initiative was launched with a broader scope, building further on the material and production quality improvements, initiating projects focusing on service quality and customer intimacy, and activities that further strengthen the quality and process-driven mindset of the organization. The approach followed is based on redesigning and introducing internal systems and processes. The first designs were completed in the reporting year, with the full strategy implementation scheduled for 2022. One example is the updated Event Action Reporting (EAR) system, which is being introduced to all production lines, enabling the real-time monitoring of loss situations and cross-communication of common root causes across the operational network to prevent incident reoccurrence. The reporting system operates as an information source and supports the definition of quality improvement opportunities. In addition to the reporting system, detailed information is generated on the incidents, automated reports, and visualizations, providing real-time monitoring of quality performance.

Third-party certifications for LENZING™ fibers

The STANDARD 100 by OEKO-TEX®, Annex 6, certification confirms that LENZING™ fibers have been tested for numerous regulated and non-regulated harmful substances and are therefore harmless to human health. By monitoring raw materials and production processes, Lenzing ensures that its fibers comply with all relevant regulations, guidelines, and standards. LENZING™ standard nonwoven fibers are certified for food-contact applications under European and U.S. regulations. Lenzing uses external third-party certifications to prove the compatibility of its products in their fields of application. Information on all the Lenzing Group's product certifications are available at: https://www.lenzing.com/sustainability/product-benefits/

Research collaborations

Scientific collaboration is deeply rooted within Lenzing's R&D. In view of the major challenges (like climate change) and ever more complex topics, such cooperation is needed, which is why Lenzing is intensifying its activities in this field. The collaborations range from large research centers to small individual projects and also include important networking with the scientific community.

One of the largest research collaborations is with the Austrian Wood K plus competence center. Wood K plus is a leading research institute for wood and wood-related renewable resources in Europe. Lenzing is its largest industrial partner. Recent topics addressed by the competence center include advanced biomass utilization, lignin and hemicellulose utilization, or the use of enzymes in the production process.

Lenzing is also a partner in the Christian Doppler Laboratory for an efficient, recycling-based circular economy lead by the Technical University Vienna. The laboratory aims to provide the scientific knowledge base for efficiently recovering secondary raw materials from different municipal solid waste streams. Another cooperative research project dealing with circular economy, more specifically textile recycling, is the recently started EnzATex project.

Bilateral research is also important to Lenzing's approach to scientific collaboration. Noteworthy examples include its collaboration with the Scripps Institution of Oceanography, University of California San Diego, USA, on the biodegradability of cellulose-based materials in the maritime environment or its collaboration with the Linz Institute of Organic Solar Cells (LIOS), Johannes Kepler University Linz, on the dielectric properties of cellulose fibers.

Lenzing is also active in scientific networks such as the European Polysaccharide Network of Excellence (EPNOE) and in supporting research projects by giving input and engaging in discussions. Finally, experts from Lenzing R&D also participate in relevant conferences and gave more than ten talks in 2021 – most of them with a strong focus on sustainability.

Alternative sources of raw materials for fiber production

Any plant-based material can potentially serve as a source of cellulose and hence as dissolving pulp for fiber production. Lenzing has undertaken extensive research into many different alternative non-wood cellulose sources. In its research, Lenzing identifies promising new cellulose sources and carefully considers their availability, technical feasibility, and economic scalability as well as the overall ecological impact with respect to Lenzing's climate target and circularity approach.

Studies have been conducted on sources such as annual plants like hemp, straw, and bamboo. In general, annual plants have a higher growth rate per hectare than trees. Additionally, certain species have a higher cellulose content. Some of them are already available in large quantities, especially in the form of agricultural waste. This allows an attractive cellulose yield per hectare to be achieved; however, the feasibility of any alternative raw material needs to be assessed case by case.

Based on current data, large-scale and sustainable production of cellulose is still best conducted using wood from sustainably managed forests instead of the above mentioned alternatives.

At the moment the most promising alternative raw materials to wood are residuals from textile production and used clothing. Here Lenzing came up with the first industrially implemented solution: REFIBRA™ technology, which uses a large amount of textile waste as feedstock and represents an important step towards achieving a circular economy.

In order to progress faster and deliver relevant volumes to the market Södra and Lenzing have teamed up in the field of textile recycling in 2021. Together they are now developing their respective processes with the goal of a recycling plant with a capacity of 25,000 tons in 2025. For more information, please see chapter "Circularity & resources".

At the same time, as an innovation leader it is Lenzing's aspiration to find new solutions, looking beyond the horizon. One example is the already mentioned cooperation with Orange Fiber, where it was possible at pilot scale to substitute 20 percent of wood pulp with pulp derived from orange residues. Lenzing is also an active partner in the newly founded INGRAIN innovation alliance, which deals with a biobased circular economy with the goal of connecting agriculture, food processing, and the textile industry.

In order to develop further new sources of non-wood-based cellulose in the future, it requires targeted research into the ecological and economic aspects of industrial production, as well as increased cooperation. A number of challenges need to be addressed, which are described in more detail below.

Availability

Alternatives such as bamboo, straw, and various annual plants do not yet meet Lenzing's needs in terms of availability in the required quality and amount. Many sources from annual plants are only available in the harvesting season and are difficult to store for year-round use. Annual plants are thus especially suitable for seasonal production campaigns. Despite specific benefits and high annual growth per hectare, the material is very bulky and more costly to transport. This favors obtaining the raw materials locally and keeping production capacities small.

Environmental sustainability
The conversion of forest to agricultural land for annual plants is a worldwide phenomenon that increases the pressure on all kinds of forests. Its drawbacks can be seen with palm oil production, for example. As sustainably managed forests store much more carbon per hectare than annual crops, this trend adversely affects the CO_2 balance of the entire value chain. Therefore, the carbon balance must be thoroughly calculated while including all co-products from annual plants.

Another important factor in the sustainability performance of annual plants is the management of the agricultural areas. Highly productive sites need far more fertilizers and pesticides than forests, causing other environmental issues. For example, the overall environmental profile of large-scale bamboo plantations is known to be unsatisfactory.

When looking into processing, important factors with regard to the environmental impact include energy consumption and the use of process chemicals in pulp production. They depend heavily on the actual process and vary significantly from one annual plant to the next. For instance, dissolving pulp can be made with cotton linters, as practiced by the viscose industry in some regions. However, the pulping process uses substantial amounts of chemicals and energy. If cotton linter pulp facilities are not state-of-the-art, resource use, emissions, and waste could be higher for cotton linter pulp.

Technical feasibility
Apart from not causing additional environmental issues, fibers produced with alternative feedstock must meet the same quality criteria as wood-based fibers. The biorefinery process for wood-based fibers is closely aligned with the raw material. This keeps quality and efficiency high and yields climate-neutral bioenergy as a co-product. With non-wood feedstocks, less bioenergy may be generated as a co-product, requiring additional energy sources for processing the feedstock into dissolving pulp, resulting in a potentially negative environmental impact.

Annual plants contain more mineral components and organic substances that have to be removed to produce high-quality dissolving pulp. This purification typically requires the use of aggressive chemicals and causes waste issues. It is a big challenge to develop new sustainable technologies for these materials while maintaining product quality and ecological friendliness. By contrast, in woody plants like trees, these components are concentrated in the bark, which can be easily removed in the first stage of the process.

Paper industry experience of these sources is of limited use since dissolving pulp has to meet very different quality and purity requirements. While modern breeding and harvesting concepts have been developed, a new biorefinery process for annual plants still has to be adapted to the special requirements, not to mention circulation management for process chemicals and treatment of impurities originating from the plants. So far, no established industrial process meets these prerequisites.

For more information, please see the “Wood and Pulp” focus paper.

Water stewardship

Lenzing considers water to be an extremely valuable resource, enabling the production of dissolving wood pulp and cellulosic fiber products. Water stewardship is therefore key to carefully interacting with this natural resource. With water being a precious resource, its increasing scarcity in many parts of the world constitutes a threat to people, the environment, and sustainable economic development. For example, poorly managed wood plantations can put pressure on the regional water balance. Lenzing procures certified wood from sustainably managed forests and therefore mitigates the potential impacts of water stress. On the other hand, some materials used in the textile supply chains occasionally create high water impacts through water consumption and water pollution. Key issues in water stewardship are the efficient use of water in production and the use of state-of-the-art wastewater treatment technologies.

Lenzing provides fibers with a lower water impact than other cellulosic fibers in order to satisfy the growing future demand for fiber and innovates products that omit downstream value chain steps. This substantially reduces water use and impacts. At the end of their life cycle, Lenzing’s fibers are biodegradable and compostable in marine and freshwater environments and therefore do not contribute to microfiber pollution like fossil raw material-based fibers.

The Lenzing Group considers water-related issues in the up-stream and downstream value chain of its products. The Life Cycle Assessment (LCA) methodology is useful for identify-ing hot spots and supports strategic decision-making. Lenzing aims to contribute to the sustainable use of water wherever it can exert a direct or indirect influence. This includes the con-sumption of fresh water as well as the discharge of process water and effluents, which are the subject of Lenzing’s Group Environmental Standard. Figure 21 illustrates Lenzing’s contribu-tion in this context at different stages of the value chain. Lenzing helps its customers reduce their water-related impacts by provid-ing solutions with LENZING™ fibers to replace water-intensive fibers and/or avoid the most polluting steps in the value chain according to Higg MSI data.

MANAGEMENT APPROACH

Material topic: Water use & pollution

Importance for Lenzing

- Water is a precious resource and its increasing scarcity in many parts of the world constitutes a threat to people and to economic development
- Dissolving wood pulp and fiber manufacturing require large amounts of water
- Lenzing is committed to mitigating any environmental harmful impacts and ensure safe access to fresh water
- Showing compliance with local regulatories and state-of-the-art technology

Opportunities

- Better product water footprint through larger proportion of Lenzing pulp and expansion of specialty product manufacturing
- LCA-based communication of Lenzing's products with improved water footprint helps value chain partners fulfill their water targets
- Development of industry benchmarks and contribution to multi-stakeholder initiatives such as ZDHC

Risks

- Physical risk of water scarcity affecting operations
- Water pollution can affect the health of employees and community residents as well as the surrounding environment

Guiding principles

- Group Water Policy
- "Naturally positive" sustainability strategy with "Water stewardship" focus area
- Lenzing Group sustainability targets
- Lenzing Group ISO 14001:2015 certification
- Group Policy for Safety, Health and Environment
- Group Environmental Standard
- Global Code of Business Conduct
- Global Supplier Code of Conduct
- Wood and Pulp Policy
- Higg FEM

Due diligence processes and (ongoing) measures

- Environmental management system based on ISO 14001:2015 (including risk assessment and internal audits to ensure effectiveness of the measures implemented)
- Continuous development of Group Environmental Standard
- ZDHC MMCF roadmap
- Regular Global QESH meetings with management review

Objectives

- Minimizing environmental impacts through impact assessment (LCA) and continuous improvement
- All sites must comply with the Group Environmental Standards
- As part of the Group sustainability targets, Group COD emissions must be reduced by 20 percent by 2022 (baseline 2014)
- Achieve "aspirational" level for ZDHC MMCF wastewater guidelines at viscose facilities by 2024

Achievements/activities in the reporting year

- Update of life cycle methodology to assess water footprint of products and technologies
- Further development of Environmental Key Data (EKD) reporting to comply with updated GRI indicator requirements
- ZDHC MMCF wastewater guideline implemented at viscose production sites
- CDP water reporting

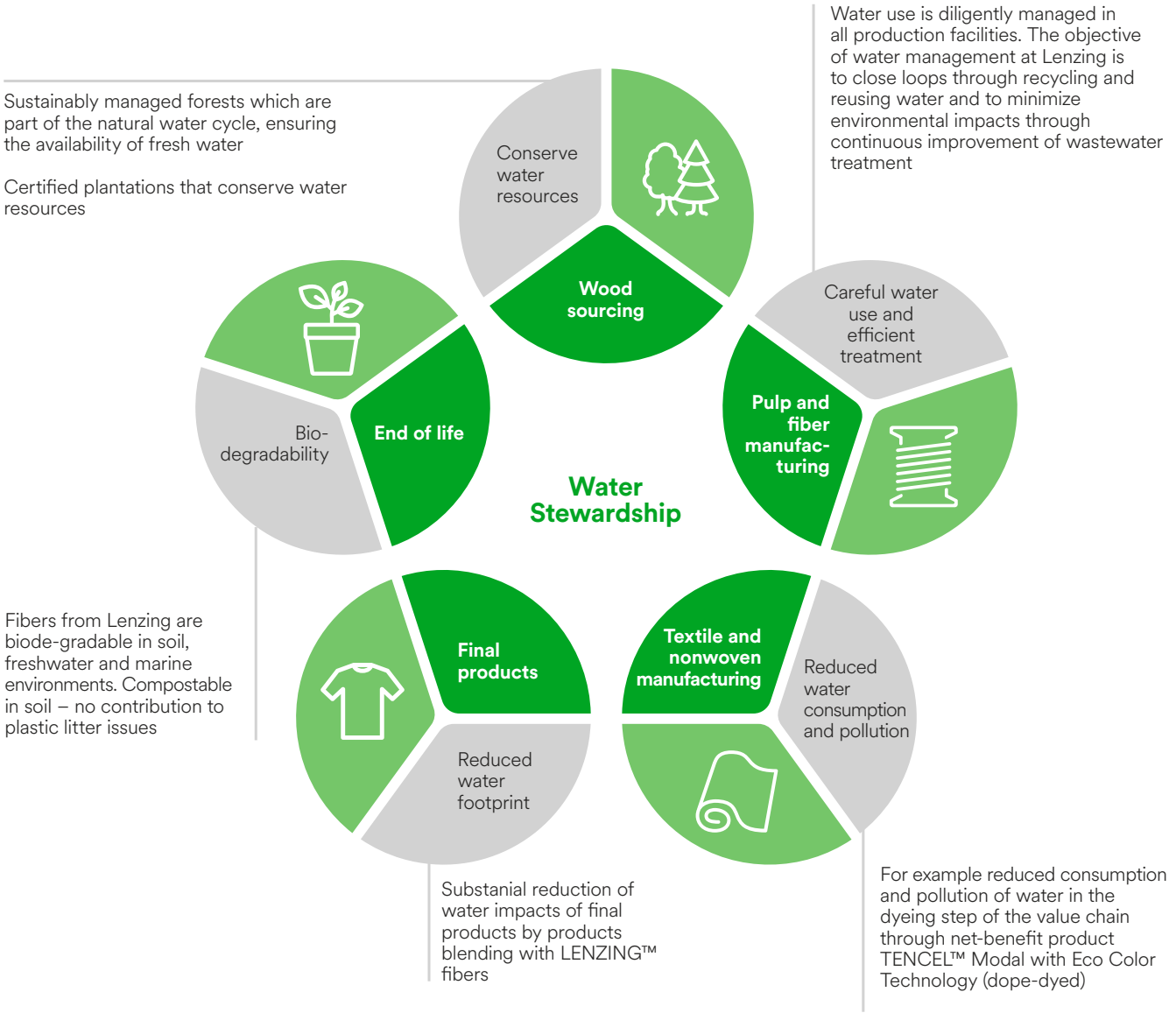
Responsible

- Member of the Managing Board (for group policy and operations)
- Site managers

Supporting

- Global QESH
- Performance.Improvement.Technology

Lenzing's water stewardship Figure 21



Water consumption

All Lenzing production units are located in regions with high water availability, so no operations take place in water stress areas. Nevertheless, the objective of water management at Lenzing is to recycle and reuse as much water as possible. For example, the Paskov pulp plant (Czech Republic) has a closed-loop cooling water system and therefore requires little make-up water to compensate for losses. Furthermore, integrated pulp and fiber production saves water by skipping the process of drying and re-moistening market pulp. Pulp and fiber production facilities obtain water from adjacent water bodies (mainly rivers and groundwater) and municipal local suppliers. During manufacturing, water serves as a cooling and process agent.

Water withdrawal (in megaliters)[a]
(≤ 1,000 mg/L Total Dissolved Solids)

Table 23

	2014	2019	2020	2021
		All areas		
Surface water	103,000	87,954	82,359	87,029
freshwater	0	87,954	82,359	87,029
other water	0	0	0	0
Groundwater	14,000	14,002	12,730	12,980
freshwater	0	14,002	12,730	12,980
other water	0	0	0	0
Seawater	0	0	0	0
freshwater	0	0	0	0
other water	0	0	0	0
Produced water	0	0	0	0
freshwater	0	0	0	0
other water	0	0	0	0
Third-party water	0	7,185	6,849	6,726
freshwater	0	7,185	6,849	6,726
other water	0	0	0	0
Total water withdrawal	**117,000**	**109,141**	**101,938**	**106,735**

a) Freshwater (≤ 1,000 mg/L Total Dissolved Solids), Other water (> 1,000 mg/L Total Dissolved Solids)

Lenzing not only resumes full-scale operations after a pandemic hit global supply chains a year before, but also continues to expand production of specialty fiber products. Thus, water use and water consumptions went back to typical levels and the trajectory for continuously decreasing specific water use has been met again (tables 23–26).

