

# Lenzing Group Sustainability Report 2017 Non-Financial Statement

Innovating  
for *balance*

**Lenzing**  
Innovative by nature

**80**  Years  
Lenzing





Target Setting

- One Lenzing Standard targeting EU Ecolabel for all sites
- Air: 50% specific sulfur emission reduction by 2022 (baseline 2014)
- Water: 20% COD reduction by 2022 (baseline 2014)
- Commitment to support conservation solutions
- Assessment of sustainability performance of 80% of Lenzing Group’s most relevant suppliers by 2022



Lenzing Performance

- Received “Gold status” in EcoVadis assessment
- VÖNIX Ranking improved from B+ to A-
- Lenzing listed in the Global Challenges Index (GCI)
- Contributing to: Circular Fibres Initiative, World Resources Institute, World Economic Forum,...
- First sustainability report with GRI Standards fulfillment and NaDiVeG compliance
- Lifelong learning: expenditure increased more than 40%

achievements  
2017



Responsible Sourcing

- First cellulose fiber producer to complete the verification audit of the CanopyStyle Initiative
- High “Green Shirt” ranking in Canopy Hot Button Report 2017
- Joined FSC® as a member



Sustainable Innovations

- TENCEL™ Luxe with Eco Filament technology
- LENZING™ ECOVERO™ branded specialty viscose fibers
- REFIBRA™ technology with cotton scraps
- Biobased acetic acid certified by USDA
- Opening of innovation center Hong Kong



# Lenzing Group: sustainability key performance indicators

Lenzing Group: sustainability key performance indicators table 0/1

	2015	2016	2017
Value creation	EUR 473.9 mn	EUR 637.9 mn	EUR 725.7 mn
ROCE (Return on Capital Employed) <sup>1</sup>	8.1%	15.1%	18.6%
Adjusted equity ratio	50.6%	53.0%	61.2%
Revenue	EUR 1,976.8 mn	EUR 2,134.1 mn	EUR 2,259.4 mn
R&D expenditure, calculated according to the Frascati method	EUR 29.8 mn	EUR 46.4 mn	EUR 55.4 mn
EBITDA (earnings before interest, tax, depreciation and amortization)	EUR 290.1 mn	EUR 428.3 mn	EUR 502.5 mn
Number of employees <sup>2</sup>	5,946	6,043	6,315
Share of female employees	12.3%	13.0%	13.5%
Own pulp supply share	56%	56%	57%
Share of fibers with forest certificate	59%	58%	62%
Share of wood source certified or controlled by forest certification	>99%	>99%	>99%
Specific Energy consumption (GJ/t, 2014=100%)	98.7%	98.6%	97.6%
Specific GHG emissions (tons of CO <sub>2</sub> eq./t, 2014=100%)	96%	95%	97%
Specific Water intake (m <sup>3</sup> /t, 2014=100%)	98%	94%	95%
Specialty fibers share	40.5%	42%	41.9%
Accident rate	36.3/1,000 persons	24.1/1,000 persons	25.3/1,000 persons

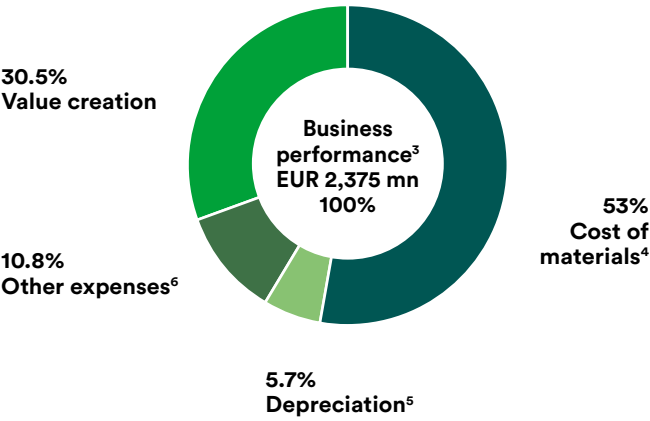
1) The financial indicators are derived primarily from the IFRS consolidated financial statements of the Lenzing Group. Additional details are provided in the section „Notes on financial performance indicators of the Lenzing Group“, in the glossary of the the Annual Report and in the consolidated financial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

2) Employees (excluding apprentices and contractors) in Austria, the Czech Republic, United Kingdom, USA, China, Indonesia, India, Thailand, Turkey, Korea and Singapore

Many stakeholders profit from the economic activities of the Lenzing Group. Apart from customers, employees, suppliers and the public sector greatly benefits from its business operations.

Value creation within the Lenzing Group is calculated as the company’s business performance less cost of materials, other expenses as well as depreciation and amortization. The distribution of value creation shows the extent to which it is distributed among stakeholders such as employees, the public sector or lenders. In 2017 the Lenzing Group created value totaling EUR 725.7 mn.

Analysis of value creation  
Lenzing Group, 2017  
figure 0/2



3) Revenue plus change in inventories of finished goods and work in progress plus own work capitalized plus other operating income plus income from the release of investment grants plus income from investments accounted for using the equity method plus income from non-current and current financial assets plus net foreign currency gain/losses from financial liabilities less allocation of profit or loss to puttable non-controlling interests.

4) Cost of material and other purchased services

5) Amortization of intangible assets and depreciation of property, plant and equipment