Specific[a] water use in the Lenzing Group
Index in percentage based on m³/t, 2014 = 100 %

Table 24

	2014	2019	2020	2021
Specific water intake/extracted	100 %	92.9 %	96.2 %	90.2 %

a) Specific indicators are reported per unit of production by the Lenzing Group (i.e. pulp and fiber production volumes).

The spinning bath in the lyocell process contains water and the solvent NMMO to dissolve the cellulose polymer prior to spinning. In the viscose process, a mix of process chemicals and water is used. In both production technologies water is recycled by separating it from process chemicals and/or solvents with very high efficiency. This is the state-of-the-art technology at all Lenzing facilities. It enables water to be saved and to provide optimal pre-treatment for water discharge, as well as to optimize fiber properties and quality. Thanks to the recovery systems, Lenzing gains marketable co-products and reusable process chemicals. A final wastewater treatment reduces effluent charge, aiming to avoid potential harms to receiving water bodies by exceeding local quality requirements.

Water discharge Table 25

	2014	2019	2020	2021
Water discharged by destination (in megaliters)				
Surface water		40,026	39,008	40,860
Groundwater		0	0	0
Seawater		0	0	0
Third-party water		59,198	57,779	57,133
of this amount third-party water sent for use to other organizations		0	0	0
Water discharged by water quality				
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)		69,802	67,673	69,772
Other water (> 1,000 mg/L Total Dissolved Solids)		29,422	29,114	28,222
Total water discharged	**108,000**	**99,224**	**96,787**	**97,993**

Substantial amounts of water are consumed by the inherent moisture uptake of cellulosic fibers and the evaporization in the cooling process. The lyocell process requires less water than the viscose fiber production. The expansion plans of Lenzing in lyocell fibers will further reduce the Lenzing Group's specific water consumption in the medium-term.

Water consumption (in megaliters) Table 26

	2014	2019	2020[a]	2021
Total water consumption	9,000	9,917	5,151	8,741

a) Due to subsequent corrections of the wastewater volumes at the Lenzing site, there is a reduction in water consumption of about 19 percent in the figures of 2020.

Wastewater (water effluents)

Sustainable pulp and fiber production comes with strict criteria not only for air emissions but also for water effluents and wastewater treatment. National or regional legislation as well as several industry standards and certification schemes – such as EU BAT, EU Ecolabel, and ZDHC – identify priority substances of concern and give guidance for reducing emissions and hence avoiding harmful impacts on water bodies. Lenzing has decades of experience in the safe handling and treatment of process chemicals used during manufacturing, including water-related issues. Lenzing has been leveraging this extensive knowledge to develop and shape today's industry standards through multi-stakeholder initiatives such as ZDHC. Discharge limits are included in the environmental permits issued for all sites by relevant authorities based on national legislation. Additional intragroup discharge limits that reflect best practices may apply under internal environment standards.

Process water is treated by biological wastewater treatment plants (WWTPs). The Lenzing Group has wastewater treatment plants at all its sites except Grimsby (United Kingdom). However, the wastewater situation at Grimsby complies with all local laws and regulations as well as the EU Water Framework Directive. Planning has begun for the construction of a wastewater treatment plant at the Grimsby site in cooperation with local government with a view to applying new technology from an ongoing R&D project.

Lenzing's site in Purwakarta (Indonesia) is making good progress in improving its wastewater after a project was launched in 2018. The project aims to debottleneck the capacity of one of the two existing wastewater treatment plants by 2022. The sewage collection and treatment system is emarked to be upgraded in order to comply with future requirements. The project also involves building a utility water treatment system and improving the existing stormwater drainage systems. Dedicated teams are currently working on basic engineering for the project, which is expected to be implemented by the target deadline in 2022.

In 2021, another WWTP upgrade project was approved for the site of Mobile (USA). The lyocell plant was one of the first of its kind and will undergo a modernization of the existing WWTP in order to meet the Group's sustainability strategy and target on COD emissions. This investment will not only help fulfilling future ZDHC requirements for lyocell production but also allow potential enlargement of fiber production capacity. The project includes refurbishment of existing structures and new modular elements for a most up-to-date waste water treatment. The investment thereby ensures an extended life cycle of the WWTP. After the project was successfully approved, construction work was initiated in late 2021 and commissioning is expected by end of 2023.

Organic chemicals from waste streams from the pulp production process are extracted early on in the biorefinery process at the Lenzing site (Austria), which significantly reduces the chemical oxygen demand (COD) of effluent water. This is one example of best practices where potential waste streams are converted into useful products, thereby avoiding pollution and reducing the amount of waste to be treated at the wastewater treatment plant.

To improve the wastewater management in China, Lenzing took control of the wastewater treatment plant in November 2019. Since then, the management of Lenzing's site in Nanjing has become responsible for the operation of the wastewater treatment plant and its further optimization. Thanks to ongoing improvements and data monitoring, the wastewater treatment plant complies with Lenzing's Group Environmental Standard and the emissions discharged are reported in the group environmental data.

The Group Environmental Standard is designed to reflect the benchmarks and emission thresholds of the best available technologies for pulp and fiber production. The ambitious framework of the standard aims for continuous improvement. That said, some requirements have not been met by particular sites. However, no infringements of regulatory discharge limits occurred during the reporting year.

Sulfate emissions mainly originate from the viscose process; COD emissions originate from pulp and all fiber production processes. Their reduction is part of the Lenzing Group's sustainability targets (for details, see page 23). Total emissions of COD, sulfates, and amines increased in 2021 over 2020 due to several trial runs for expansion of specialty fiber products, especially in China and Indonesia. However, as the amount of marketable fiber products were again on pre-pandemic levels, specific emissions obviously decreased compared to the previous year (table 27 and 28).

Absolute emissions to water after wastewater treatment plant (t) Table 27

	2014	2019	2020	2021
COD	6,110	5,286	5,510	5,666
SO_4	173,648	152,519	177,003	182,576
Amines	198	208	233	247

Specific[a] emissions to water after wastewater treatment plant (t)
Index in percentage based on kg/t, 2014 = 100 % Table 28

	2014	2019	2020	2021
COD	100 %	86.2 %	99.6 %	91.7 %
SO_4	100 %	87.5 %	112.6 %	104.0 %
Amines	100 %	104.4 %	130.1 %	123.3 %

a) Specific indicators are reported per unit of production by the Lenzing Group (i.e. pulp and fiber production volume)

Air emissions

MANAGEMENT APPROACH

Material topic: Air emissions

Importance for Lenzing

- Managing air emissions to reduce potential risks to environment and society
- Compliance with legislation and stakeholder needs

Opportunities

- Further improvement and development of closed-loop processes and recovery technologies
- Showing leadership in pulp and fiber production with low environmental and social impacts

Risks

- Air emissions carry potential regulatory, technology, market and corporate reputational risks
- Air emissions can affect the health of employees and community residents as well as the surrounding environment

Guiding principles

- "Naturally positive" sustainability strategy with "Sustainable innovations" focus area
- Sustainability targets for the Lenzing Group
- Group Policy for Safety, Health and Environment
- Lenzing Group ISO 14001:2015 certification
- Group Environmental Standard
- Global Code of Business Conduct
- Global Supplier Code of Conduct
- Higg FEM

Due diligence processes and (ongoing) measures

- Environmental management system based on ISO 14001:2015 (including risk assessment and internal audits to ensure effectiveness of the measures implemented)
- Regular Global QESH meetings with management review

Objectives

- All sites must comply with the Group Environmental Standard based on EU BAT by 2022
- Group-wide EU Ecolabel certification

Achievements/activities in the reporting year

- LURA III (air cleaning system), started operations in the viscose-modal production in Lenzing
- Lenzing contributing to leading multi-stakeholder initiatives (ZDHC, SAC, etc.)
- Continuous improvement activities to further reduce air emissions

Responsible

- VP Global QESH

Reduction of sulfur emissions

Sulfur and sulfur compounds are indispensable for the standard viscose fiber manufacturing process. Lenzing has dramatically reduced sulfur emissions over the decades by closing loops and installing recovery systems. Although all of the Lenzing Group's viscose fiber producing sites (Lenzing, Austria; Nanjing, China; and Purwakarta, Indonesia) are equipped with waste gas purification and recovery technologies, some carbon disulfide (CS_2), hydrogen sulfide (H_2S), and sulfur dioxide (SO_2) is emitted from the process itself and from on-site energy production. The planned carbon disulfide absorption plant (CAP) project in Indonesia is on schedule. It will be essential for reducing specific sulfur emissions by 50 percent (target 1).

In 2021, after the market recovery from the 2020 COVID-19 pandemic, production at Lenzing sites has normalized to a large extent. As a result, the emissions are comparable to the 2019 level. At the Austrian site in Lenzing, CS_2 emissions have fallen due to the new emission treatment system in operation since the beginning of 2021 (table 29).

Lyocell fiber production generates only trace emissions since NMMO, an organic solvent, remains in the water/solvent cycle throughout the entire process and is recovered at a rate of more than 99.8 percent.

At the Nanjing site, projects on reducing odor emission as carried out, which resulted the reduction of sulphur emission to air in Q4 2021.

For more information about important steps taken in 2021, see section "Sustainability targets, measures and progress".

Absolute emissions to air[a] Table 29

	2014	2019	2020	2021
Sulfur emissions (t) (CS_2, H_2S emissions expressed as sulfur)	34,787	23,280	19,187	25,969
SO_2 emissions (t)	3,908	2,684	2,135	2,603
NOx emissions (t)[b]		619	587	1,321

a) Sulfur emissions were calculated using mass balance, and SO_2 emissions are based on measurements.

b) NOx data is only available on Group level from 2019 onwards respectively for the Indonesian production facility since 2021.

Specific emissions to air
Index in percentage based on kg/t, 2014 = 100 % Table 30

	2014	2019	2020	2021
Sulfur emissions	100.0 %	66.7 %	60.9 %	73.8 %
SO_2 emissions	100.0 %	68.4 %	60.3 %	65.9 %

Health & safety

MANAGEMENT APPROACH

Material topic: Health & safety

Importance for Lenzing

- Employee health and wellbeing is a fundamental prerequisite for the Lenzing Group's long-term success and business growth
- Lenzing is morally, ethically and legally responsible for occupational health and safety, which ensures the wellbeing of Lenzing's employees, visitors and contractors

Opportunities

- A safe work environment, and supportive health measures for employees enables an engaging and contributive workforce
- Upcoming generations of talent are likely to value purpose, fulfilment and social responsibility more highly than ever before
- Educating, training and motivating team members to behave safely and to care for each other
- Occupational medical services to ensure that employees are fit and well, offering health surveillance to support workplace risk management and employee health screening to support health and wellbeing
- Protecting people based on the belief that every adverse event, injury and occupational illness is preventable

Risks

- Occupational health and safety risks for own employees, visitors and contractors
- Talent attraction and retention

Group guiding principles

- sCore TEN strategy
- HR Strategy
- Policy for Safety, Health and Environment
- ISO 45001:2018 certification
- Global Code of Business Conduct
- Global Supplier Code of Conduct
- Health guiding principle ("House of Health")
- Life-Saving Rules Group Guideline

Processes and (ongoing) measures

- Lenzing Corporate Action Plan (COVID-19)
- Safety, Health & Environment Action Reporting System
- Management of risk processes
- Regular Global QESH meeting with management review
- Regular meetings of health and safety committees at every production site
- Heartbeat for Safety Program
- IOSH safety training
- Safety Walks and Talks
- Monthly safety webinars
- Provision of health services
- eMotion program with "Moveeffect" app

Objectives

- Global roll-out and implementation of guiding principles to continuously improve group-wide safety and health performance
- Contribution to a high level of health and wellbeing
- Commitment to a sustainable and healthy leadership style

Achievements/activities in the reporting year

- Health Climate Index survey for employees to develop a work climate everybody feels comfortable with
- Health promotion campaigns e.g: Boost your immune system
- "ZUKUNFT SICHERn" (Safe Future) safety project at the Lenzing site
- COVID-19 care measures: offering vaccinations, tests
- 15 million safe man hours without a lost time incident at major construction side in Thailand
- Total recordable frequency rate reaching group target
- Introduction of safety webinars

Responsible

- Managing Board
- VP QESH
- VP Human Resources
- Senior leadership roles
- Health & safety is a shared responsibility through all layers of the organization

Supporting

- Corporate Communications

Health

The Lenzing Group's health management system ("House of Health") is based on the salutogenesis concept, which is tailored to the individual social and health care systems of the countries where Lenzing operates. It provides a conceptual framework for targeted investments in the health of Lenzing's employees. Global Health Care Management works closely with the regional employees responsible for health issues as well as the department of Quality, Environment, Safety and Health (QESH).

Health care at Lenzing production facilities

Lenzing gives employees at almost all production sites access to an in-house primary care system that complements the existing health systems of the individual countries.

Lenzing uses medical partners in the regions around the sites to offer its employees a diagnosis and therapy service tailored to local needs. The range of medical services extends from several medical examinations and therapy sessions per week at the sites in Mobile (United States) and Grimsby (United Kingdom) through to healthcare services for family members at a clinic in the vicinity of the production site in Purwakarta (Indonesia).

The large production plants in Lenzing and Purwakarta also have their own outpatient clinics with qualified medical staff for quick, competent outpatient treatment of acute conditions and injuries as well as their own ambulances to ensure prompt follow-up treatment at special medical facilities.

Every Lenzing facility has first aiders trained in certified basic and regular refresher courses.

Health Climate Index (HCI) survey

Since 2021, all employees have been surveyed twice a year about their psychosocial working conditions. An index is formed from 17 questions on the topics of "health, social capital, effort, reward, control of work task, recreation, meaning, support, respect, development", the trend of which over several survey rounds reflects the development of the working climate at the individual company sites. The responses are evaluated anonymously, and each participant receives personal feedback on their stated working conditions, which they can discuss with their manager. The summarized results and the trends at the individual sites are discussed in the Group management and, based on this, focal points are derived which appear suitable for improving or optimizing the internal working climate. The goal is to make workplaces at the Lenzing Group as sustainable as possible. In the first two survey rounds, the HCI changed from 67 percent to 66 percent. An HCI of 100 percent would mean optimal working conditions for all participating employees. The participation rates in both survey rounds of 2021 were 39 percent and 36 percent, respectively.

Health promotion

In addition to numerous regular activities at the company's sites, fitness training has been the focus of the Lenzing Group's health-promoting measures (eMotion programs) since 2019. These programs are designed to motivate and support employees in adopting a healthy lifestyle at work and during their leisure time. Due to the pandemic, activities were still reduced in 2021, but health information related to COVID-19 was also communicated via the health app mentioned below.

A healthy living app specifically tailored to companies (Moveeffect®) was adapted to meet the needs of the company and the various countries in which Lenzing operates. It was then distributed to all employees for voluntary use. The app aims to encourage employees to become more active via features such as feedback tools on the user's own exercise habits, personal and group targets, ranking options, and small-scale competitions. It also offers a platform for communicating about personal fitness activities and initiating group activities. In 2021, the company used the app's innovative appointment booking feature to offer COVID-19 vaccinations and "COVID-safe" health checks and COVID-19 antibody tests to employees at the Lenzing site.

Boost your immune system

In a group-wide six-week program, which could be accessed via the Moveeffect® app, employees were encouraged to strengthen their immune system. On the one hand, tips were given for a healthy lifestyle, and on the other hand, there was the "Boost your immune system" challenge, in which smiles could be collected through activities. All of the measures were designed to build up a daily healthy routine. The focus was on the topics: Move, Sleep, Stay Hydrated, 5 a Day, Vitamin D-Loading and Relax. Furthermore, vitamin D boxes were distributed to participants at all locations. The company also provided additional support in the form of free COVID-19 and influenza vaccinations.

Occupational medical care

In 2021, Lenzing continued to work on the gradual development of a coordinated network for occupational medical care that exceeds the minimum standards required by the individual countries. By enhancing competence in occupational medical care, Lenzing will ensure that employees and managers have the best resources available to protect themselves from and deal with risks in the workplace.

The COVID-19 pandemic also challenged occupational medical care at all Lenzing sites. Additional tasks such as COVID-19 testing, contact tracing and staff information were added to the daily activities. Thanks to the well-coordinated teams at the sites and the excellent preparation for global crisis management, the company has been able to manage the pandemic well so far. To date, there have been no major outbreaks at the sites.

OCCUPATIONAL HEALTH PROTECTION DURING THE PANDEMIC – TWO EXAMPLES

Lenzing site

Since the outbreak of the pandemic, three full time equivalents at the Lenzing site have been working exclusively on COVID-19 and the associated testing and contact tracing measures. The well-established health center at the company's headquarters and the internal and external laboratories also play an essential role in this context. Furthermore, close and smooth cooperation with local authorities has been in place from the outset.