6) Other operating expenses less asset taxes and similar taxes

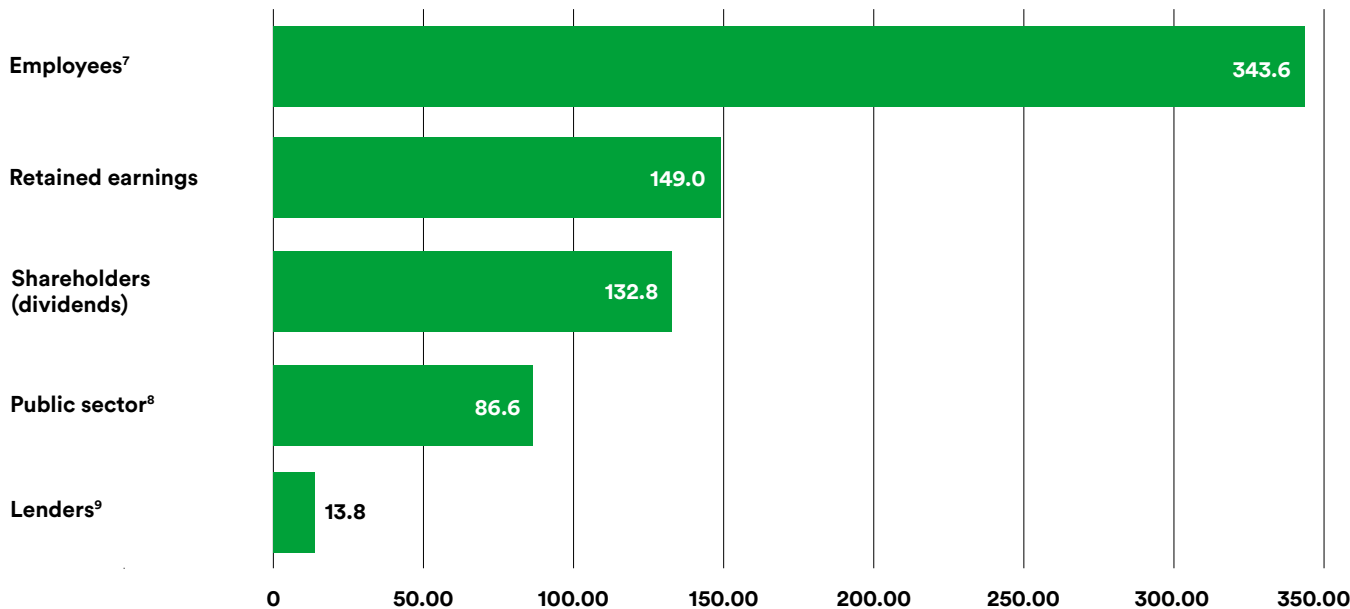


The Lenzing Group employees profited the most from the industrial value creation of the company in 2017. Shareholders were ranked second, followed by the public sector to which Lenzing paid considerable taxes and duties as well as external providers of capital. **[201-1]**

### Distribution of value creation

Lenzing Group in EUR mn, 2017

figure 0/3



7) Personnel expenses less municipal taxes

8) Income tax expenses plus asset taxes and similar taxes plus municipal taxes

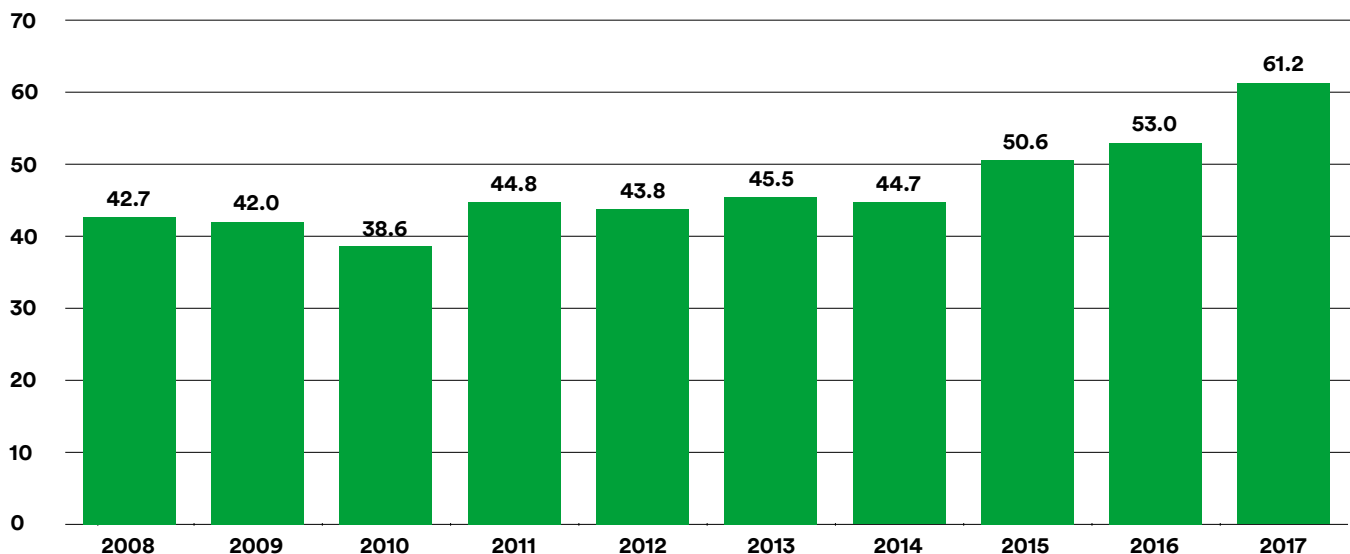
9) Financing costs less net foreign currency gain/losses from financial liabilities

The Lenzing Group boasts a solid balance sheet structure. The equity ratio is a key benchmark for the company’s financial power. This ratio increased to 61.2 percent in 2017.

### Adjusted equity ratio

in %

figure 0/4





# Innovating for *balance*





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The Lenzing

Group





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# About this report

This report is the combined consolidated non-financial report for the Lenzing Group<sup>1</sup> (according to §267a UGB) and for Lenzing AG (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 for both, Lenzing Group and Lenzing AG. For those indicators where meaningful figures can be provided, separate data for Lenzing AG can be found in the annex (according to legal requirements by the Austrian Sustainability and Diversity Improvement Act<sup>2</sup> – NaDiVeG – and AFRAC recommendation). For a better overview, a NaDiVeG compliance table can be found in the annex.

This report covers all the entities where the Lenzing Group has a level of operational control, as shown in the map on page 10. A list of the group companies as at December 31, 2017 is provided in Note 43 of the Annual Report of the Lenzing Group. In 2017 new sales representations were established in Istanbul. Data relating to human resources covers the whole Lenzing Group. The environmental data focus – according to the results of the materiality analysis – is solely on production sites.