Since the early summer of 2020, the Lenzing site has been carrying out COVID-19 tests directly on site using two of its own PCR devices. The throat swabs are taken by a doctor at the health center and analyzed in the company's own laboratory. To date, 1321 tests have been performed. The results of the PCR tests are always available within 24 hours. In addition, more than 960 antigen tests have also been performed directly at the site in 2021.

In addition to people with symptoms, close contacts also have the option of getting tested in the company. Employees are encouraged to get tested in the company in order to quickly contain or prevent any further spread of the virus.

In January 2021, the immune status of 422 employees was determined via a voluntary blood test. Six percent of those participants who did not have a known COVID-19 infection nevertheless had antibodies due to asymptomatic infection.

Construction site in Brazil

It was very important for the Lenzing Group to be able to continue construction work in Brazil. An extremely dedicated external company (with several doctors and medical support staff) was contracted to provide medical care for personnel. A physician was also hired to manage and coordinate all COVID-19 issues. In addition, extensive rapid antigen testing and PCR testing was carried out in Brazil at a very early stage in collaboration with an external laboratory.

Safety

Occupational health and safety

The priority throughout the Lenzing Group is keeping everyone safe and maintaining the safety measures in place. Whether working from home or adapting to new site procedures, the employees play an instrumental role in ensuring Lenzing's business can continue to operate safely during the pandemic.

The strategy for improving health and safety and achieving the commitment to "LEAVE HOME HEALTHY, COME HOME HEALTHY", is outlined in the "Heartbeat for Safety" roadmap and throughout 2021, steps were taken at the corporate level to continue building a strong safety culture. A key initiative was the introduction of monthly safety webinars, based on a zero accident concept, which opens up the field of safety culture and breaks it down into bite-sized components to facilitate new and critical thinking to inspire practical action. The safety webinars have directed the efforts to align safety culture concepts with the business agenda, with the involvement of contributors from senior managers and leaders throughout the group.

Within the management systems, another central development in 2021 was the transition from OHSAS 18001 to the new Health and Safety Management standard ISO 45001, which will improve processes, help monitor progress and support efforts to build a strong safety culture. In order to achieve this certification, gap analysis was undertaken at all sites as well as audits conducted by Lenzing's own in-house safety experts, which were also validated externally by an independent certification body, using remote and on-site auditing.

Maintaining a robust health and safety communication framework, encourages shared learning and preventative action following incidents. The reporting processes were enhanced with the introduction of a safety dashboard at the corporate level to support the safety cross and safety triangle concepts. This is intended to maintain transparency and streamline the management review and reporting tools, whilst using business analytics to provide an interactive overview across the group.

The new structure within the Global Quality, Environment, Safety and Health (QESH) team allowed the company to streamline the global meeting structure, following the four technology streams within the business. This enables a full understanding of all averse events relating to health and safety to be obtained, with the relevant event details and learning outcomes at the corporate level shared via a regular performance review.

In 2021, Lenzing continued to improve the management of hazardous substances across the group with the introduction of the chemicals database, which will allow the systematic organization of all relevant data sheets, the collection and presentation of current data and information to all employees.

For more information about Lenzing's SHE policies, please visit the Lenzing website.

Focus on improving safety performance

SAFETY HIGHLIGHTS AT LENZING SITE IN 2021, "ZUKUNFT SICHERN" SAFETY PROJECT

In 2021, a joint safety project for the Lenzing site was launched, aimed at improving the safety work environment, whilst reducing the number of accidents and injuries and creating the necessary framework conditions for continued improvement.

Setting one standard for:

- Training, instruction and communication of safety topics – standard has been developed and implementation in progress
- Reinforcement of Life Saving Rules, with special focus on isolations, line breaking and the permit to work system – standard has been developed, the next step is training for the standard
- Job Safety Analysis – standard has been developed and implementation has begun

Current performance compared to previous years

As these figures are affected by the COVID-19 pandemic, this should be considered when comparing them with previous time periods.

In 2021, zero fatal accidents were recorded. Lenzing also saw a reduction in the rate of recordable work-related injuries for employees from 0.92 in 2020 to 0.81 in 2021. The rate for contractors working on Lenzing sites also dropped slightly from 0.86 in 2020 to 0.78 in 2021. Meanwhile, the rate for all work-related injuries rose to 3.0 in 2021 from 2.46 in 2020 for employees and to 1.59 in 2021 from 1.48 in 2020 for contractors. This may be partly attributable to increased activity during the COVID-19 pandemic, as Lenzing's production sites returned to full production. Thus, the changes in injury figures in this report should be interpreted with caution and may not be indicative of an ongoing trend, as opposed to random year to year variation.

High-consequence work-related injury

In terms of broader personnel safety performance, high-consequence work-related injury events (i.e. injuries from which the worker cannot, does not, or is not expected to recover fully to pre-injury health status within six months) have remained at zero since 2019.

Work-related injuries for all employees Table 31

	2019	2020[a]	2021
Total hours worked (productive working hours)	14,104,975	14,572,350	13,661,177 (15,440,743)
i) Number of fatal injuries	0	0	0 (0)
Rate of fatal injuries	0	0	0 (0)
ii) Number of high-consequence work-related injuries	0	0	0 (0)
Rate of high-consequence work-related injuries	0	0	0 (0)
iii) Number of recordable work-related injuries	148	67[b]	55 (59)
Rate of recordable work-related injuries	2.10	0.92	0.81 (0.76)
iv) Number of work-related injuries or ill health	228	179[c]	205 (220)
Rate of work-related injuries	3.23	2.46	3.01 (2.85)

Work related injuries for other workers

	2019	2020[a]	2021
Total hours worked (productive working hours)	5,160,620	4,179,812	5,917,437 (30,706,268)
i) Number of fatal injuries	0	0	0 (0)
Rate of fatal injuries	0	0	0 (0)
ii) Number of high-consequence work-related injuries	0	0	0 (0)
Rate of high-consequence work-related injuries	0	0	0 (0)
iii) Number of recordable work-related injuries	37	18	23 (42)
Rate of recordable work-related injuries	1.43	0.86	0.78 (0.27)
iv) Number of work-related injuries or ill health	46	31	47 (232)
Rate of work-related injuries	1.78	1.48	1.59 (1.51)

Bracketed data includes major projects in 2021

a) Exclusive of major projects in Brazil and Thailand for reasons of data consistency

b) 2020 reduction due to introduction of recordable incident classification in accordance with OHSAS standard

c) Reduction partly related to COVID-19

Top five work related injuries

Table 32

	2019	2020[a]	2021[b]
The top five work-related injuries for employees	–	Cuts and lacerations (50) Bruises (21) Strains (17) Chemical burns (15) Abrasions (15)	Cuts & lacerations (19) Fractures (11) Strain (6) Hot burn (5) Sprain (5)
The top five types of injuries for contractors	–	Chemical burns (7) Cuts and lacerations (5) Abrasions (4) Fractures (4) Bruises (3)	Cuts & lacerations (11) Fractures (5) Bruise (5) Sprain (5) Condition due to substances (4)

a) Exclusive of major projects Brazil and Thailand for reasons of data consistency
b) 2021 data analysis is for total recordable injuries only

Human rights & fair labor practices

MANAGEMENT APPROACH

Material topic: Human rights & fair labor practices

Importance for Lenzing

- People are at the core of the company's business success

Opportunities

- Good labor practices promote staff safety and wellbeing and ensure healthy and satisfied employees
- Enabling personal success and contributing to the growth and success of the company
- Lenzing is a first choice employer in the global fiber industry
- Diversity promotes the quality of business decisions and contributes to the company's resilience
- Competitive advantage through a committed workforce
- Development of a corporate culture that is characterized by openness and mindful interactions
- Definition of related targets of social sustainability

Risks

- Risk of discrimination and other possible negative impact on human rights
- Potential regulatory, technology, market and corporate reputational risks

Guiding principles

- Local Labor Right laws
- Policy on Human Rights and Labor Standards
- Lenzing Group Reward Guideline
- Global Code of Business Conduct
- Global Supplier Code of Conduct
- Wood and Pulp Policy
- Sustainability Policy
- HR Strategy
- sCore TEN culture and leadership model
- Diversity concept
- Personnel development measures and tailor-made training programs

Due diligence processes and (ongoing) measures

- Compensation and benefit benchmarks and grading systems
- Application of 4-eye's principles
- Whistleblower system

Objectives

- Global roll-out and implementation of guiding principles
- Contribution to SDG 5, 8 and 10
- Continuous development of corporate culture
- To have a continuously valid third-party audited accredited social certificate for every Lenzing Group production (fiber or dissolving wood pulp) site by 2024
- To enable people to live even better lives with Lenzing products and by respecting human rights, employee wellbeing, and diversity
- To continuously support the development of local communities near Lenzing production sites and support social welfare programs to 2025 and beyond

Achievements/activities in the reporting year

- No cases of discrimination and human rights abuses reported in the CMS (Compliance Management System)
- Eye-to-eye partner for local unions, works councils, and other workforce representatives
- No strikes at any Lenzing production facility
- Annual performance reviews
- Employees training programs
- Regional social projects
- Implementation of Global Performance and Talent Management

Responsible

- VP Corporate Human Resources

Supporting

- Corporate Communications
- Corporate Sustainability

Target setting

The Lenzing Group highlights "People" as a strategic element of sCore TEN, which demands a systematic agenda and the management of social responsibility targets. Doing good and supporting social causes is part of the company's DNA and fully in line with its philosophy. Success in social sustainability and the people agenda can do justice to the world and improve business results, while boosting brand value and the external perception of the company. Lenzing is of the firm belief that this will further enhance a shared set of values between employer and employees. This cross-departmental project was initiated in 2020 and continued in 2021 to create a framework for joint social responsibility targets in order to:

- define, agree and approve global targets across the group
- prepare the ground for follow-up lighthouse projects and quick wins
- ensure the organizational integration & anchoring of the topic for the long term

The Lenzing Group's corporate culture is characterized by long-term partnerships, close collaboration, and mutual respect based on open dialog and transparency. Sustainability has been integrated into Lenzing's global human resources (HR) strategy, HR policy, and HR processes as a company value.

The Lenzing Group is committed to conducting business in a manner that respects the rights and dignity of all people. Lenzing respects internationally recognized human and labor rights for all employees and business partners.

Labor rights are subject to national laws. Employees at all Lenzing sites receive fair wages thanks to a highly regarded internal global grading system, collective bargaining, the activities of union representatives, and national protections for human rights. The EcoVadis supplier assessment tool includes fair labor rights in the upstream supply chain. The wood certification systems used by Lenzing ensure that labor conditions meet the requirements of ILO Core Conventions. The Lenzing Group's own labor practices also form part of the EcoVadis assessment.

Employees

2021 was also a challenging year for employees. From switching between home and office working to constantly changing safety regulations – everyone supported the measures and played a huge part in keeping the disruption caused by COVID-19-related downtime to a minimum.

Global pandemic – global crisis management

As part of the Group-wide crisis management, Lenzing reacted quickly, efficiently and innovatively to protect employees and their families and avoid production downtime. It set up local COVID-19 crisis teams at every production site and all sites under construction to supplement global crisis management efforts. Meetings were held at least once a week in the reporting year under review to evaluate proposed measures throughout the Group and decide whether to implement them.

A Lenzing corporate action plan was created to align corporate pandemic safety measures with national regulations and policies. The company's measures were generally stricter and implemented earlier than national regulations. Moreover, they were never significantly relaxed within the company even though individual countries eased their lockdowns at times. This action plan includes a number of measures that were implemented on a site-specific basis.

- Social distancing and anti-transmission measures (working from home, maintaining a distance of at least 2 m, face masks, travel bans or restrictions)
- Technical measures (temperature control checks at entrances, surface disinfection)
- Information on personal hygiene practices to avoid infections
- Psychological support (hotline, assistance for employees and families in need)

"Lock-in" schemes were also developed for the Lenzing Group's production sites to keep operations running at all times.

All employees at the Austrian sites were offered testing (antigen, PCR) to quickly confirm or rule out suspected infections. Online townhall meetings were held regularly – every two weeks in the first few months – so that employees could hear about the current situation from the Managing Board and have the opportunity to ask questions or express concerns. Local crisis teams set up additional online meetings to explain new measures and answer employees' questions.

One of the first actions that Lenzing took was to instruct employees to work from home wherever possible. It quickly built the necessary infrastructure so that remote workers could have the best possible technical working conditions. For more information on remote working conditions and opportunities, please refer to "Digitalization & cyber security" chapter.

The Austrian sites signed up for the government's furlough program, which allows companies to quickly respond to the changes in business conditions without layoffs. Lenzing was also forced to temporarily slow production and even close plants at some sites.

International workforce

The Lenzing Group's workforce is becoming increasingly international. Despite the company's firm roots in Europe, an international corporate culture has evolved in the Lenzing Group based on strong collaboration between its sites in Asia, Europe, and America. The management team actively supports the internationalization of the workforce at all levels. At the same time, Lenzing remains an agile, hands-on company committed to service excellence while still preserving a familial atmosphere.

Further milestones in terms of internationalization include the successful integration of the new plants in Thailand and Brazil, while taking into account the respective national cultures of staff members. The installation of the pulp plant in Brazil will allow Lenzing to extend its asset base to South America.

Diversity

Respect, diversity, and inclusion are fundamental pillars of the sCore TEN corporate strategy and integral, indispensable elements of the Lenzing culture. A diversity program was adopted on February 19, 2018. These rules are taken into consideration in staffing positions on the Supervisory and Managing Boards and are also principles applied more broadly in the overall recruitment process. It is in the interest of the group to further grow diversity with respect to experience, cultural background and gender. The percentage of Austrian personnel decreased from around 47 percent in 2020 to some 45 percent in 2021 as Lenzing continued to expand internationally. The number of female managers increased by 21 percent in 2021 versus the year before and the total number of female employees increased by almost 14 percent, twice the rate of growth of male employees.

In the Lenzing Group's Policy on Human Rights and Labor Standards, Lenzing undertakes to respect and support fundamental labor rights principles such as protection from discrimination, harassment, and inhumane treatment. This encompasses protection against employment decisions based on personal characteristics or beliefs that are not related to the ability to do one's job, including gender, age, race, color, national origin, ethnicity, social background, sexual orientation, family responsibility (including pregnancy), disabilities, political opinion, sensitive medical conditions, marital status, and any other discrimination in working conditions.

Lenzing has initiated a review to better understand the barriers to enabling greater diversity in its workforce, particularly in relation to gender diversity. In November 2021 Lenzing conducted three focus groups across the company to better understand the challenges in achieving more balanced gender representation. The objective was to identify the lived experience of men and women in Lenzing, and determine whether barriers exist in enabling greater gender diversity. In total 19 women and 9 men across the global Lenzing organization were invited to participate. Lenzing worked with Shape Talent, a renowned UK based agency. An evidence-based model was used which describes the three categories of barriers that undermine women's equal representation in the workplace, particularly at senior levels. The results are currently analysed and will be actioned in 2022.

In a survey by the Financial Times and Statista, the Lenzing Group was awarded the "Leader in Diversity 2022" accreditation logo in the area of diversity. Over 100,000 workers across Europe voted.

In a Europe-wide survey last year, over 100,000 employees were asked to rate their employers and other companies in the areas of age distribution, gender distribution, ethnic distribution, inclusion, LGBTQ+ and diversity in general. Evaluations and recommendations from HR experts were also included in the analysis, which was carried out by the Financial Times and the independent market research company Statista. Lenzing clearly stood out in the ranking in the area of Manufacture and Processing of Materials, Metals and Paper and was therefore awarded the accreditation logo.

Respect, diversity and inclusion are fundamental pillars of the Lenzing corporate strategy sCore TEN and are thus an important part of Lenzing's success. The diversity of employees is what makes Lenzing stand out: the company not only benefits from their know-how and expertise, but also grows every day through teamwork, new perspectives and approaches, as well as the respect its employees show to one another every day.

Fair pay committment

Lenzing AG, with its strong focus on sustainable growth, is committed to recognizing equality and diversity in the implementation of compensation practices worldwide. The company has set itself the goal of designing salary structures and levels in such a way that they are both internally fair and externally competitive.

Internal equity means paying equal salaries or wages for work of equal value (job evaluation system and classification methodology) and is important to achieve job satisfaction and meet regulatory requirements. External competitiveness is determined by tracking market wages through published surveys and other local data sources.

In addition, in the reporting year preparations have been made to anchor the performance of an annual gender pay equity analysis in the Lenzing Group Reward Guideline to ensure equal pay and close any gaps. In this context, Lenzing AG will continue to conduct an annual benchmarking and data analysis and keep the Management Board informed of its progress.

Employees in numbers

Compared to previous years, the ongoing progress and development of Lenzing's two future projects in Brazil and Thailand have greatly contributed to increasing employee headcount in 2021. The main reasons for employees leaving in 2021 are a higher number of retirements and mutual contract terminations. This is reflected in all figures in the following tables.

Employees 2021 Table 33

General information required	2019	2020	2021
Total number of employees	7,036	7,358	7,958
Female	1,010	1,090	1,244
Male	6,026	6,268	6,714
thereof in Austria	3,513	3,482	3,575
thereof in Indonesia	1,735	1,614	1,633
thereof in Czech Republic	416	410	451
thereof in China	751	839	873
thereof in USA	209	210	221
thereof in UK	200	203	218
Others (India, Thailand, Turkey, Korea, Singapore, Taiwan and Brazil)	212	600	987
Total number of employees – full time	5,482	6,904[a]	7,500
Female	717	797	933
Male	4,765	6,107	6,567
Total number of employees – part time	1,554	454	458
Female	293	293	311
Male	1,261	161	147
Total number of supervised workers	457	433	444
Number of apprentices	190	184	184
Female	24	22	20
Male	166	162	164

a) Due to a transition to a 5-shift system, these employees (= 0.9 FTE) were counted as part-time employees in the previous reporting years. From 2020 onwards they will be counted as full-time employees and therefore be included in the full-time employees figures.

Employees 2021

Table 33

Individuals within the organization's governance body (Managing and Supervisory Board)[b]	2019	2020	2021
Number of individuals, total	15	14	14
Under 30	0	0	0
Between 31 and 50	4	2	4
Over 50	11	12	10
Female	1	2	2
Male	14	12	12
Percentage of individuals			
Under 30	0 %	0 %	0 %
Between 31 and 50	27 %	14 %	29 %
Over 50	73 %	86 %	71 %
Female	7 %	14 %	14 %
Male	93 %	86 %	86 %
Individuals outside the organization's governance body[c]	**2019**	**2020**	**2021**
Number of individuals, total	7,032	7,353	7,953
Under 30	1,304	1,337	1,487
Between 31 and 50	4,116	4,341	4,722
Over 50	1,612	1,675	1,744
Female	1,010	1,090	1,244
Male	6,022	6,263	6,709
Percentage of individuals			
Under 30	18.5 %	18.2 %	19 %
Between 31 and 50	58.5 %	59.0 %	59 %
Over 50	22.9 %	22.8 %	22 %
Female	14.4 %	14.8 %	16 %
Male	85.6 %	85.2 %	84 %

b) Excluding Supervisory Board members appointed by works council, members of Supervisory Board are not included in any other headcount figure/table, apart from this one.
c) Including Supervisory Board members appointed by works council

Employees 2021 Table 33

Individuals within managing role – overall (at least one direct)	**2019**	**2020**	**2021**
Number of individuals, total	793	836	941
30 and below	32	32	34
Between 31 and 50	480	507	586
Over 50	281	297	321
Female	99	128	155
Male	694	708	786
Percentage of individuals			
30 and below	4 %	4 %	4 %
Between 31 and 50	61 %	61 %	62 %
Over 50	35 %	36 %	34 %
Female	12 %	15 %	16 %
Male	88 %	85 %	84 %
Number of employee **category 1**, total	596	653	748
30 and below	13	16	17
Between 31 and 50	348	388	466
Over 50	235	249	265
Female	84	115	138
Male	512	538	610
Percentage of employee category 1			
30 and below	2 %	2 %	2 %
Between 31 and 50	58 %	59 %	62 %
Over 50	39 %	38 %	35 %
Female	14 %	18 %	18 %
Male	86 %	82 %	82 %

Category 1: white collar manager

Category 2: blue collar manager

Category 3: supervised worker – manager

Employees 2021 Table 33

Number of employee **category 2**, total	193	167	171
30 and below	19	16	16
Between 31 and 50	130	108	109
Over 50	44	43	46
Female	15	11	13
Male	178	156	158
Percentage of employee category 2			
30 and below	10 %	10 %	9 %
Between 31 and 50	67 %	65 %	64 %
Over 50	23 %	26 %	27 %
Female	8 %	7 %	8 %
Male	92 %	93 %	92 %
Number of employee **category 3**, total	4	16	22
30 and below	0	0	1
Between 31 and 50	2	11	11
Over 50	2	5	10
Female	0	2	4
Male	4	14	18
Percentage of employee category 3			
30 and below	0 %	0 %	5 %
Between 31 and 50	50 %	69 %	50 %
Over 50	50 %	31 %	45 %
Female	0 %	13 %	18 %
Male	100 %	88 %	82 %

Employees 2021 Table 33

Newly hired employees	2019	2020	2021
Number of newly hired employees, total	605	888	1198
Female	111	185	279
Male	494	703	919
Under 30	44	152	285
Between 30 and 50	324	465	644
Over 50	237	271	269
Austria	294	213	315
Indonesia	40	2	105
China	115	96	132
Czech Republic	26	18	63
USA	30	12	31
United Kingdom	19	11	32
Others (India, Thailand, Turkey, Korea, Singapore, Taiwan and Brazil)	81	536	520
Percentage of newly hired employees, total	8.6 %	12.1 %	15.1 %
Female	18.4 %	20.8 %	23 %
Male	81.7 %	79.2 %	77 %
Under 30	7.3 %	17.1 %	24 %
Between 30 and 50	53.6 %	52.4 %	54 %
Over 50	39.2 %	30.5 %	22 %
Austria	48.6 %	24.0 %	26 %
Indonesia	6.6 %	0.2 %	9 %
China	19.0 %	10.8 %	11 %
Czech Republic	4.3 %	2.0 %	5 %
USA	5.0 %	1.4 %	3 %
United Kingdom	3.1 %	1.2 %	3 %
Others (India, Thailand, Turkey, Korea, Singapore, Taiwan and Brazil)	13.4 %	60.4 %	43 %

Employees 2021

Table 33

Employee turnover	2019	2020	2021
Number of employees that left the company, total	408	566	598
Female	47	105	125
Male	361	461	473
Under 30	100	119	135
Between 30 and 50	160	240	262
Over 50	148	207	201
Austria	168	244	222
Indonesia	68	123	86
China	100	95	98
Czech Republic	16	24	22
USA	26	11	20
United Kingdom	9	8	17
Others (India, Thailand, Turkey, Korea, Singapore, Taiwan and Brazil)	21	61	133
Percentage of employees that left the company (turnover rate), total	5.8 %	7.7 %	7.5 %
Female	11.5 %	18.6 %	21 %
Male	88.5 %	81.5 %	79 %
Under 30	24.5 %	21.0 %	23 %
Between 30 and 50	39.2 %	42.4 %	44 %
Over 50	36.3 %	36.6 %	34 %
Austria	41.2 %	43.1 %	37 %
Indonesia	16.7 %	21.7 %	14 %
China	24.5 %	16.8 %	16 %
Czech Republic	3.9 %	4.2 %	4 %
USA	6.4 %	1.9 %	3 %
United Kingdom	2.2 %	1.4 %	3 %
Others (India, Thailand, Turkey, Korea, Singapore, Taiwan and Brazil)	5.2 %	10.8 %	22 %

Employees 2021 Table 33

Employees with disabilities[d]	2019	2020	2021
Lenzing Group	104	101	90
Austria	88	79	69
Czech Republic	11	11	8
USA	3	2	2
Indonesia	2	2	2
China	–	–	–
Brazil	–	7	9

d) No formal recording of numbers of employees with disabilities is conducted at the site in Grimsby (United Kingdom) since there is no definition provided by local legislation.

Most Lenzing Group employees are employed in a permanent employment/service relationship. It is currently customary to work the first 6 months under a fixed-term contract followed by an automatic transition to a permanent employment/service relationship. Only around 2 % of the workforce (including external personnel) has a genuine fixed-term employment/service contract that goes beyond the usual 6-month fixed-term period. For this reason, there is no further separate breakdown into permanent/fixed-term employment contracts. Lenzing complies with the local labor standards in all countries of operation. Collective agreements cover 80.2 percent (2020: 84.0 percent, 2019: 81.9 percent) of the Lenzing Group's global workforce. 95.0 percent (2020: 91.1 percent, 2019: 98.9 percent) of employees are subject to notice periods governed by labor law or collective agreements.

Works council

The Lenzing Group's management is committed to a transparent information policy towards the employees' official representatives. There are local works councils at the facilities in Lenzing and Heiligenkreuz. In accordance with the Austrian Labor Constitution Act, representatives of the Lenzing AG works council at the Lenzing site have seats and voting rights on the Supervisory Board. The Lenzing AG works council represents the interests of employees at the sites in Lenzing and Heiligenkreuz (Austria). In addition to these sites, trade union representatives of different fractions and interest groups are active at the sites in Paskov, Purwakarta, Nanjing, Grimsby, and Mobile.

As the two plants in Brazil and Thailand are not yet operational, no relevant information can be provided at this stage.

This would mean that 100 percent of the active workforce at Lenzing production sites would be represented by local trade unions or works councils, with membership being voluntary.

Implementation of Global Performance and Talent Management

Lenzing rolled out two fundamental people development processes in the reporting year: Performance and Talent Management. The company is stepping up its efforts to support the development of individual employees and the company as a whole by defining profound processes, clear roles, and a digital system.

Lenzing strongly believes that everyone has potential and talent. Like a seed, human beings need the right conditions and support to grow and blossom. Talent Management aims to accelerate talent development and enable promising individuals to grow with the business. The Talent Management process is designed to understand and support the needs of the Lenzing Group and to develop the right talent mix to implement the sCore TEN strategy. Furthermore, Talent Management helps to develop a strong internal talent pipeline of successors to key positions in the future.

The global Performance Management process aims to drive growth and build a sustainable business excellence by creating a culture of high engagement and high performance. Performance Management focuses on creating an environment where people can perform to the best of their abilities to produce the highest-quality work most efficiently and effectively. It is simply the way the company makes its decisions and build sustainable business performance.

Both processes were rolled out to the first three levels of the Lenzing Group and some selected departments in 2021. As a result that Lenzing trained more than 1250 employees in 2021. The rest of the organization will be trained in 2022. Thereafter, all white collar employees will use this up to date digital process for Performance and Talent Management.

Lenzing Leadership programs

31 highly motivated employees were selected in autumn 2019 to join "Springboard III", Lenzing's global junior leadership program, for training and preparation for future leadership positions within the Lenzing Group. Due to the unprecedented situation brought about by the global pandemic, the program was reorganized in 2020 as a virtual learning program that enabled participants to learn and develop their skills via different program modules: self-learning, virtual exchange and individual and group coaching.

In 2021, the participants completed Learning Unit 3 out of 5, which covered "Shape", an important aspect of Lenzing's leadership model. They began Learning Unit 4, covering the topic "Deliver" in the third quarter of 2021. This Learning Unit is set up in the form of individualized learning journeys, which are closely linked to business projects that the Springboarders are working on, so that they can develop the necessary skills to deliver outstanding results via teamwork in a practical setting.

In 2022, the Springboard program will be end with Learning Unit 5 "Develop" and a formal graduation ceremony to celebrate the Springboarder's development.

The first global group of "Leaders of Tomorrow", a tailor-made development program for skilled workers early in their careers, was completed in the beginning of 2021. It was launched in 2018 with an Austrian pilot group and rolled out globally in autumn 2019. The program includes job rotations, seminars and virtual exchanges. Ten employees from Austria, the Czech Republic, Great Britain, Indonesia, and China successfully graduated in this unique development program and are now prepared for future leadership roles and international collaboration.

Competency Framework

The Lenzing Competency Framework concept was developed in 2020. Each framework consists of leadership and functional competencies. The leadership competencies align with the sCore TEN leadership model and are globally consistent for all Lenzing employees. The functional competencies describe the required level of competency for the specific business area. By assessing employees according to the expected competencies of their job role, Lenzing is able to systematically identify its employees' strengths and development needs. It can then leverage these insights to provide individual learning opportunities and prioritize different training initiatives. In 2021, almost 200 colleagues from the Commercial area assessed their competencies. The Commercial Academy was developed based on the insights from the competency assessments. With this successful launch other target groups within Global Engineering and Human Resources will start the process in 2022. In total, more than 400 employees will participate in the competency assessment process. Lenzing will roll out the competency framework to all white collar employees in the coming years to be able to analyze the development needs of individuals and teams.

Learning & Development

Lenzing employees take responsibility for their own personal and professional development. To enable their continuous, individual development, Lenzing has developed a global Learning & Development (L&D) catalog. The catalog is part of the Lenzing internal learning management system Learn@Lenzing and allows employees to individually browse for development opportunities. The catalog includes formal training programs with a particular focus on social learning and experience learning opportunities. This 70:20:10 blended learning approach has proven its value in adult development. It was rolled out in 2021 and will be promoted again as part of Lenzing's performance management process. The catalog is available to all Lenzing sites in English. In adition, a global Learning & Development guideline will be launched at the beginning of 2022 to ensure processes and the use of tools and systems are standardized for the professional development of Lenzing's employees.

As the global pandemic continued in 2021, it was difficult to conduct face-to-face trainings. Lenzing therefore continued to expand its digital training offering. A representative cross-section of the remote training sessions includes:

- Onboarding eLearning roll-out started in Q4 2021
- The Commercial Academy for a target group of 315 employees with virtual training on internal topics of Lenzing such as fiber and product know-how, sustainability and branding as well as commercial focused learning opportunities such as value selling, virtual presence and customer care skills
- In total, more than 30 sessions involving over 450 participants took place in 2021
- New eLearning courses on social skills were piloted in Austria. In 2022 Lenzing plans to roll out even more eLearning courses globally
- Remote "Train the Trainer" courses for technical experts to train new employees in Brazil within the construction project

Despite the constraints of the pandemic, Lenzing still managed to conduct strategically important face-to-face training in 2021. This was accompanied by strict preventive measures such as regular testing, social distancing, face masks etc.

- Technical training for 29 employees from the plant in Thailand, at the Heiligenkreuz, and Lenzing sites
- The ERP Academy to boost SAP and process knowledge was launched in 2021 and will continue in the coming years, involving a target group of 700 employees at the Lenzing site and other global participants
- Total expenditure on lifelong learning and personnel development decreased from EUR 6.15 mn in 2019 to EUR 4.03 mn in 2020, and levelled at EUR 6.19 mn end of 2021. This includes group-wide expenses by Bildungszentrum Lenzing (BZL). Therefore, the group-wide consolidated expenses for trainings in 2021 are EUR 2.46 mn. (2020: EUR 1.38 mn, 2019: EUR 2.83 mn).

Enhancing community wellbeing

The Lenzing Group's various production sites operate in their specific ecological, social and economic environments. Lenzing businesses and their regional partners are mutually dependent, sharing opportunities as well as challenges.

Community wellbeing is therefore necessary for the company's continued operations. As a good corporate citizen, the Lenzing Group promotes the beneficial development of the communities and regions where it operates. This is achieved through safe and eco-friendly operations, fair employment practices and contributions to local economic development and community life.

Promoting societal wellbeing is a key cornerstone of Lenzing's "Naturally positive" sustainability strategy and more than just a question of ensuring society's acceptance of Lenzing's activities. The Lenzing Group takes its responsibility as a large industrial company and reliable corporate citizen very seriously, even outside its direct business operations. The company strives to help improve the living conditions of its neighbors. Lenzing relies on them just as much as they rely on Lenzing.

In addition to conducting safe and environmentally responsible operations with fair business practices, Lenzing provides support to numerous social and environmental protection projects, often over many years. It also promotes local activities, from educational initiatives to healthcare and infrastructure measures. The individual production sites of the Lenzing Group act autonomously for the most part in selecting specific projects and measures that support local development and a positive social environment. For more information, please see "Social responsibility" focus paper.