The contents of this report reflect the relevant and material topics for sustainable development at the Lenzing Group. The material topics have been determined on basis of their significance on social and environmental impacts by considering perspectives of different stakeholders and are described in the relevant chapters.

Specific environmental indicators are calculated using data from all production sites of the Lenzing Group. These account for 100 percent of the company's worldwide production volume. There have been no changes in the consolidation scope compared to the previous sustainability report. **[102-45, 102-49]**

This Sustainability Report covers topics of sustainability management, responsible sourcing, efficient production, Lenzing's innovations, key ecological and social developments as well as economic factors in the 2017 reporting year.

Five primary targets (baseline 2014) for the Lenzing Group are addressed in chapter 2, page 26 :

- Target 1<sup>3</sup>: To improve the Lenzing Group's specific sulfur emissions by 50 percent by 2022
- Target 2<sup>3</sup>: To improve Lenzing Group's specific wastewater emission by 20 percent by 2022
- Target 3: To implement conservation solutions – start an afforestation project in 2018
- Target 4: To assess the sustainability performance of 80 percent of the Lenzing Group's "most relevant suppliers"<sup>4</sup> by 2022
- Target 5: To improve transparency by implementing the HIGG-Facilities Environmental Module (FEM 3.0) at all sites by 2019<sup>5</sup>.

The structure of the report follows a value chain perspective and provides an insight into specific data and performance in the corresponding chapters. The report is addressed to all stakeholders, including company employees, customers and value chain partners, suppliers, NGOs, shareholders, and the general public.

The Lenzing Sustainability report is the follow-up report to the sustainability report published in 2017 containing data from 2016. Five restatements of information provided in previous reports have been made. **[102-48, 102-51]**

This report mainly covers data from 2017, wherever possible also presenting a series of data over three years (2015, 2016 and 2017)<sup>6</sup> to make the information transparent, relevant, and comparable. The reporting period for waste data is limited to 01/2017 – 09/2017. (see page 68) **[102-50]**

Regional as well as group-wide data is reported according to the standards of the Global Reporting Initiative (Core option). A detailed GRI Content Index can be found in the appendix for cross-reference (pages 104-107). In line with GRI Standards requirements, the reporting cycle of Lenzing's sustainability performance will be annual. **[102-46, 102-52, 102-54]**

## Contact

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**[102-53]**

Lenzing Aktiengesellschaft  
Lenzing, 06 March, 2018

1) "The Group" (for better readability occasionally referred to as "Lenzing") comprises of Lenzing Aktiengesellschaft (Lenzing, Austria) and its subsidiaries

2) Nachhaltigkeits- und Diversitätsverbesserungsgesetz (§§243b, 267a UGB)

3) These two targets will allow us to meet the EU Ecolabel criteria for all Lenzing production sites.

4) „Most relevant suppliers“ comprise 80% of the Lenzing Group's purchasing value.

5) Details see page 27

6) The financial year of the Lenzing Group corresponds to the calendar year (1 January to 31 December)



## Dear stakeholders!

For the Lenzing Group, 2017 was more than just the best financial year in the company's history. We also progressed in showcasing our corporate values and implementing our sCore TEN corporate strategy.

One of the core values of the Group is sustainability, a balance in all our decisions between People, Planet and Profit. Sustainability, however, more than a mere value in the Lenzing Group - it is the key business and innovation driver. Lenzing's differentiates itself in the market by aiming to be the sustainability leader in the wood-based cellulosic fiber industry and by making sustainability the guiding light for all our R&D and innovation initiatives. In the 2017 reporting year, we successfully initiated important projects and launched a series of leading-edge products on the market.

Lenzing decided to grow its business by further expanding its lyocell production capacities to boost output of the world's most sustainable botanic fibers. Thailand will be the next location to build a state-of-the-art facility to produce lyocell fibers. Together with the 90,000 ton lyocell fiber plant already under construction in Mobile, Alabama and the debottlenecking of our lyocell facilities in Lenzing and Heiligenkreuz (both Austria), we support our customers in making their product portfolios even more sustainable. With lyocell fibers from Lenzing, they are buying cellulosic fiber with exceptional environmental performance.

The launch of our new TENCEL™ Luxe filament was the clear innovation highlight in the wood-based cellulosic fiber industry in 2017 and the most important cellulosic fiber innovation in the last 25 years. It will be the first filament yarn based on the renewable raw material wood to be produced with the particularly eco-friendly lyocell process with potential to grow. This product opens up new innovation and textile creation opportunities for environmentally conscious customers along the textile value chain; opportunities that could not be provided by conventional filaments.

With the market launch of LENZING™ ECOVERO™ fibers, Lenzing now provides a solution for customers who want to ensure they can buy viscose with a clear conscience. ECOVERO™ branded viscose fibers mark the next milestone in Lenzing's sustainability journey by offering eco-friendly viscose with the lowest environmental impact in the industry – setting a new industry-wide benchmark for the sustainability of viscose fibers.

As a contribution to the objective of a circular economy, we continued with the successful commercialization of our new TENCEL™ Lyocell fiber with REFIBRA™ recycling technology, which partly utilizes cotton scraps from the textile industry as a raw material. As a high-quality recycled fiber, this has already found its way into the fashion collections of prominent business partners in 2017, attracting considerable attention in the marketplace.

We systematically maintain our innovation efforts in line with our "Naturally positive" sustainability strategy. In 2017, our research and development expenditure amounted to EUR 55.4 million, the highest in the company's history, underlining our position as global innovation leader.

This year the industry's sensitivity to sustainability issues has been increasing perceptibly. Apart from product features, it is increasingly the environmental impacts of production and end-of-lifecycle considerations that are becoming crucial factors. This is a very important and positive trend for Lenzing and the world in light of annual fiber consumption close to 100 million tons and very limited recycling rates. A company such as Lenzing and the wood-based cellulosic fiber industry as a whole can only be successful in the long term if the industry ensures that we optimize use of natural resources, optimize our operational processes and reduce the impact of our industry at large on people and the environment.

NGOs play a very important role in this process as they stimulate change. Several NGOs have started to take a critical look at the viscose fiber industry. Lenzing is collaborating closely with a number of the most important NGOs and multi-stakeholder initiatives. A report from NGO Changing Markets, published in summer 2017, highlights several shortfalls in the viscose fiber industry and outlines potential for improvement. In this case too we cooperate closely with the NGOs and ask them for their input to help Lenzing improve its systems and to share with them information. We know that the whole industry – including our company – has some way to go before we see top-notch sustainability standards at all of the world's viscose plants.

Based on an intense dialog with various stakeholder groups, we decided to establish a voluntary and ambitious Lenzing Group standard for the production of viscose fibers at all sites and to push for its speedy implementation. With this Lenzing Group standard, we intend to meet the strict requirements of the EU Ecolabel at all our production plants by 2022.

We will continue on our chosen path in 2018 and remain in close consultation with everyone close to our industry.

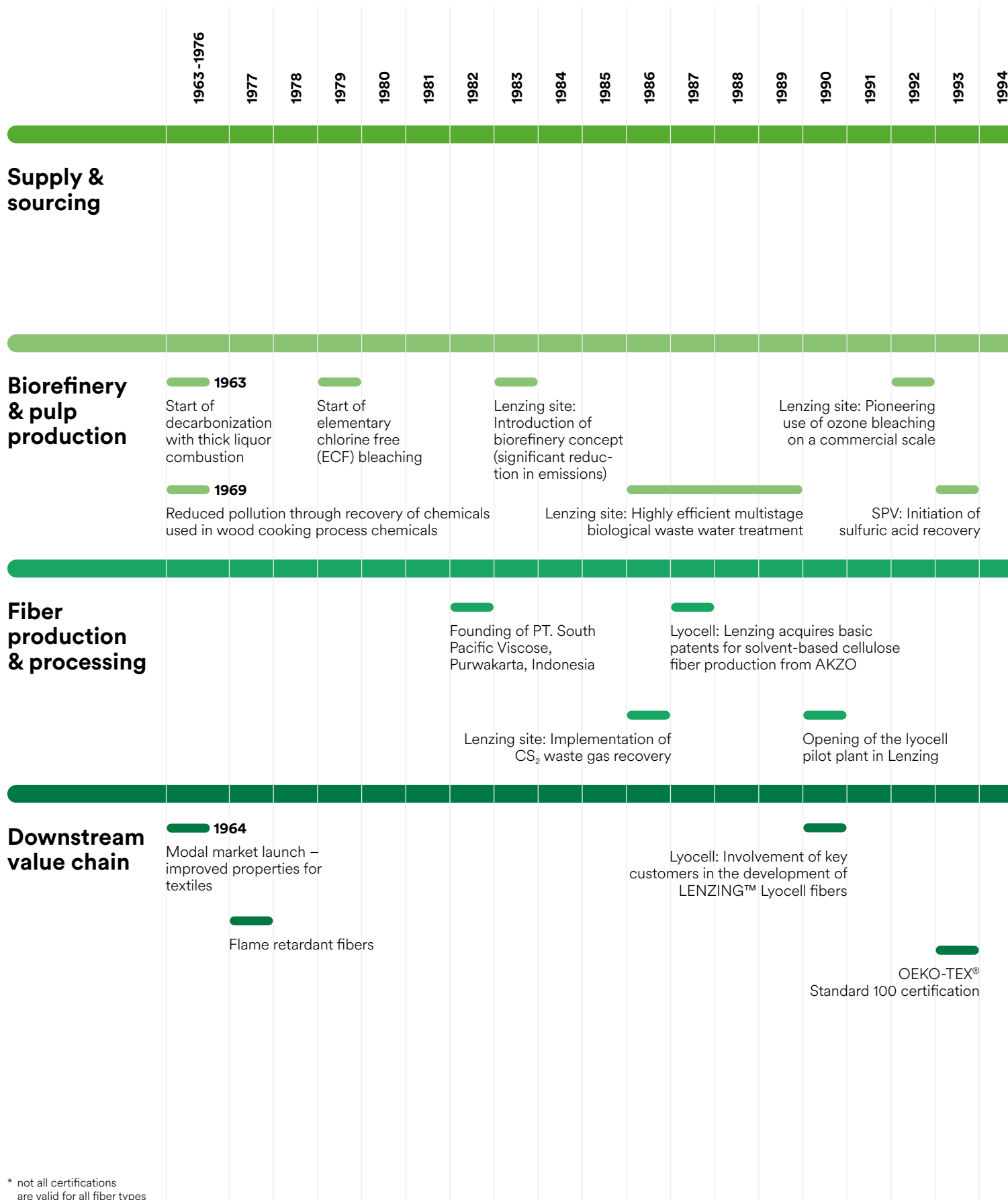
Yours

**Stefan Doboczky**

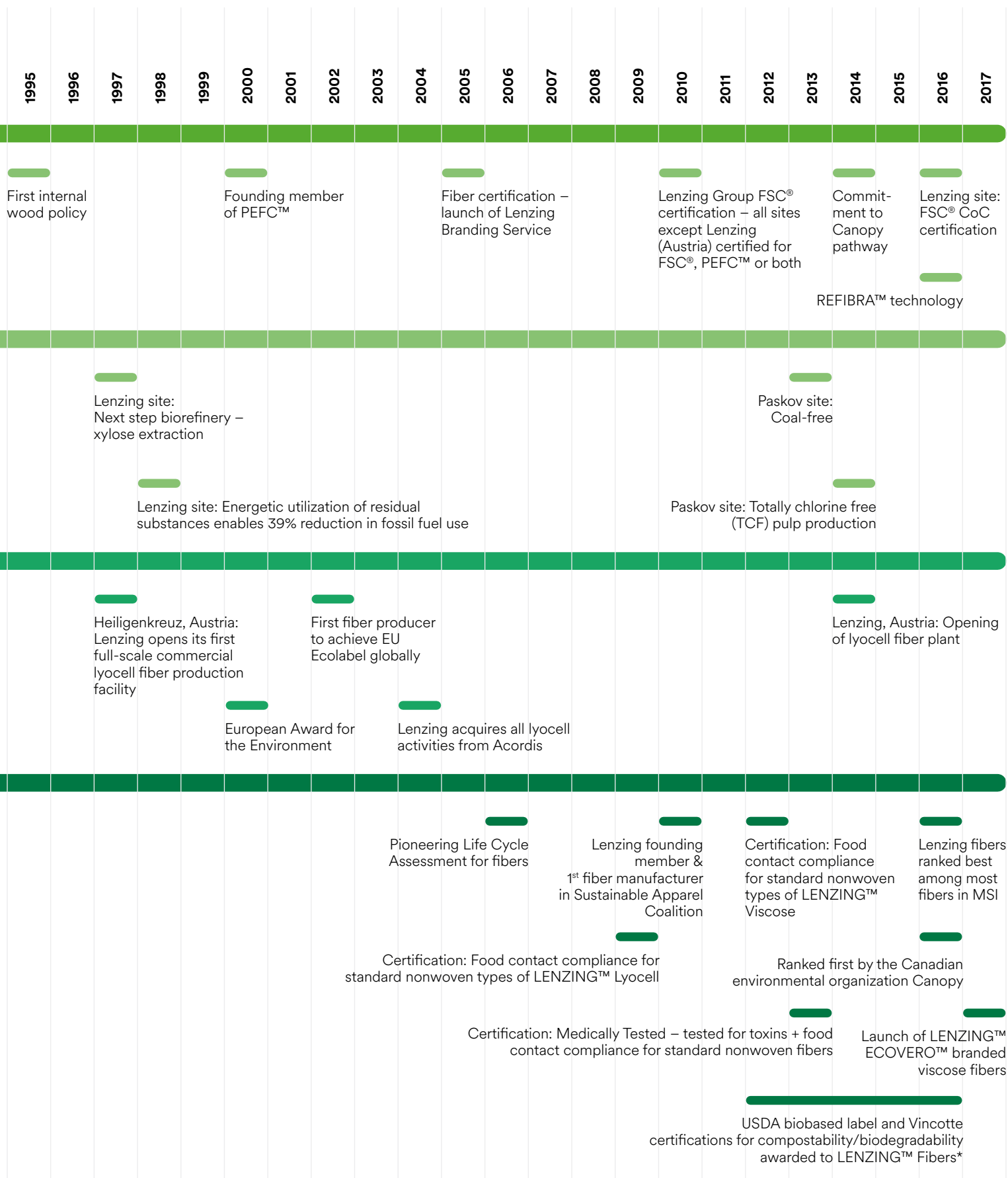




# Dedicated to sustainable technology figure 1/1









# Locations of the Lenzing Group<sup>1</sup>

figure 1/2 [102-4, 102-6]



1) Nameplate capacities as at December 31, 2017  
2) Air-dry



## Heiligenkreuz

Austria

**Fiber production**

**Lyocell**

Capacity: 65,000 t fibers p.a.

## Nanjing

China

**Fiber production**

**Viscose**

Capacity: 178,000 t fibers p.a.