Business ethics

MANAGEMENT APPROACH

Material topic: Business ethics

Importance for Lenzing

- Compliance at the Lenzing Group not only stands for compliance with legal regulations and regulatory standards, but for the active responsibility of all employees and executives as well as a shared culture of values that are firmly anchored in the entire Group
- Lenzing aims to deal honestly and with integrity in its behavior towards business partners and shareholders

Opportunities

- Compliance through a shared culture of values
- Preventive measures via whistleblowing
- Prevent retaliation against those who raise a concern
- Promote trust and confidence in business dealings
- Maintain corporate reputation
- Avoid conflicts of interest, misrepresentation, bias and negligence
- Prevent and report bribery and other forms of corruption

Risks

- A constantly changing internal and external business environment
- Violation of fair and compliant business practices leading to
  - reputational damage and resultant loss of public trust
  - loss of clients and business partners
  - value depreciation in the capital market
- Non-compliance with laws, regulations and obligations
- Costs and damage arising from involvement in bribery or breaches against (antitrust) law
- Fines, invalidity of contracts, claims for compensation from competitors and customers

Guiding principles

- Global Code of Business Conduct
- Global Supplier Code of Conduct
- Policy on Human Rights and Labor Standards
- Modern Slavery Act Transparency Statement
- Sustainability Policy
- Quality Policy
- Policy for Wood and Pulp
- Policy for Safety, Health and Environment (SHE)
- Anti-Bribery and Corruption Directive (ABC Directive)
- Local Guidance Document for the ABC Directive (e.g. registration system for gifts/hospitality)
- Antitrust Directive
- Whistleblower Directive
- Issuer Compliance Directive
- Anti Money Laundering Directive (AML Directive)
- Know-How Protection Directive

Due diligence processes and (ongoing) measures

- Compliance with Lenzing Global Code of Business Conduct and internal group-wide directives
- Reporting incidents via BKMS® whistleblower system (“Tell us”)
- Following up procedure for reported incidents
- Transparent reporting within Lenzing’s Corporate Governance Report
- Leading by example: supervisors, leaders, and managers act as role models
- Compliance trainings for employees
- Compliance Register Tool (e.g. gifts and hospitality)

Objectives

- Finalization and publication of Compliance Organization
- Continued penetration of compliance throughout the entire Lenzing Group
- Enhancement of compliance training for employees
- Short rule books for compliance issues (e.g. gifts and hospitality)
- Introduction of a new Know Your Counterpart (KYC) system

Achievements/activities in the reporting year

- Internal audit of Compliance Management System
- Updating Issuer Compliance Directive, Antitrust Directive, Anti Money Laundering Directive (preparing for update)
- Implementation of local standards/limits for gifts and hospitality
- Compliance workshops with IT, HR and Corporate Communications
- Compliance workshop with Managing Board
- Employees trained on business ethics issues
- Company-wide anonymous survey on the culture of integrity at Lenzing
- Awareness campaign on whistleblowing
- No corruption incidents

Responsible

- VP Global Legal, IP & Compliance
- Local Compliance Manager

Supporting

- Managing Board
- Corporate Communications
- Corporate HR
- Corporate Audit & Risk
- Corporate Sustainability
- Global Process Information Technology
- Site managers

Naturally compliant

Lenzing's mission of compliance

"We are a global company and naturally act in a compliant manner. Our Compliance Management System is an integral part of the Lenzing Group's reporting system. The compliance function aims to advise and support all Lenzing employees, executives and managers through preventive risk-oriented measures and consistent detection and response processes, ultimately protecting them from the negative consequences of violations of laws and values."

Compliance goes beyond adhering to legal requirements

Lenzing strives to achieve exemplary quality in products and processes, as well as integrity and honesty in dealing with business partners and shareholders. Compliance at the Lenzing Group not only stands for compliance with legal regulations and regulatory standards. Compliance for Lenzing is a question of attitude that also reflects a culture of tolerance and integrity when dealing with one another. Thus, the subject of compliance via the active responsibility of all employees and executives, as well as a shared culture of values is firmly anchored within the entire Group.

To Lenzing, compliance is teamwork

Lenzing's compliance organization is transnational and composed of international experts led by the Group Compliance Officer, who reports directly to the Managing Board and the Supervisory Board. The executives of the Lenzing Group have the task of ensuring that the rules are known, understood and adhered to by all employees. Lenzing expects its employees to comply with its rules of conduct. They are also asked to be alert, examine carefully and report anything that can be improved or any violation of rules and values that is detected.

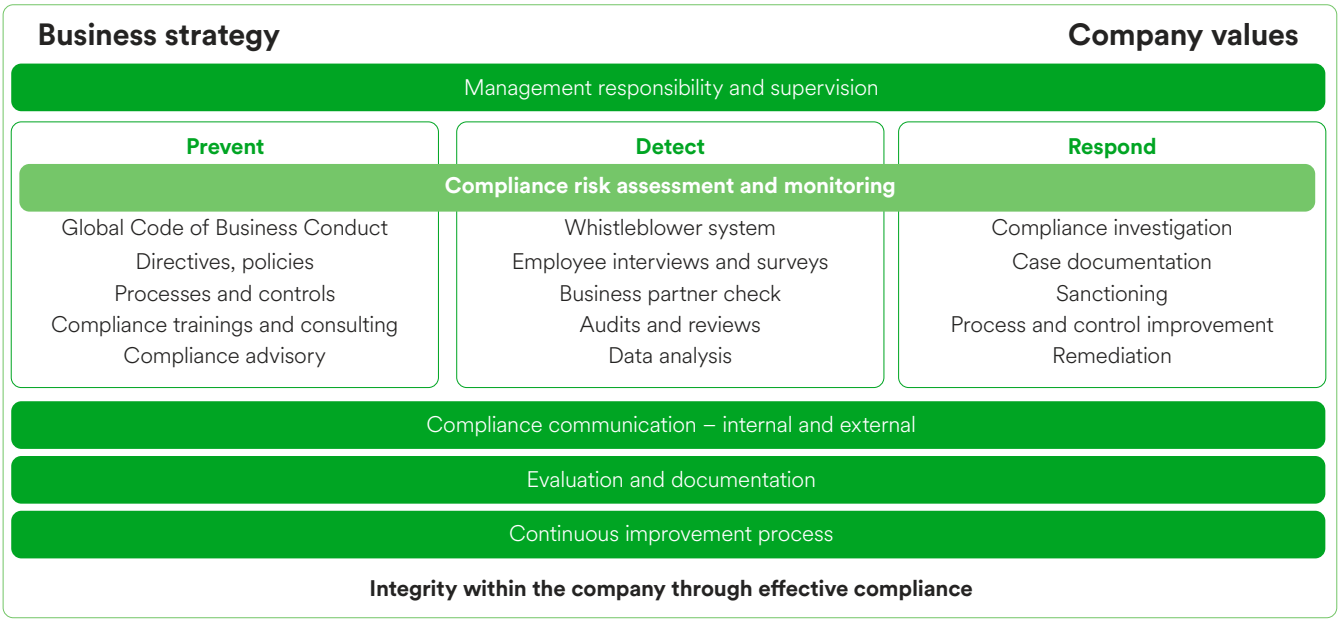
The management has adopted a Compliance Management System for the entire Lenzing Group, which is intended to ensure and demonstrate compliance with legal provisions, the Lenzing Global Code of Business Conduct and internal directives on a permanent basis.

Compliance Management System

The objective in setting up and continuously developing the Compliance Management System is to prevent, detect and respond to compliance violations against the interests of the company, to avoid liability risks and damage to the company's reputation, to advise and safeguard the company's management, executives and employees, and to increase efficiency by coordinating existing compliance activities.

The structure of the Compliance Management System corresponds to the following systematics (figure 22):

Elements of the Lenzing Compliance Management System Figure 22



Compliance is based on the corporate values of the Lenzing Group and its measures promote integrity within the company. Formal structures, such as the assignment of responsibilities, ongoing monitoring and structures for communication, evaluation and documentation are essential components of the Compliance Management System.

The ongoing compliance program is based on the following pillars:
- Measures to prevent misconduct
- Measures to detect compliance risks and weaknesses
- Measures to respond to misconduct and identified weaknesses in order to avoid them in future.

The Compliance Management System was subjected to an internal audit in the first half of 2021, in which improvements were analyzed and measures developed. At the meetings of the Supervisory Board's Audit Committee on September 8, 2021 and November 17, 2021, the Compliance Officer reported on the content, objectives and status of the compliance organization, the structure of the Compliance Management System, training, internal and external investigations and various compliance measures (communication, surveys) in a separate agenda item.

Preventive measures

Lenzing Global Code of Business Conduct

Compliance measures and business ethics are crucial for Lenzing to comply with a multitude of legal regulations and standards at various sites and countries around the world. Lenzing attaches great value to the integrity and legally compliant behavior of all employees and business partners. Therefore, Lenzing has anchored its principles for compliant behavior in the Lenzing Global Code of Business Conduct. It serves as a guideline, orientation aid and advisor at the same time, so that all employees know how to react appropriately and in compliance with the rules in every situation. At the same time, it points out to Lenzing employees that violations of the Code of Conduct have serious consequences (civil, criminal, administrative criminal and/or disciplinary consequences, up to and including termination of employment). The Lenzing Global Code of Business Conduct is available to all employees in the Group languages on the intranet ("Lenzing Connect") and is also accessible to external stakeholders on the company website. It is supplemented by the Global Supplier Code of Conduct which outlines Lenzing's expectations for supplier conduct with respect to safety and health at work, labor and human rights, environmental protection, ethics and management practices. An overview of other publicly available policies to which Lenzing has committed can be found here.

Lenzing's internal rules and principles

Besides the Lenzing Global Code of Business Conduct, there are additional internal rules and principles of conduct (known as directives) that help to ensure that daily actions are in line with the applicable legal frameworks and Lenzing's demand for integrity from each individual employee. Directives define rules of conduct that are binding for all employees of the Lenzing Group. Classifying a document as a directive always implicates the decision that non-conformance with the content of the directive may incur penalties and, in the worst case, layoffs. Important directives include, amongst others, the Anti-Bribery and Corruption Directive, the Antitrust Directive, the Whistleblower Directive, the Issuer Compliance Directive, the Anti Money Laundering Directive and Know-How Protection Directive.

Anti-Bribery and Corruption Directive (ABC Directive)
The Anti-Bribery and Corruption Directive ("ABC Directive") supplements Lenzing's Global Code of Business Conduct by providing global minimum standards to ensure that Lenzing's activities are conducted ethically and with integrity. The goal of this directive is to ensure that all relevant anti-bribery and corruption regulations are known and observed across the Lenzing Group. The directive applies to all operations and activities in compliance with all applicable anti-corruption laws, including the Austrian Criminal Code, the United Kingdom Bribery Act 2010 and the US Foreign Corrupt Practices Act. It clearly defines what bribery, corruption and acceleration payments mean and provides guidelines on what is considered acceptable behavior. Receiving and giving gifts, as well as accepting and giving hospitality or invitations, require – depending on the monetary value – specific approval within the Compliance Register Tool. Country-specific limits have been defined for all legal entities.

Antitrust Directive
Lenzing does not tolerate or participate in any business conduct, transaction or activity that violates the antitrust and competition laws applicable to it. The company respects applicable trade laws and restrictions as imposed by the United Nations or other national or supranational bodies or governments. To ensure that all relevant antitrust regulations are known and adhered to within the Lenzing Group, Lenzing's internal Antitrust Directive serves as a supplement to the Lenzing Global Code of Business Conduct. It applies to all business activities and operations in accordance with applicable competition law. The directive was revised in the reporting year to make it more comprehensible in terms of appearance and language. It informs all employees how to behave correctly when dealing with business partners and shows which activities may pose an increased risk of antitrust violations. Furthermore, this directive helps to promote trust in business dealings, preserve Lenzing's reputation and avoid or reduce costs, risks and damages resulting from a violation of antitrust law.

Whistleblower Directive
The purpose of Lenzing's Whistleblower Directive is to encourage all employees to speak up in good faith against potential violations of laws, the Global Code of Business Conduct or Lenzing's internal rules and principles. The directive aims to provide all employees with more concrete guidance and information on how to report compliance concerns about actual or potential rule violations. It emphasizes that for reports which were made in good faith (i.e. with a reasonable suspicion that a potential violation has occurred, is occurring, or is likely to occur), the parties involved are protected from subsequent punishment, discrimination, retaliation, disadvantage, harassment or termination for making reports. Lenzing takes all concerns raised under the Whistleblower Directive seriously and defines clear processes in this directive on how reports are handled internally, who is involved in any necessary investigations, and what the consequences are for identified violations.

Issuer Compliance Directive
The Issuer Compliance Directive of Lenzing AG was updated during the reporting year. This directive regulates the principles for the disclosure of information within the company, organizational measures to prevent the improper use or disclosure of compliance-relevant information or insider information as well as the special reporting obligations for trading in securities for executives and persons closely related to these executives.

The directive supplements and clarifies the existing legal obligations to prevent insider trading and proprietary trading by executives ("directors' dealings") for listed companies. The aim of this directive is to familiarize all employees of Lenzing AG as well as the members of the executive bodies with the essential obligations that pertain to them and make it easier for them to comply with the legal regulations via rules of conduct.

Anti Money Laundering Directive (AML Directive)
The objective of the Anti Money Laundering Directive is to guarantee that all relevant anti money laundering and counter terrorism provisions are known in the Lenzing Group and are complied with. It applies to all business actions and activities in accordance with the applicable legislation. The directive was originally introduced in 2020. In 2021, preparations were made for an update by choosing a suitable tool for a new KYC (Know Your Counterpart) system. In the course of the update, the directive and included processes will be adapted to the new system. The KYC check will confirm that new customers and suppliers actually exist and their funds are derived from legitimate business activities.

Know-How Protection Directive
Specialization and innovative strength are key factors for the worldwide success of Lenzing. In today's economy, information and know-how as a result of R&D investments, creativity and business initiatives have become the most important factors for developing and maintaining competitive advantages. Lenzing's know-how is a central asset that must be preserved and protected using all the protective measures at Lenzing's disposal. The protection of know-how relates not only to Lenzing's leadership in technology, but also extends to its many different activities worldwide, including business secrets. Every employee is a key factor in Lenzing's future know-how protection program and is directly affected by the know-how protection process described in this directive.

Compliance trainings
Understanding rules and regulations is a fundamental requirement for "correct" behavior. Hence the eLearning program was continuously expanded during the reporting year to efficiently convey the most important content of the compliance directives to the relevant target groups. New employees receive welcome folders and onboarding training on the Global Code of Business Conduct and on the topics of "Bribery and Corruption" and "Issuer Compliance". In addition, every employee receives training on data protection, whistleblowing and know-how protection in the form of eLearning. Training on anti-bribery and anti-corruption as well as whistleblowing was rolled out at the group level during the reporting period. Roughly 906 employees (approx. 12 percent of the total workforce) completed the training on anti-bribery and corruption, while some 2,940 employees (approx. 38 percent of the total workforce) completed training on whistleblowing.[66] Due to COVID-19, this training took place primarily via eLearning program and online meetings. The roll-out of an eLearning program on antitrust law began in the third quarter of 2021 in the Asian region. Additionally, compliance workshops with IT, HR and Corporate Communications took place in the reporting year. The Managing Board received compliance training in the fourth quarter of 2021.

Detective measures

Whistleblower system
Timely notification of unlawful conduct and/or ethical misconduct is important to take precautionary measures to prevent or reduce financial loss or reputational damage. In this context, all employees – and other stakeholders – are the primary and most valuable source of information. They in particular are able to support Lenzing in identifying violations of its Global Code of Business Conduct or directives.

In order to enable all employees and other stakeholders to report concerns in connection with topics such as corruption, bribes, conflicts of interest, antitrust laws and capital market law, an online-based whistleblower system was established in 2017. Grievances can be reported in-house in person, by phone or email, e.g. to supervisors, the works council or the Group Compliance Officer. In addition, the BKMS® whistleblower system ("Tell us") is freely accessible for everyone on the webpage to express any concerns anonymously (available in all languages relevant to production sites: English, German, Czech, Chinese, Indonesian, Thai, Portuguese). Reporting an incident does not only relate to Lenzing's employees, but also to customers, suppliers, and other third parties around the world. Reported incidents are assessed by lawyers (if necessary in cooperation with local partners), and forwarded to the Group Compliance Officer or to the Local Compliance Officer. Recommendations on the further examination or termination of the investigation are provided. Concerns can be reported anonymously and without fear of retaliation worldwide thanks to this system. The professional handling of the information protects both the whistleblower and the person affected. Nine reports were filed during the reporting period (six of them via a designated mailbox that has been set up), which were processed in a targeted manner in accordance with the internal Investigation Directive. The Audit Committee is informed about the incidents reported once a year.

Company-wide anonymous survey on the culture of integrity
In December 2021, Group Compliance conducted an anonymous survey of all employees to assess the current status of the integrity and compliance culture at Lenzing. The scientifically supervised survey provides an external benchmark for governance and compliance performance in the short and long term. Lenzing will derive targeted measures for compliance activities, such as awareness campaigns, training and communication for both managers and employees from the results. In due course, it will be possible to monitor whether these measures lead to the desired success.

Responsive measures

Legal complaints and investigations
Compliance violations via the whistleblower system are collected in the Legal, IP and Compliance department. As in previous years, no significant cases of corruption were reported at Lenzing in 2021. There were no public complaints in connection with corruption brought against the company or its employees during the reporting period. Moreover, there were no legal actions pending or completed during the reporting period regarding anti-competitive behavior or violations of anti-trust and monopoly legislation in which the Lenzing Group has been identified as a participant. A statement on the allegations concerning Hygiene Austria LP GmbH is provided below.

Hygiene Austria LP GmbH
On March 1, 2021, a house search took place at Hygiene Austria LP GmbH, a non-controlled joint venture established by Lenzing and Palmers Textil AG in the second quarter of 2020 to secure the availability of protective masks in Austria. On becoming aware of the allegations relating to Hygiene Austria LP GmbH, Lenzing also launched its own internal investigations. From day one, Lenzing fully cooperated with the relevant authorities.

Accompanied by appropriate requirements for an orderly going concern, Lenzing transferred its shares in Hygiene Austria LP GmbH to Palmers Textil AG. In order to ensure the continuation of the business of Hygiene Austria LP GmbH, Lenzing waived a corresponding purchase price (see the press release from Lenzing AG dated April 2, 2021). In the meantime, the investment has been fully written off.