## Seoul

Korea

**Sales and marketing office**

## Shanghai

China

**Sales and marketing office**

## Hong Kong

China

Headquarter North Asia

**Sales and marketing office**

## Singapore

Headquarter AMEA

(Asia, Middle East and Africa)

**Sales and marketing office**

## Purwakarta

Indonesia

**Fiber production**

**Viscose**

Capacity: 323,000 t fibers p.a.

## Jakarta

Indonesia

**Sales and marketing office**

## Bangkok

Thailand

Office for planning a new fiber production plant

## Coimbatore

India

**Sales and marketing office**





# Lenzing Group: brief portrait

Based in Austria, the Lenzing Group (Lenzing Aktiengesellschaft and its subsidiaries) is one of the world's leading producers of eco-friendly, wood-based cellulose fibers and pulp with production sites in major markets and has a global network of sales and marketing offices. [102-1, 102-3]

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

### Lenzing Group 2017

Employees:	6,315 <sup>7</sup>
Revenue:	EUR 2,259.4 mn
EBITDA:	EUR 502.5 mn
Total assets:	EUR 2,497.3 mn
Equity:	EUR 1,507.9 mn
Liabilities:	EUR 989.4 mn

[102-7]

Lenzing's high-quality fibers are supplied to the textile and non-wovens industry as well as for industrial applications.

### Lenzing Group: Technological competence in fiber production

Lenzing's quality and innovative strength contribute to shaping global standards for the wood-based fiber industry. With 80 years of experience in pulp and fiber production, the Lenzing Group combines

three major fiber process technologies on a commercial scale:

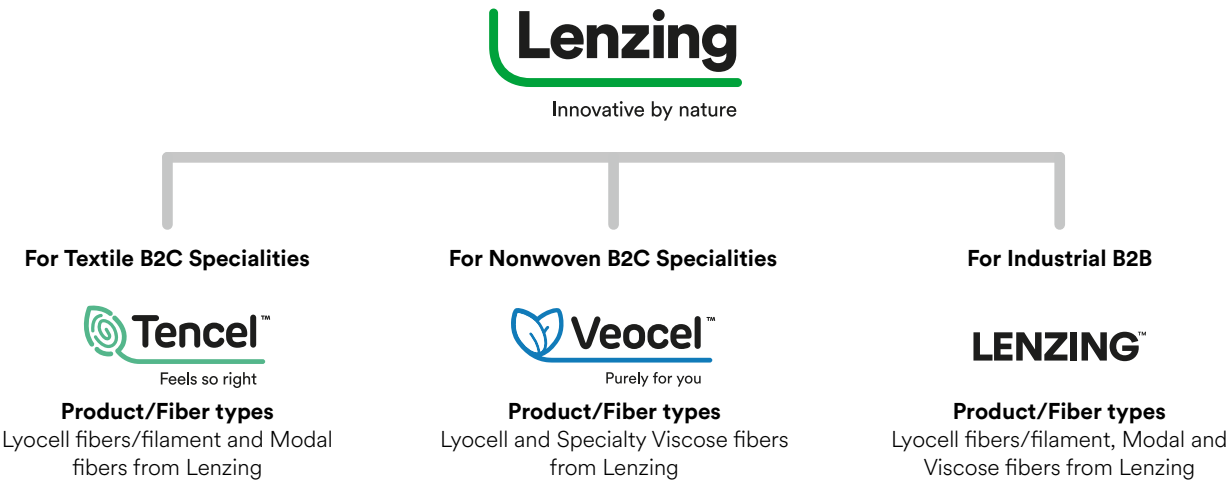
- Viscose (rayon) process (staple fibers)
- Modal process (staple fibers)
- Lyocell process (staple fibers)