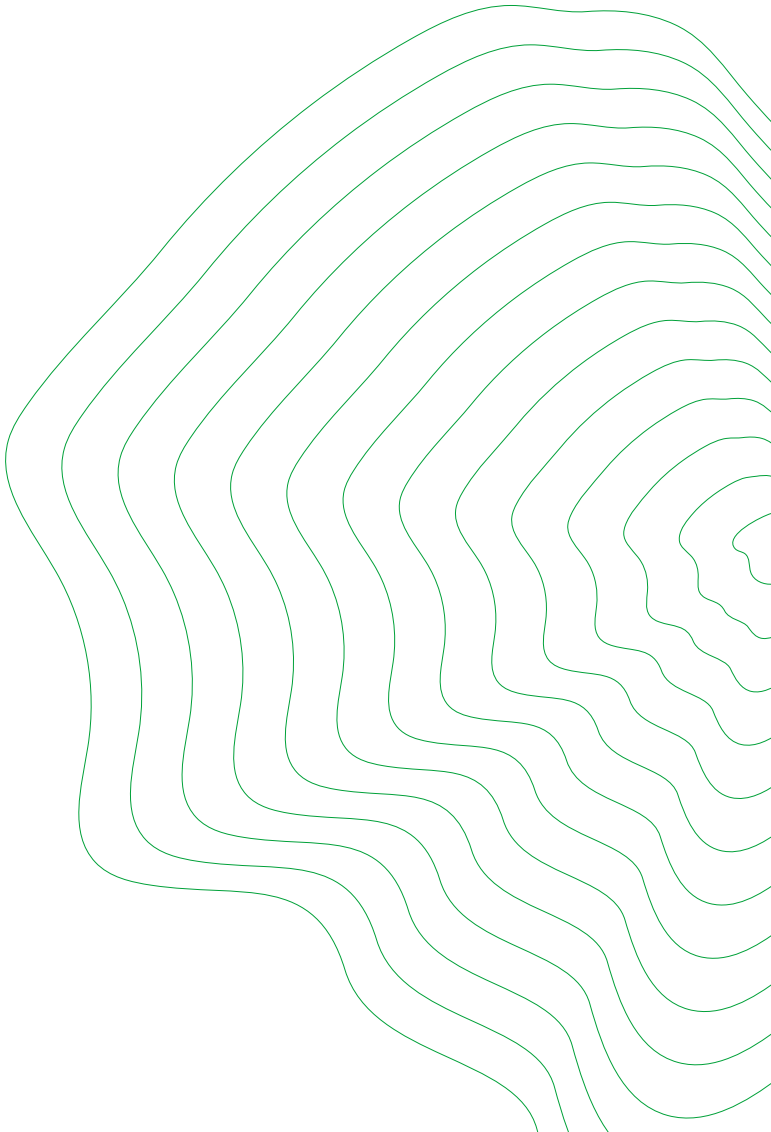
66) Training data as of December 23, 2021, as not otherwise presentable for technical reasons. Percentage data based on total workforce as of December 31, 2021.

Social and environmental compliance

InConflicts of interest and production-related circumstances, such as noise, unpleasant odors, and environmental pollution, can result in disputes with local residents. Procedures are in place at all sites to ensure that complaints are handled fairly and impartially. All complaints are reviewed monthly and reported directly to the Lenzing Group's senior management teams. Complaints were registered at the sites in Lenzing (Austria), Purwakarta (Indonesia), Nanjing (China), Paskov (Czech Republic), and Indianópolis (Brazil) in 2021, and appropriate remedial measures were taken following the investigation and review process. In Brazil, a resident's complaint led to a legal dispute that is still ongoing.

While Lenzing companies/subsidiaries have always placed compliance to national and local laws, regulations and policies as fundamental principle and any related issues are treated and resolved with utmost priority, three minor administrative penalties (fines amounting to 203,000 RMB) were imposed on Lenzing's site in Nanjing (China), in the reporting year.

The issues were in connection with the disposal and storage of waste and the management of pollutant data. All were immediately rectified to the local authorities' satisfaction. At the site in Paskov (Czech Republic), an administrative proceeding is currently ongoing in connection with the Czech Environmental Inspectorate. In Brazil, a preliminary injunction against the release of effluents was issued by local authorities. The appeal against the injunction was successful.



Digitalization & cyber security

MANAGEMENT APPROACH

Material topic: Digitalization & cyber security

Importance for Lenzing

- More and increasingly sophisticated external attacks, much greater complexity of networked ecosystems and rising regulatory demands are calling for utmost care in cyber security
- Information security and data protection are imperative to protect business, customer, partner and employee data as well as intellectual property (know-how)
- Harvesting the benefits of digital technologies to maintain Lenzing's technological advantage

Opportunities

- Increased trust of employees, customers and partners through responsible data handling
- Optimization of business processes, saving time, energy and reducing raw material usage
- Digitalization helps to anticipate the needs of customers and improves the customer experience
- Increased transparency and traceability of supply chains and thus supply chain security
- More flexible digital working environments to retain talent, attract future talent and allow for a new way of working

Risks

- Successful cyber-attacks could stall business processes or even impact operation
- Potential disclosure of information could incur high regulatory penalties or claims
- Potential compliance issues could reduce Lenzing's credibility in the values it champions

Guiding principles

- Data Protection & Information Security by design & default
- Protective measures appropriate to the related risks
- Applicable legal regulations and a set of internal policies/directives/guidelines

Due diligence processes and (ongoing) measures

- Continuous improvement of Lenzing's security measures
- Alignment of cyber security measures to business needs
- Maintaining appropriate technical and organizational measures
- Further development and management of the information security & data protection management system
- Regular information security assessments, audits and trainings
- Regular internal/external penetration testing
- Regular risk assessments with enterprise risk management and cyber insurances
- Running information security due diligence programs on third parties
- Notification mailbox to report anything suspicious, such as fraudulent emails
- Continuously monitor applicability of the technical organizational measures (TOMs)

Objectives

- Ensure appropriate level of protection for the Lenzing Group and its connected partners
- Manage information security and data protection risks
- Build and maintain a security-conscious culture
- Value-adding use of data, digital technologies and IT infrastructure
- Generate competitive advantages via the use of digital technologies

Achievements/activities in the reporting year

- Cyber-attacks have been averted successfully, e.g. via the rapid mitigation of several zero-day incidents
- Continuous improvement – existing safety measures were challenged with involvement of the public NIST Cyber Security Framework
- Launch of "Next Generation Level of Protection" program
- Completion of several penetration tests including corrections via Service Improvement Plans (SIP)
- Further digitalization with company seals used for E-Branding Service, invoice signing and approval workflows
- All board members & directors worldwide (90+) were provided with qualified electronic signatures for eSign-off
- Launch of a Digital Innovation Function to capitalize on digital technologies
- Extension of fiber identification technology to TENCEL™ branded lyocell and modal fibers
- Launch of fiber identification system for VEOCEL™ Lyocell fibers

Responsible

- VP Global IT
- Chief Information Security Officer
- Senior Director Digital Innovation

Supporting

- Security Operators within IT
- Local coordinators

Cyber security

Information security is the practice of protecting information by mitigating information risks. Cyber security is the practice of protecting critical systems and sensitive information from digital attacks. Cyber resilience is the ability to anticipate, withstand, recover from, and adapt to adverse conditions, stresses, attacks, or compromises on systems that use or are enabled by cyber resources. These are the dimensions companies are permanently working on to reach an adequate level of protection.

Current state

For years, most business organizations have incorporated information security into their daily works. Unfortunately, in recent years, cyber security has become one of the top ten risks for businesses worldwide[67]. Attacks against companies are dramatically soaring in number, quality and scale. Nowadays it no longer seems to be a case of, "if you get hacked", but "when you get hacked".

Lenzing, its partners and suppliers, are all impacted by the various social, organizational and economic impacts of the ongoing pandemic crisis. Many companies (especially small and medium-sized companies) are increasingly migrating their IT workstations to cloud solutions. Vendors of IT-software and especially providers of IT and/or business services (cloud providers) are required to support governmental agencies and current customers on site. In addition, they have very high numbers of new business customers waiting to be taken on.

Criminal groups are specializing in various specific matters and offering their expertise for sale as a service. Stolen credentials, credit cards, known flaws in software/hardware/services are for sale on blackmail shopping portals in the undocumented part of the internet or the dark web. Even attacks, such as denial of service or ransomware as a service, can be purchased as easily as on the public internet. During successful attacks, sensitive data is often stolen and companies are blackmailed to pay high ransoms.

There is the alarming trend of cybercrime evolving into a criminal economy too – studies estimate attackers are generating annual revenues of EUR 1.5 trillion, which is roughly equal to the GDP of Spain[68].

What does this mean for Lenzing? Is the company immune to such negative trends? Quite simply, the answer is "no". As a global company, Lenzing is inter-connected with numerous business partners, authorities, customers and consumers at its numerous sites. During the last year, companies in Lenzing's reach were hit by cyber attacks, causing a disruption of services and commerce and the closure of production sites.

Like many other companies in the world, the Lenzing Group has invested heavily in improving cyber resilience and information security. Existing security concepts have been challenged and adapted to the new normal. However, Lenzing not only relies on technical protection measures, but also strongly focuses on the awareness of its employees. Cyber security is not a project, but a permanent endeavor for the entire organization.

Information Security Policy

Protection of information is therefore a vital activity to each and every employee, contractor or business partner of all the Lenzing Group's companies in order to proactively maintain and improve an appropriate level of security for all kinds of information processes. The Information Security Policy promotes a risk-based approach as key to achieving global compliance with information security and data protection. In doing so, Lenzing is balancing the rights and needs of the company, society and individuals.

Within the framework of this policy and applicable legal regulations, several directives/guidelines are in place, which are monitored and reworked on a regular basis, including:

- Lenzing Global Code of Business Conduct
- IT User Directive (secure use of the IT systems and the basic principles of data security measures)
- Smartphone Directive (mobile devices)
- Terms of Use for Private Mobile Devices
- Know-How Protection Directive (including classification of data and its processing)
- Secure storage of personal identifiable information
- Cyber Defense Operation Handbook

Activities to fight cybercrime

Examples of some of the activities that can be shared publicly are listed below.

Human factor as best firewall

As outlined above, technical measures are important, but cannot protect in all situations. This is why empowered and security-conscious employees are essential in the front line of defense. To promote these skills, Lenzing carries out several activities, for example:

- Regular awareness initiatives through news articles on the intranet
- Regular information via group mails, info-screens and departmental or townhall meetings
- Ad-hoc information in the event of relevant observations in the neighborhood
- Tailored face-to-face trainings for IT employees, HR teams, finance and accounting
- Keynotes on (virtual) corporate department summits
- Reporting line for any security concerns, questions or potential fraudulent activities (including giving feedback and advice on topics raised)
- Security eLearning for each and every IT user
- Privacy eLearning for each and every IT user

67) World Economic Forum 2021, https://www.weforum.org/agenda/2021/01/building-resilience-in-the-face-of-dynamic-disruption/).
68) https://www.techrepublic.com/article/cybercriminals-raking-in-1-5-trillion-every-year/

The consciousness and awareness of Lenzing's IT users has led to almost 200 reports on potential spam, phishing/malware and fraudulent mails/calls/contacts worldwide in the reporting year.

Continuous improvement as paradigm for all activities
Targeted technical and organizational measures to combat data theft, the manipulation of business processes and other forms of internet crimes have been in place for several years. As technology evolves and the number and sophistication of attacks increases continuously, businesses are constantly required to check and improve their measures at a similar pace.

Achievements of the year
2021 was the year of several major security gaps that were found in the tools of software vendors, cloud service providers and, for the first time, even within the security products of giants in the IT industry. Zero-day vulnerabilities such as these, represent high levels of risk to each and every company using these products. In 2021, there were 83 zero-day vulnerabilities in total for IT vendors, of which 43 related to widely used products from tech giants such as Apple, Adobe and Microsoft.

Lenzing's responsible security and infrastructure teams were under extreme pressure to mitigate these risks. Due to these intense situations, the competent authorities issued the highest security alert levels and in some cases, Lenzing was forced to take drastic measures to lock out potential intruders.

As a result, vulnerability management activities were stepped up to improve security hygiene and reduce the relevant threats for every day operations. Lenzing uses so-called penetration tests on a regular basis to assess security measures. These tests, performed by highly skilled external partners, result in Service Improvement Plans (SIP). In addition, external Security Scorecards Systems are frequently used to gain feedback from outside the company. Regular background checks are performed to search for potential threats, disclosures in the dark web or pawned accounts. All findings revealed by such assessments, tests and reported incidents then lead to a security review, risk assessment and, subsequently, corrective action.

Structural re-assessment of our cyber resilience
In light of these new challenges, an external auditor performed an assessment with the help of the highly regarded global NIST Cyber Security Framework to examine Lenzing's cyber resilience. The analysis highlighted various gaps to be addressed. The whole set of recommendations, prioritized according to risk-level, were then compiled into a comprehensive program. Both, the assessment results and the recommendations, were presented to the Managing Board and, after their approval, accordingly embedded into Lenzing's security program.

Digitalization

Today, digital technologies are evolving at a faster pace than ever, becoming increasingly complex and affecting more and more people. As new digital technologies dramatically reshape industries, Lenzing pursues efforts to leverage the benefits of these technologies to keep its technological advantage. Digital technologies have already optimized many operation processes at Lenzing and led to a new way of working. To further exploit opportunities, especially for emerging technologies, a dedicated Digital Innovation Function was launched in 2021.

Digital solutions leading to a new way of work

When the COVID-19 pandemic began, the Lenzing Group was able to transition to remote working within a very short space of time. The infrastructure had already been well prepared and only an increase in bandwidths and licenses became necessary. Despite the exceptional circumstances, Lenzing still made sure that all protective measures were maintained at a high level, for example, by providing handling instructions for data protection and information security at home or by applying security patches at home like it is applied in the office.

One other important process optimization has been the "Lenzing eSign" digital solution. It allows for documents to be fully signed-off using qualified electronic signatures complying with the EU's eIDAS regulation and the UNCITRAL Convention. So far, around 900 employees worldwide are authorized to sign-off or approve thousands of documents with this intuitive and mobile tool. For example, the infrastructure is used for SAP invoicing as well as quality management report signing. This has replaced several paper-based processes, thereby almost eliminating the need to print, sign, scan and redistribute documents and contracts.

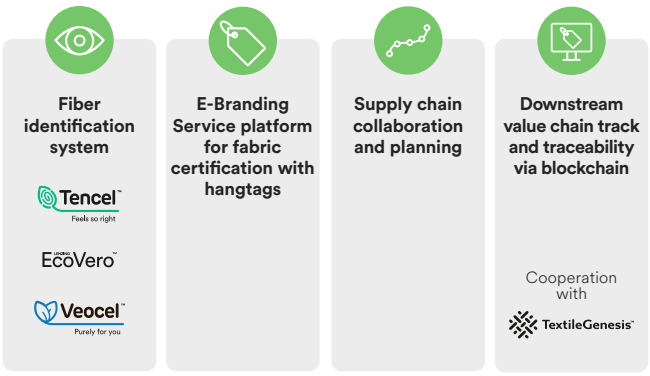
Due to these measures, remote working on a large scale has worked very well for the Lenzing Group. Human resource experts assume that many employees intend to continue working from home in the future, at least for some time. The recent developments led to framework conditions being devised to allow Lenzing employees to partially work from home even after the crisis. Remote working is likely to appeal in particular to a younger generation of employees as it allows a better balance between work and private life. Besides this social aspect, moving to a more digital working environment can also help to improve the environmental footprint. For example, the aforementioned replacement of several paper-based processes eliminates the need for printing, and thus saves valuable resources. Since the start of the pandemic, significantly more meetings have also been taking place online. Overall, remote working and more digital events are leading to less commuting and business travel, which will likely result in a reduction of CO_2 emissions.

Digital solutions for transparency and traceability across entire supply chains

Beyond its ongoing digitalization processes in its own operations, Lenzing is committed to driving digital solutions throughout the supply chain. In this way, Lenzing aims to improve transparency and traceability in the textile and nonwovens industry. Transparency means openness towards the people who come into contact with Lenzing fibers. This is crucial as only an honest discussion with the industry can ensure traceability, verifying the origin of Lenzing fibers throughout the supply chain up to the finished garment.

Lenzing's fiber identification system and E-Branding Service form the basis of its overall approach to transparency, while the TextileGenesis™ blockchain project uses the data for maximum traceability. The supply chain collaboration and planning project complements these pillars. Lenzing follows a four-pillar approach to a more sustainable and transparent supply chain:

Lenzing Group's bulidng blocks of transparency Figure 23



Fiber identification system

Lenzing has developed a technology for fiber identification. The system was successfully implemented for LENZING™ ECOVERO™ branded viscose fibers, all TENCEL™ branded fibers, TENCEL™ x REFIBRA™ lyocell fibers and the LENZING™ FR portfolio. In addition, the product brand VEOCEL™ launched the beauty industry's first fiber identification system for LENZING™ Lyocell Skin, LENZING™ Lyocell Fine Skin and LENZING™ Lyocell Micro Skin fibers in the reporting year.