On the basis of the lyocell process, two new pioneering technologies have been developed within the last two years: the REFIBRA™ recycling technology, and the new Eco Filament technology for the production of TENCEL™ Luxe filament. With both technologies Lenzing underlines the company's shift to becoming a true specialty player in wood-based fibers. Lenzing intends to expand the filament capacity at its Austrian Lenzing site over the coming years and has started the basic engineering work. [102-2]

### New brand strategy for global end consumers

The ambition of the new brand strategy of Lenzing is to move from B2B to B2B2C, building product brands which focus at generating consumer preference and reducing the complexity of our brand portfolio. Going forward, TENCEL™ is the brand for textile applications focusing on B2C specialties (lyocell and modal) and VEOCEL™ has the same B2C role for nonwovens specialties. These brands go beyond just fiber type and functional characteristics, they are about the promise of something more: Functionality and emotions. By elevating them as a promise to the consumer rather than a product message to the value chain we can start to educate consumers and other stakeholders about the holistic benefits of botanic fibers in terms of sustainability, comfort, performance and innovation.

### New brand strategy figure 1/3



<sup>7</sup>) Employees (excluding apprentices and contractors) in Austria, the Czech Republic, United Kingdom, USA, China, Indonesia, India, Thailand, Turkey, Korea and Singapore



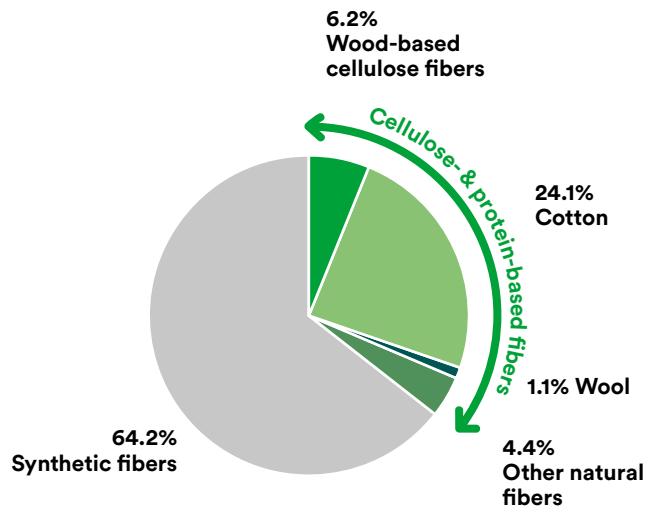
### Global fiber market

Lenzing supplies the global textile and nonwoven industry as well as producers of various advanced industrial applications with high-quality, wood-based cellulose fibers. With a share of 6.2 percent of global consumption, this fiber category occupies a niche position on the global fiber market, but it is continually exhibiting high growth rates. Synthetic fibers (64.2 percent) account for the lion's share of demand on the world's fiber market and are growing fastest in actual volume (3.9 percent increase, 2.6 mn tons more than 2016).

### Global fiber consumption 2017

by type of fiber in percent (basis = 104.8 mn tons)

figure 1/4



\*Sources: ICAC, CIRFS, TFY, FEB, Lenzing estimates

### Nature of ownership and legal form

Lenzing AG is a publicly traded company and its shares are quoted on the Vienna Stock Exchange. In 2017, there was a shift in the ownership structure. Major shareholder B&C Group reduced its share from 62.6 percent to 50 percent plus two shares and Oberbank reduced its share from 4.2 percent to 3.97 percent. Since May 2017, the free float has been accounted for 46.03 percent.

[102-5]



# Value chain [102-6, 102-9]

Lenzing lies at the beginning of a long value creation chain in the textile industry with several processing steps. Value chains for the nonwoven segment and industrial applications are often shorter.

The Lenzing Group's business model is based on intensive collaboration across all stages of the value chain.

The Lenzing Group supports its partners along the textile and nonwoven value chain in optimizing their production processes. For this purpose, Lenzing operates its own testing facilities and collaborates with a network of external laboratories in order to provide an optimum service for its customers. Any potential problems with the fibers or improvement opportunities arising at the customers' premises can be quickly analyzed, solved and implemented. Lenzing also works closely with manufacturers and retailers, keeping the end user in mind throughout the entire value creation process.

## Steps in the value chain

Cellulose is the most common organic compound in nature and the main component of plant cell walls. It is therefore the most important construction material in nature. As Lenzing's cellulosic fibers are derived from the basic raw material wood and are biodegradable at the end of their life, all LENZING™ fibers are part of a natural cycle. [102-9]

### Supply and sourcing

The principle raw materials for producing LENZING™ fibers are wood and chemicals. Lenzing uses pulp from its own production as well as from external suppliers.

### Pulp and fiber production

Production takes place in two steps: firstly the pre-production of pulp, and secondly the production of fibers. By the end of 2017, 57 percent of all the pulp required for fiber production originated from the company's own production. Pulp is produced in two biorefineries at the sites in Lenzing (Austria) and Paskov (Czech Republic), along with energy and other biorefinery products that are extracted, utilized, or sold. During subsequent fiber production, some chemicals are also recovered and sold.

### Fiber processing

The customers in Lenzing's downstream value chain use the fibers to manufacture numerous textile, nonwoven or industrial applications. As shown in figure 1/5 "Value chain", the further processing of fibers, which is not part of the Lenzing production chain, means the manufacturing of textiles and nonwovens for numerous applications. The textile value chain begins with yarn making, followed by fabric making, dyeing, finishing, and finally garment manufacturing. Alternatively, fibers can enter a short nonwoven value chain involving roll-good production and conversion to final products, such as wipes. Lenzing also produces fibers for industrial applications, such as for example fruit nets, tea bags, beverage filtration, footwear, agriculture and automotive applications. For details see chapter 5, page 61. [102-6]

### Distribution and use phase

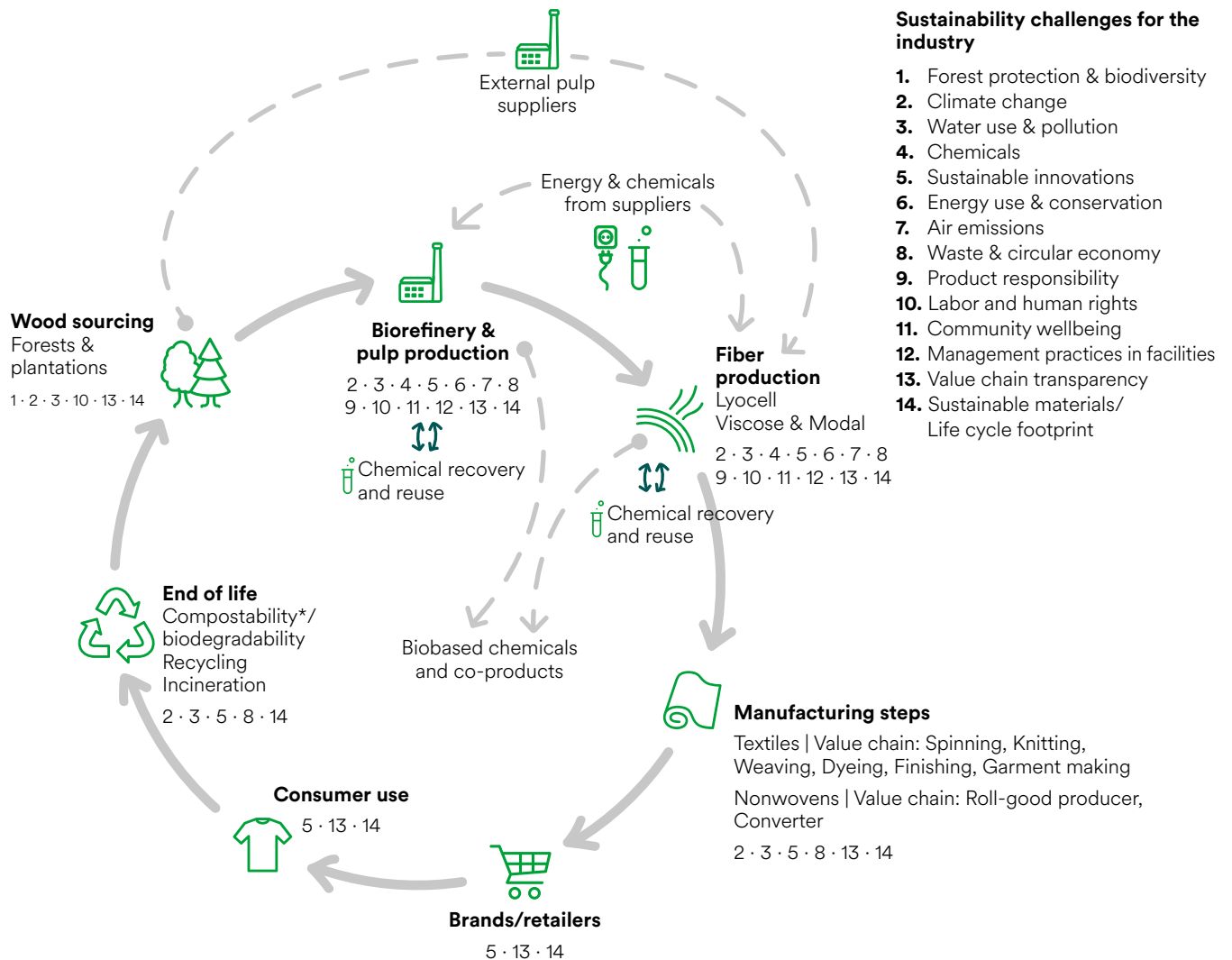
After manufacturing, finished products are distributed and the consumer use phase begins.

### End of life

All LENZING™ fibers are compostable and biodegradable in marine and soil conditions. However, the compostability of final products depends on the material composition (fiber blend) and processing in the value chain steps.



**Value chain for Lenzing's products**  
figure 1/5



\* All standard fibers from Lenzing are compostable and biodegradable in marine and soil conditions. However, the compostability of textile and nonwoven products depends on the material composition (fiber blend) and processing in the value chain steps.



# Managing

# sustainability

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# Interview: Sustainability – challenge and welcome opportunity for innovation

Chief Commercial Officer (CCO) Robert van de Kerkhof and Sustainability Director Peter Bartsch, talking about the sustainability in Lenzing's DNA, new goals, and innovative sustainable products.

*Why have sustainability issues become so significant in the value chain in 2017?*

**Robert van de Kerkhof:** Sustainability is more than just relevant, it really has become a must for the industry. The younger generation of consumers has developed a completely new awareness of sustainability. They pay much closer attention to everything that they consume, and this applies to all aspects of life, from food through to clothing. Along with the growing demand, available resources are declining. In addition, climate change has become a major issue for the media. Many consumers and industry leaders are driving improvements and recognize the importance of the subject. Some countries, such as for example China, tackle their environmental issues with great determination. However, many other countries and companies are indecisive as regards targets and required commitments.

**Peter Bartsch:** The challenges are growing, and the problems are more widely acknowledged than before. Social media play a significant role and certain issues can quickly develop into global issues. The networking of NGOs in their endeavors for greater transparency is becoming stronger, leading ultimately to a change in thinking among producers, retailers, and, above all, global brands. NGOs call for commitment and want companies to take leadership. They are increasingly developing a value chain approach to meet the more demanding requirements. Greater consideration is also being given to global political goals, for example by the United Nations, when improving social and environmental standards. This in turn leads to political guidelines for companies.