The technology for fiber identification relies on the physical identification of fiber origin at different stages of the product such as the fabric and garment stage. This enables full fiber origin traceability and counterfeiting protection. It thus protects the brands and retailers by providing assurance that their products do not contain fibers made from wood from controversial sources. This guarantees that the fibers are produced in state-of-the-art-production facilities that meet high standards for resource efficiency and environmental and social responsibility.

Supply chain transparency through the Lenzing E-Branding Service

Many consumers know that not all textiles offered on the market are produced in an environmentally conscious and socially sustainable way. Given the complexity of supply chains, they depend on information on the packaging or label to make informed decisions.

Ingredient branding to communicate raw material sustainability

Lenzing has adopted an ingredient branding approach in which it collaborates with brand partners in the value chain who convey the valuable properties of the fiber to the end consumers. Retailers, in turn, need supply chain partners who can positively support them in communicating a believable and consistent sustainability story. Lenzing has seized this opportunity with its branding platform.

E-BRANDING-SERVICE

Since the launch of the E-Branding Service in 2018, the number of applications for licenses and swing tickets processed by the E-Branding Service Team has grown by more than 60 percent every year. Even in a very challenging pandemic year, the TENCEL™ and LENZING™ ECOVERO™ brands still managed to grow their combined license product base by 20 percent from 2020 to 2021.

The Lenzing E-Branding Service is an online platform that provides customers along the value chain with access to Lenzing's product brands.

Registered Lenzing textile partners can apply for fabric certifications, license agreements, or Lenzing labels. Lenzing nonwoven partners can also register and apply for combined certification and license agreements. In addition to the supply chain disclosure, certification also includes fabric testing by Lenzing, i.e. only fabrics that really meet the defined standards are accepted.

After acquiring the license to use the requested Lenzing brand on the final product, partners may use the associated product logos in their communications to the end consumers. Ready-made Lenzing labels can also be provided to identify the product on request.

In addition to enabling end consumers to make conscious purchase decisions, the platform aims to protect the Lenzing brand portfolio (TENCEL™, LENZING™ ECOVERO™, VEOCEL™, TENCEL™ x REFIBRA™). It helps Lenzing and its partners defend the brands against counterfeiting and assures the end consumers that the product is exactly what the label promises.

Target groups for the Lenzing E-Branding Service are all partners along the value chain, starting with direct customers (i.e. those who buy Lenzing fibers) to fabric/roll-good manufacturers/ converters and manufacturers of the end products, to retailers who ultimately position the goods at the point of sales including online stores.

FOR ALL PARTNERS ALONG THE VALUE CHAIN

- Informed decisions for end consumers
- Service for the supply chain partners
- Transparent communication in complex environments
- Minimized risk of brand counterfeiting
- The product is exactly what the label promises

Supply chain collaboration and planning

Lenzing's supply chain collaboration and planning project is about generating a digital image of its extended supply chain, enabling end-to-end planning, agility, and responsiveness with the objective of reducing material and environmental impacts. Although the project is still in its development phase, Lenzing believes that the project – armed with the right partners, connectivity, control, autonomy, and a spirit of collaboration – will drive supply chain transparency.

Downstream value chain track and traceability via blockchain technology

Building on several successful pilot projects in 2019 with the innovative start-up TextileGenesis™, Lenzing introduced a digital platform for textile supply chain traceability in 2020 – a milestone for the Lenzing Group. The digital platform was launched in November 2020 for TENCEL™ and LENZING™ ECOVERO™ branded fibers.

TEXTILEGENESIS™

TextileGenesis™ is a pioneering supply chain traceability platform for the fashion and textile industry that is enabled by blockchain technology. Fibercoin™ traceability technology creates real-time digital accounting of sustainably produced fibers along the entire supply chain from fiber to retail, creating an entirely new level of traceability for brands and retailers. The platform is custom-built for all sustainably produced fibers such as wood-based cellulosic fibers, wool, recycled polyester, and organic cotton.

The platform provides customers, partners, and consumers with an overview of the entire textile supply chain. Supply chain traceability has become a top priority for apparel and home textile brands. Lenzing's new blockchain-enabled supply chain traceability platform supports the entire supply chain in meeting increasing demands for transparency and sustainability.

Phased onboarding and new digital certificates

After conducting a twelve-month pilot program and field trials with four well-known brands (H&M, ArmedAngels, Mara Hoffman and Chicks) and supply chain players from ten countries in three regions, Lenzing has successfully implemented its blockchain-enabled supply chain traceability platform and has integrated hundreds of supply chain partners into the system.

Lenzing's supply chain partners in South Asia (India, Bangladesh, Pakistan and Sri Lanka) completed the onboarding process in 2020 as part of the first phase. Since then, 670 supply chain partners have completed the program, enabling full supply chain traceability from fiber to production and distribution.

TextileGenesis™ platform: Fibercoin™ technology to ensure traceability along the supply chain

By using innovative Fibercoin™ technology in the TextileGenesis™ platform, Lenzing and other brand partners can now issue digital tokens (blockchain assets) in direct proportion to the physical shipments of TENCEL™ and LENZING™ ECOVERO™ branded fibers. These digital tokens provide a unique "fingerprint" and authentication mechanism, preventing adulteration, providing a more secure and trustworthy, digital chain of custody across the entire textile supply chain, and, most importantly, ensuring the materials are sustainably produced.

Lenzing, March 01, 2022
Lenzing Aktiengesellschaft

The Managing Board

Cord Prinzhorn
Chief Executive Officer

Mag. Thomas Obendrauf
Chief Financial Officer

Robert van de Kerkhof
Member of the Managing Board

DI Stephan Sielaff
Member of the Managing Board

DI Christian Skilich
Member of the Managing Board

CHAPTER
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Annex 2021

Table of content

Supplementary information pursuant to §243b UGB

Lenzing Aktiengesellschaft – Safety

Work-related injuries for all employees – Lenzing AG Table 34

	2019	2020[a]	2021
Total hours worked (productive working hours)	5,734,880	4,129,308	4,830,780
i) Number of fatal injuries	0	0	0
Rate of fatal injuries	0	0	0
ii) Number of high-consequence work-related injuries	1	0	0
Rate of high-consequence work-related injuries	0.03	0	0
iii) Number of recordable work-related injuries	114	35	34
Rate of recordable work-related injuries	3.98	0.94	1.41
iv) Total number of work-related injuries or ill health	129	99	87
Rate of work-related injuries	4.50	4.79	3.60
Work-related injuries for other workers (workers who are not employees but whose work and/or workplace is controlled by the organization)	**2019**	**2020[a]**	**2021**
Total hours worked (productive working hours)	1,127,658	789,421	853,099
i) Number of fatal injuries	0	0	0
Rate of fatal injuries	0	0	0
ii) Number of high-consequence work-related injuries	0	0	0
Rate of high-consequence work-related injuries	0	0	0
iii) Number of recordable work-related injuries	8	5	5
Rate of recordable work-related injuries	1.42	1.27	1.17
iv) Total number of work-related injuries or ill health	8	5	10
Rate of work-related injuries	1.42	1.27	2.34

a) With the exception of the major projects in Brazil and Thailand for data consistency reasons. The data analysis for 2021 refers only to the total number of reportable violations.

Work-related fatalities

No work-related fatalities were reported at Lenzing AG in the 2021 financial year.

Top five injury types – Lenzing AG

Top five injury types – Lenzing AG Table 35

	2019	2020	2021
The top five work-related injuries for employees	–	–	Cuts and lacerations (11) Bruises (6) Fracture (5) Sprain (5) Conditions due to substances (2)
The top five types of injuries for contractors	–	–	Bruises (2) Chemical burn (1) Condition due to substances (1) Cuts and lacerations (1)

The list of injury types for the Lenzing site was newly introduced with 2021. Comparative figures are therefore not available.

Lenzing Aktiengesellschaft workforce

Employees 2021 – Lenzing AG
Lenzing Aktiengesellschaft: Number of employees as of December 31; employees only (including apprentices, excluding temporary workers)

Table 36

	2019	2020	2021
Total headcounts as of 31.12.	2,958	3,119	3,201
Proportion of women	18.3 %	17.7 %	18.6 %
Proportion of age > 50	25.9 %	26.0 %	24.9 %
Proportion of non-Austrians	6.0 %	6.1 %	6.8 %
Apprentices	130	140	144
Contractors	171	144	167
Proportion of employees with full-time contract	55.0 %	87.5 %	87.2 %
Thereof female	17.4 %	10.8 %	11.6 %
Thereof male	82.7 %	89.2 %	88.4 %
Proportion of employees with part-time contract	45.0 %[a]	12.5 %	12.8 %
Therof female	19.2 %	65.8 %	65.9 %
Therof male	80.8 %	34.2 %	34.1 %
Proportion of employees for whom collective bargaining agreements exist	100 %	100 %	100 %
Employees with disabilities	79	78	68
Turnover rate	3.7 %	6.7 %	6.1 %

a) Due to the transition to a 5-shift-system, shift employees (= 90 percent employment level) were treated as part-time employees. This changed in 2020 as these 5-shift employees are now counted as full-time employees.

As regards potential corruption offenses or breaches of antitrust law, no official measures were undertaken or legal claims made against Lenzing Aktiengesellschaft in 2021.

Figures concerning environmental matters will not be reported separately for competitive reasons and because these matters are managed and measured on a Group-wide basis. The omission of this information does not prevent a fair and balanced understanding of its development, performance, position, and impact of these activities.

Additional information on chapters

Wood and pulp procurement

Wood procurement for the company's own fiber pulp plants in Lenzing (Austria) and Paskov (Czech Republic)
Beech and spruce, by country, 2019 to 2021.
Regional – own country and neighboring countries

Lenzing Table 37

Country	2019	2020	2021
Austria	39.8 %	45.9 %	38.6 %
Germany	24.9 %	22.1 %	23.4 %
Czech Republic	9.3 %	9.9 %	14.0 %
Slovakia	14.9 %	12.1 %	13.5 %
Hungary	2.2 %	4.0 %	5.3 %
Slovenia	0.5 %	0.4 %	0.4 %
Total regional	**91.5 %**	**94.5 %**	**95.2 %**
Poland		2.1 %	2.0 %
France		2.6 %	2.1 %
Switzerland		0.9 %	0.7 %
Other countries		**5.6 %**	**4.7 %**
Total		**100.0 %**	**100.0 %**

Paskov Table 38

Country	2019	2020	2021
Czech Republic	77.9 %	89.6 %	84.0 %
Slovakia	18.7 %	10.0 %	8.7 %
Poland	3.4 %	0.4 %	2.1 %
Total regional	**100.0 %**	**100.0 %**	**94.8 %**
Austria	0.0 %	0.0 %	2.9 %
Germany	0.0 %	0.0 %	2.3 %
Other countries	**0.0 %**	**0.0 %**	**5.2 %**
Total	**100.0 %**	**100.0 %**	**100.0 %**

Certification status in the Lenzing Group, 2019–2021

Certification status of total wood input at Lenzing fiber production sites via own and purchased dissolving wood pulp. Basis: dissolving wood pulp by weight. All PEFC certified or controlled sources are also FSC® controlled.

Certification status in the Lenzing Group, 2019–2021 Table 39

	2019	2020	2021
PEFC	23.9 %	28.5 %	27.4 %
FSC® Controlled Wood	35.6 %	29.7 %	36.7 %
FSC® Mix	40.5 %	41.8 %	35.9 %

NaDiVeG compliance table

You can find this table here:
https://reports.lenzing.com/sustainability-report/2021/annex/nadiveg

GRI Content Index

You can find this table here:
https://reports.lenzing.com/sustainability-report/2021/annex/gri

TCFD Index

You can find this table here:
https://reports.lenzing.com/sustainability-report/2021/annex/tcfd

Independent Assurance Report on the Non-financial Report according to §§ 243b and 267a UGB

To the Board of Directors and to the Supervisory Board of Lenzing Aktiengesellschaft, Lenzing

This English language independent assurance report is a translation provided for information purposes only. The original German text shall prevail in the event of any discrepancies between the English translation and the German original. We do not accept any liability for the use of, or reliance on, the English translation nor for any errors or misunderstandings that may derive from the translation.

We have performed an independent limited assurance engagement on the combined consolidated non-financial report according to §§ 243b and 267a UGB ("NFI report") for the financial year 2021, which has been published as Sustainability Report 2021 / Nonfinancial Report 2021 of

Lenzing Aktiengesellschaft, Lenzing,
(referred to as "Lenzing" or "the Company").

Conclusion

Based on the procedures performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the NFI report of the Company is not in accordance with the legal requirements of the Austrian Sustainability and Diversity Improvement Act (§§ 243b and 267a UGB), the provisions of Article 8 of the Regulation (EU) 2020/852 as amended and the supplementing delegated Regulation (EU) 2021/2178 (hereafter "EU Taxonomy Regulation") and the sustainability reporting guidelines of the Global Reporting Initiative (GRI Standards) Option "Core" in all material respects.

Management's Responsibility

The Company's management is responsible for the proper preparation of the NFI report in accordance with the reporting criteria. The Company applies the legal requirements of the Austrian Sustainability and Diversity Improvement Act (§§ 243b and 267a UGB) and the sustainability reporting guidelines of the Global Reporting Initiative (GRI Standards) Option "Core" as reporting criteria. In addition, the company prepares disclosures in accordance with the EU Taxonomy Regulation, which are published as part of sustainability reporting.

The Company's management is responsibile for the selection and application of appropriate methods for non-financial reporting (especially the selection of significant matters) as well as the use of appropriate assumptions and estimates for individual non-financial disclosures, given the circumstances. Furthermore, their responsibilities include the design, implementation and maintenance of systems, processes and internal controls that are relevant for the preparation of the sustainability report in a way that is free of material misstatements – whether due to fraud or error.

Emphasis of Matter

We refer to the disclosures in section "Managing Sustainability" of the non-financial statement, related to Article 8 of the EU Taxonomy Regulation, in which the legal representatives have set out their understanding of the regulations and the delegated legislation adopted in this regard. Both the disclosures as well as the delegated legislation issued in this regard are based on wordings and terms that are subject to significant uncertainties in their interpretation and for which there are no authoritative sources available for clarification. The legal representatives are responsible for the selection of these interpretations as well as their reasonability. Due to the inherent risk that ambiguous legal terms may be interpreted differently, an assessment of legal conformity with regulations is subject to uncertainties. Our conclusion is not modified in respect of this matter.

Auditors' Responsibility

Our responsibility is to state whether, based on our procedures performed and the evidence we have obtained, anything has come to our attention that causes us to believe that the Company's NFI report is not in accordance with the legal requirements of the Austrian Sustainability and Diversity Improvement Act (§§ 243b and 267a UGB), the legal requirements of the EU Taxonomy Regulation and the sustainability reporting guidelines of the Global Reporting Initiative (GRI Standards) Option "Core" in all material respects.

Our engagement was conducted in conformity with the International Standard on Assurance Engagements (ISAE 3000) applicable to such engagements. These standards require us to comply with our professional requirements including independence requirements, and to plan and perform the engagement to enable us to express a conclusion with limited assurance, taking into account materiality.

An independent assurance engagement with the purpose of expressing a conclusion with limited assurance ("limited assurance engagement") is substantially less in scope than an independent assurance engagement with the purpose of expressing a conclusion with reasonable assurance ("reasonable assurance enagement"), thus providing reduced assurance. Despite diligent engagement planning and execution, it cannot be ruled out that material misstatements, illegal acts or irregularities within the non-financial report will remain undetected.

The procedures selected depend on the auditor's judgment and included the following procedures in particular:

- Inquiries of personnel at the group level, who are responsible for the materiality analysis, in order to gain an understanding of the processes for determining material sustainability topics and respective reporting threshholds of the Company;
- A risk assessment, including a media analysis, on relevant information on the Company's sustainability performance in the reporting period;
- Evaluation of the design and implementation of the systems and processes for the collection, processing and monitoring of disclosures on environmental, social and employees matters, respect for human rights, anti-corruption as well as bribery and also includes the consolidation of data;
- Inquiries of personnel at the group level, who are responsible for providing, consolidating and implementing internal control procedures relating to the disclosure of concepts, risks, due diligence processes, results and performance indicators;
- Inspection of selected internal and external documents, in order to determine whether qualitative and quantitative information is supported by sufficient evidence and presented in an accurate and balanced manner;
- Assessment of the processes for local data collection, validation and reporting, as well as the reliability of the reported data through a (remotely conducted) survey performed on a sample basis at Lenzing Fibers Inc., Mobile (USA).
- Analytical evaluation of the data and trend of quantitative disclosures regarding the GRI Standards listed in the GRI-Index, submitted by all locations for consolidation at the group level;
- Evaluation of the consistency of the of the Austrian Sustainability and Diversity Improvement Act (§§ 243b and 267a UGB), the EU Taxonomy Regulation and the GRI Standards, Option "Core" to disclosures and indicators of the NFI report, which apply to the Company;
- Evaluation of the overall presentation of the disclosures by critically reading the NFI report.

The procedures that we performed do not constitute an audit or a review. Our engagement did not focus on revealing and clarifying of illegal acts (such as fraud), nor did it focus on assessing the efficiency of management. Furthermore, it is not part of our engagement to audit future-related disclosures, prior year figures, statements from external sources of information, expert opinions or references to more extensive external reporting formats of the Company.

Restriction on use

Because our report will be prepared solely on behalf of and for the benefit of the principal, its contents may not be relied upon by any third party, and consequently, we shall not be liable for any third party claims. We agree to the publication of our assurance certificate and NFI report. However, publication may only be performed in its entirety and as a version hat has been certified by us.

General Conditions of Contract

Our responsibility and liability towards the Company and any third party is subject to paragraph 7 of the General Conditions of Contract for the Public Accounting Professions.

Linz, 4th of March 2022

KPMG Austria GmbH
Wirtschaftsprüfungs- und Steuerberatungsgesellschaft

Mag. Gabriele Lehner
Wirtschaftsprüferin
(Austrian Chartered Accountant)

Glossary

Accelerating Circularity
Accelerating Circularity is a collaborative effort to accelerate the textile industry's move from linear to circular. The textile industry must move from a take, make waste system to circularity, avoiding the massive amounts of textile waste annually put into landfill. www.acceleratingcircularity.org

AFRAC
The Austrian Accounting Standards Committee, whose activities are not aimed at profit, serves the research, documentation and further development of accounting and auditing in Austria, taking into account international and European developments and Austrian interests in this field. www.afrac.at

Austrian Sustainability and Diversity Improvement Act
The "Nachhaltigkeits-und Diversitätsverbesserungsgesetz" (NaDiVeG) implements the European "NFI Directive" (2014/95/EU) in Austria. It expands the reporting obligations in the area of non-financial information for large companies of public interest, with an average of more than 500 employees.

BAT – Best available techniques
Best available techniques means the most effective and advanced stage in the development of activities and their methods of operations. The techniques should indicate the practical suitability of particular techniques for providing, in principle, the basis for emission limit values designed to prevent, and, where this is not practicable, generally to reduce emissions and the impact on the environment as a whole.

Biobased
Biobased products are those that originate partially or completely from renewable resources. These products can be either biodegradable or non-biodegradable.

Biobased chemicals
Chemicals from the biorefinery, originating from renewable resources and also referred to in this report as biorefinery products Biodegradable The ability of a substance to be broken down by micro-organisms (bacteria, fungi, etc.) into carbon dioxide (CO_2) and water, so that it can be consumed by the environment. Test methods describe a certain time, conditions of temperature, oxygen availability, and humidity, and set a certain percentage of breakdown.

Biodegradable
The property of a substance or material to be degraded by microorganisms (bacteria, fungi, etc.) to water and carbon dioxide (CO_2) and to be absorbed by the environment. Test methods specify a fixed time under defined conditions of temperature, oxygen and humidity, and a certain percentage of degradation.

Biodiversity
This is the variability among living organisms from all sources including, among others, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems.

Bioenergy
Bioenergy is energy derived from biomass. The term refers to various forms of energy, including heat and electricity. Also the biomass that contains this energy can be referred to as bioenergy. The main sources of bioenergy are renewable resources.

Biorefinery
A biorefinery is a facility for sustainable processing of biomass into a spectrum of marketable biobased biorefinery products and bioenergy.

Blockchain
Blockchains are forgery-proof, distributed data structures in which transactions are recorded in the time sequence, traceable, unchangeable and without a central instance linked in a peer-to-peer network. The blockchain technology enables digital traceability of TENCEL™ branded fibers and the corresponding wood sources across each production and distribution step. The technology also allows consumers to verify the garment composition and the underlying textile supply chain.

Canopy
Canopy is a Canadian non-profit organization dedicated to the conservation and protection of ancient and endangered forests. Lenzing works together with Canopy to ensure responsible wood sourcing. canopyplanet.org

CDP – Carbon Disclosure Project
The Carbon Disclosure Project (CDP) is a non-profit organization with the aim that companies and also municipalities disclose their environmental data, such as climate-damaging greenhouse gas emissions and water consumption. Once a year, the CDP collects data and information on behalf of investors using standardized questionnaires on CO_2 emissions, climate risks and reduction targets and strategies of companies. Participation is voluntary. www.cdp.net

Carbon footprint
A carbon footprint is the sum of greenhouse gas emissions and greenhouse gas removals of a product system or an organization, expressed as a carbon dioxide equivalent.

Carbon – zero
CO_2 neutrality means, in a narrow sense, that no CO_2 is emitted or that the CO_2 emissions are fully offset or compensated. https://de.wikipedia.org/wiki/Klimaneutralit%C3%A4t

Cellulose
The raw material for pulp production. Cellulose is a component of all plants. The cellulose content of wood is about 40 percent.

Chain of custody
The chain of custody documents the flow of materials and raw materials through various stages right up to the final product. It is important for the certification of raw materials and their traceability. In order to ensure that final products really meet the requirements of the standard, initiatives trace the flow of materials throughout the chain of custody.

COD
Chemical oxygen demand. A further method for assessing the organic load of wastewater (besides BOD biological oxygen demand). It measures the degree to which the wastewater can undergo chemical oxidation.

Compliance
In general, compliance means conforming to a rule, such as a specification, policy, standard or law. Regulatory compliance describes the goal that organizations aspire to achieve in their efforts to ensure that they are aware of and take steps to comply with relevant laws, policies, and regulations.

Co-product
By-products recovered during fiber production.

Debottlenecking
Increasing the production capacity of existing plants by eliminating bottlenecks.

Decarbonization
Decarbonization denotes the declining average carbon intensity (CO_2 emission per unit of a product) over time. Products can be, for example, (primary) energy, gross domestic product, or any units produced by a company.

Denial of service
A denial of service attack (DoS attack) is a cyberattack, that prevents legitimate users from accessing services, computer systems, networks, or other information technology resources.

Dissolving wood pulp
A special kind of pulp with special characteristics used to manufacture viscose, modal and lyocell fibers and other cellulose-based products. This grade of pulp is characterized by higher alpha cellulose content and by a high degree of purity.

ECF
Elemental chlorine free – a bleaching process without using elemental chlorine

EcoVadis
EcoVadis aims to promote the environmental and social practices of companies through CSR performance monitoring within the supply chain and to support companies in improving sustainability. EcoVadis operates the first collaborative platform to deliver CSR ratings from suppliers to global supply chains.

EPA (United States Environmental Protection Agency)
The United States Environmental Protection Agency (EPA, resp. USEPA) is an independent agency of the United States for the environmental protection and the protection of human health.

ESG – Environmental, social and governance standards
Environmental, social and governance (ESG) refers to the three central factors in measuring the sustainability and ethical impact of an investment in a company or business.

FAO – Food and Agriculture Organization of the United Nations
The Food and Agriculture Organization of the United Nations (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger. It is based in Rome.

FSC®
The Forest Stewardship Council® (FSC) is an international non-profit organization for wood certification.

Furfural
A clear yellowish liquid with a characteristic scent of almonds. During viscose fiber production, beech wood is cooked and furfural is released in a double distillation process.

GHG – Greenhouse gas emissions
Emissions of gases which contribute to global warming by absorbing infrared radiation, thereby heating the atmosphere. The main contributors are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

GRI – Global Reporting Initiative
The Global Reporting Initiative (known as GRI) is an international independent standards organization that helps businesses, governments and other organizations understand and communicate their impacts on issues such as climate change, human rights and corruption. The purpose of GRI is to develop globally applicable guidelines for sustainability reporting.

Hemicellulose
The designation for carbohydrates that are contained in wood but that are not cellulose. They can have the widest variety of compositions depending on the type of wood involved, e.g. xylan (in beech wood).

Higg FEM/FSLM

The Higg Facility Environmental Module (Higg FEM) informs manufacturers, brands and retailers about the environmental performance of their of their individual facilities and enables them to make improvements achieve sustainability. The Higg Facility Social and Labor Module (FSLM) tool focuses on issues such as hours of work, wages and benefits, health and safety, and strengthening communities. https://apparelcoalition.org/higg-facility-tools/

Higg MSI

The Higg Materials Sustainability Index (Higg MSI) is the apparel industry's most trusted tool to measure and score the environmental impacts of materials.

ILO – International Labour Organization

The International Labour Organization (ILO) is a United Nations agency that sets international labor standards and promotes social protection and work opportunities for all. The ILO has 187 member states: 186 of the 193 UN member states plus the Cook Islands are members of the ILO.

Integration

All stages of fiber production are concentrated at one and the same site, from wood, the raw material, to pulp and fiber production.

IOSH – Institute of Occupational Safety and Health

IOSH is the only Chartered body for safety and health professionals. Their members follow a strict Code of Conduct and a formal professional development program.

IPBES

IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) is an intergovernmental body providing scientific policy advice on biodiversity – comparable to the IPCC (Intergovernmental Panel on Climate Change).
https://www.bmuv.de/faq/was-ist-und-macht-ipbes

IPCC

The abbreviation "IPCC" stands for Intergovernmental Panel on Climate Change. In German-language media, the IPCC is usually referred to as the "Intergovernmental Panel on Climate Change".

The IPCC was founded in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). Its findings form the basis for international climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). In it, member states affirm their intention to prevent "dangerous climate change."
https://wiki.bildungsserver.de/klimawandel/index.php/IPCC

ISO 14001:2015

An international standard for the certification of environmental management systems.

ISO 9001:2015

An international standard for the certification of quality management systems.

ISS ESG

ISS ESG is the responsible investment arm of Institutional Shareholder Services Inc., the world's leading provider of environmental, social, and governance solutions for asset owners, asset managers, hedge funds, and asset servicing providers.

KPI

The term key performance indicator describes indicators in business economics which are used to measure progress or achievements related to important targets or critical success factors within an organization.

LCA

Life Cycle Assessment is a systematic analysis of the environmental impacts of products throughout their life cycle ("from cradle to grave").

Lignin

A polyaromatic component of wood that cannot be used for fiber production. It is used for generating power and to recover co-products.

Lignosulfonate

The decomposition products of lignin from wood after pulping.

Lyocell fibers

Lyocell fiber is the latest generation of wood-based cellulosic fibers. The generic fiber name is lyocell, the branded products from Lenzing are marketed as TENCEL™ and VEOCEL™ fibers.

Modal

Modal is a viscose fiber refined under modified viscose production conditions and spinning conditions. It is characterized by a particular softness and is the preferred fiber for high-quality underwear and similar products. The fibers have improved use characteristics such as tenacity, dimensional stability, and so forth. Lenzing markets these fibers under TENCEL™ Modal.

Net-benefit products

Lenzing's net-benefit products offer positive impacts and benefits for the environment, society, and value chain partners, and are better than most competing alternatives in the market. Net-benefit products take a life cycle perspective and thus include both upstream and downstream value chain processes. Net-benefit thinking describes the performance of our specialties and forward solutions that form part of the sCore TEN strategy.

Net-zero target

Setting corporate net-zero targets aligned with meeting societal climate goals means (1) achieving a scale of value chain emissions reductions consistent with the depth of abatement at the point of reaching global net-zero in 1.5°C pathways and (2) neutralizing the impact of any residual emissions by permanently removing an equivalent volume of CO_2. Quelle: Net-Zero-Standard.pdf (sciencebasedtargets.org)

NIST Cyber Security Framework

The NIST Cyber Security Framework consists of voluntary guidelines, standards and best practices to manage cybersecurity risk.

NMMO
N-Methylmorpholine N-oxide is an aqueous, biodegradable, organic solvent.

Nonwovens
Nonwoven materials, fleece. Nonwovens made from Lenzing fibers are used for sanitary, medical, and cosmetics applications.

Offsetting
Reducing the damage caused by releasing carbon dioxide into the environment by doing other things that remove carbon dioxide from the atmosphere, e.g. through climate protection projects.

OHSAS 18001:2007
Occupational Health and Safety Assessment Series (OHSAS) is a certification system for management systems pertaining to work safety.

PEFC
The Programme for the Endorsement of Forest Certification Schemes (PEFC) is an international non-profit organization for wood certification.

Plantation
Forests of exotic species that have been planted or seeded by human intervention and that are under intensive stand management, fast growing, short rotation. Examples: poplar, acacia or eucalyptus plantations.

Pre-consumer
Pre-consumer upcycling is the reclamation of waste materials that were created during the manufacturing process prior to their delivery to a consumer (such as cotton scraps from garment making).

Post-consumer
A product made from post-consumer material is made from waste that has been used and disposed of by a consumer (such as used clothing).

Ransomware as a Service (RaaS)
RaaS is a service in which cybercriminals provide a compact malware program that can be used to launch a ransomware attack. Ransomware is a malware, where cybercriminals attack a system with malicious code. The goal is to lock legitimate users out of their system and encrypt sensitive data. Companies are then often blackmailed into paying high ransoms in order to obtain the decryption key.

SAC – Sustainable Apparel Coalition
An association of leading companies, non-profit organizations as well as research and educational experts aiming to create a more sustainable international apparel, footwear and textile industry. The SAC is the developer of the Higg Index.

Salutogenesis
Developed by Aaron Antonovsky († July 7, 1994), an Israeli-American professor of sociology. In contrast to pathogenesis, the salutogenic approach does not focus on the question "What makes a human being ill?" but rather "What keeps a human being healthy?"

Security patch
A security patch is a method of updating applications, systems or software by inserting code to fix the vulnerability.

Science-based targets
Targets adopted by companies to reduce greenhouse gas emissions are considered "science-based" if they are in line with the level of decarbonization required to keep global temperature increase below 2°C compared to pre-industrial temperatures, as described in the Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). [Applies to the 4th or 5th AR of IPCC as well as modeling of the IEA.]

Scope 1, 2 and 3 emissions
Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

sCore TEN
The name of the Lenzing Group's corporate strategy stands for a steady focus on performance (scoring) and the strengthening of the core business (core) as well as for long-term growth with specialty fibers such as TENCEL™ and VEOCEL™.

SHEARS
Safety, Health and Environment Action Reporting System of the Lenzing Group

Semi-natural forest
Forests of native species, established either through assisted or natural regeneration, or a mix of these under intensive stand management (includes forests in which assisted regeneration carried out with same species and similar species composition as in the natural forests in the area). Examples: many production forests in Europe, some teak plantations.

SFI
Sustainable Forestry initiative

Stakeholders
All internal and external persons or groups affected directly or indirectly by business activities currently or in the future. Standard fibers Standard LENZING™ fibers for textile applications (viscose, modal, lyocell) and standard LENZING™ fibers for nonwoven applications (viscose, lyocell) are fibers that are not designated as specialties.

Standard fibers
LENZING™ standard fibers for textile applications (viscose, modal and lyocell fibers) and LENZING™ standard fibers for nonwoven applications (viscose and lyocell fibers) are fibers that are not designated as specialties.

Sustainalytics
Sustainalytics is a rating agency that assesses the sustainability of listed companies based on their environmental, social and governance performance. www.sustainalytics.com

TCF
Totally chlorine free (bleaching process)

Textile Exchange (TE)
Textile Exchange, founded in 2002, is a global nonprofit organization that works closely with all sectors of the textile supply chain to find the best ways to minimize and even reverse the negative impacts on water, soil, air, animals, and the human population.

VBV Austrian Sustainability Index VÖNIX
VÖNIX is Austria's first sustainability index. It was created by the VBV Austrian pension fund and is comprised of listed Austrian companies that are leaders in terms of social and environmental performance.

Vigeo Eiris
As a rating and research agency, V.E evaluates organizations' integration of social, environmental and governance factors into their strategies, operations and management – with a focus on promoting economic performance, responsible investment and sustainable value creation.

Viscose fibers
Regenerated cellulosic fibers produced from raw materials of plant origin (e.g. wood) using the viscose process.

WEF – World Economic Forum
The World Economic Forum (WEF) is a foundation which is primarily known for its annual meeting of the same name that takes place annually in Davos in the canton of Grisons.

Wood-based cellulosic fiber
A fiber industrially produced from raw materials of plant origin (e.g. wood), known in the industry as man-made cellulose fiber.

Xylose
Wood sugar, component of thick liquor and base material for xylitol (sweetener that inhibits tooth decay)

ZDHC – Zero discharge of hazardous chemicals
The ZDHC Foundation is a global center of excellence in responsible chemical management which works towards zero discharge of hazardous chemicals in the textile, leather, and footwear value chain to improve the environment and people's wellbeing. Net-zero: Put simply, net zero means we are not adding new emissions to the atmosphere. Emissions will continue, but will be balanced by absorbing an equivalent amount from the atmosphere. (Source: UN)

ZDHC MMCF Guidelines
The ZDHC MMCF Guidelines is a set of guidelines that addresses integrated expectations for discharge wastewater quality, emissions to air, and chemical recovery for manufacturing facilities producing Man-Made Cellulosic Fibers (MMCF).

Zero-day vulnerabilities
A zero-day vulnerability is a computer-software vulnerability that is unknown to the vendors and therefore has no patch ready. The term zero-day means that there is a zero-day gap between the time the vulnerability is discovered and the first attack happens.

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