*Isn't this trend merely a flash in the pan that will diminish over the course of time as greater emphasis is placed on other issues again?*

**Robert van de Kerkhof:** No, it will persist. We are only at the beginning of this trend. The environmental situation in some global cities in Asia and elsewhere clearly shows that we have long since reached breaking point. It really says a lot when I read in the Guardian that a cricket match in India has to be abandoned due to pollution that leaves players vomiting. Developing countries are also reacting more strongly and quickly to these problems than western industrial nations.

*Is particular emphasis currently being placed on specific sustainability issues?*

**Peter Bartsch:** In global terms and across all industries, the main issues are environmental challenges, namely climate change, waste, pollution into air and water, limited resources, deforestation, loss of biodiversity, soil degradation, and social aspects. In the social sector, the points for discussion are poverty alleviation, human rights, and diversity. As regards wood-based fibers, deforestation and pollution are naturally key issues.

**Robert van de Kerkhof:** A very topical buzzword that has been much discussed recently is "Circular Economy". Important top-level initiatives, such as the Circular Economy package of the European Union and the Circular Fibres Initiative of the Ellen McArthur Foundation, make significant contributions to this global discussion. Lenzing is supporting the groundbreaking Circular Fibres initiative as a Core Partner. Lenzing's input is appreciated because we can offer an approach to finding a solution to the problem of textile waste with our innovative TENCEL™ Lyocell fibers with REFIBRA™ technology partly based on recycled fibers.

*To what extent will the issue of raw materials affect the textile industry? Global fiber production is already unavoidably approaching the 100 million tons per annum mark.*

**Robert van de Kerkhof:** With the future challenges we face, there is no alternative to the circular economy. However, we must take care not to find solutions today that could potentially cause us even greater problems tomorrow. Recycling of raw materials only makes sense if it has clear environmental and social benefits. Net-benefit thinking, as we have defined it at Lenzing, considering the entire value chain, is therefore more important than ever, because it enables a transparent, comprehensible overall assessment.

*How has Lenzing perceived the dynamic developments in 2017 – in dialog with customers and the value chain?*

**Robert van de Kerkhof:** The number of people on our planet and their prosperity are growing. The resulting increase in demand for textiles must be met by the industry in a responsible way using sustainable solutions. One example of our attempts to minimize the impact of this is the launch of TENCEL™ Lyocell branded fibers with REFIBRA™ technology, which we began to market in 2017. This fiber is a very innovative product based on an advanced technology. However, the concept of closing the loop in the textile industry can only be implemented in partnership. Even if partners pursue the same goals in the circular economy, in the same way as Lenzing and our partners at REFIBRA™, this is still not easy. The concept is the right one, although we need to think long-term here.

With LENZING™ ECOVERO™ fibers, we offered a new solution for another fundamental consumer need in 2017: transparency. The textile chain can trace precisely where the fibers and thus the raw materials originate from. It therefore offers a guarantee that the fibers have been produced in as environmentally friendly a way as possible. With these two products, we received extremely positive publicity on the market. Lenzing is very well positioned with these products. And with our new TENCEL™ Luxe Eco filament, we also score highly in terms of sustainability in the high-end segment of luxury manufacturers and have attracted a great deal of attention.

In the nonwovens business, the biodegradability of our cellulosic fibers is an upcoming issue. Environmentally conscious consumers are beginning to realize that use of fossil-based synthetic materials for products such as cosmetic wipes and baby wipes may be detrimental. And then there's the subject of avoiding marine pollution





caused by microplastics. And issues have recently come to light which we do not yet completely understand. For example, we do not know precisely how and when the smallest synthetic fiber particles end up in the sea through the washing of textiles.

*How is Lenzing responding specifically to rapidly increasing awareness of sustainability in the textile chain?*

**Peter Bartsch:** On the one hand, we have defined sustainability as one of our key corporate values, and we are implementing this consistently. On the other hand, as a leading voice in sustainability, we make the case for the sustainability principle proactively in the value chains of the textile and nonwovens industry in which we offer solutions. Partnerships for systemic change and close collaboration with the value chain are decisive for us, because they provide us with a better understanding of the needs and wants that prevail in our industry. And we are currently supporting numerous initiatives and working proactively to design new evaluation methods.

*How has Lenzing reacted to the „dirty fashion“ report, which was so critical of the entire industry?*

**Robert van de Kerkhof:** Naturally, we were all deeply concerned at Lenzing. However, after initial consideration, we decided that we should really regard this report as a mirror held up to ourselves. This was not something we expected. Are we really as good as we previously thought at all our locations? If these problems are present, we must solve them. We immediately created a task force at the highest level, and we are devising a concrete action plan to address how and by when we should solve these problems.

**Peter Bartsch:** In addition to our internal efforts, independent external auditors were brought in to provide us with an objective view of the situation. We also cooperate with other initiatives, such as Zero Discharge of Hazardous Chemicals (ZDHC) to address existing issues on an industry level and to drive continuous improvement.

**Robert van de Kerkhof:** In any case, our plan for Lenzing is to comply with the same high standard at all its production sites worldwide by 2022. This ambitious Lenzing Group standard meets the demanding requirements of the EU Ecolabel. With this

ambitious plan, we intend to set a clearly visible example for our industry and consumers.

*What is definitely in the pipeline for 2018?*

**Robert van de Kerkhof:** Top priority will be to support our partners in scaling up our leading-edge Lenzing branded innovations LENZING™ ECOVERO™ fibers, REFIBRA™ technology and TENCEL™ Luxe filaments. We defined our strategy over the last two years and the medium- to long-term goals are clear. In 2018, we intend to concentrate on further implementation of these goals. This will not be achieved overnight at our Indonesian facility. Here we'll need until 2021/22 to meet the respective targets. At present, we are working specifically on the details of which investments will be required to rectify all the weaknesses revealed.

**Peter Bartsch:** We will also strengthen our partnerships with organizations working on improving sustainability and transparency in the various value chains in 2018. Our dialog with major NGOs and initiatives, such as the World Resources Institute on science-based targets, Canopy on wood and pulp sourcing and conservation solutions, and Ellen MacArthur's Circular Fibres Initiative, are examples for this partnership focus. In this respect, we will cooperate with our customers to an even greater extent.

*Where will Lenzing be in terms of sustainability in five years time and thereafter?*

**Peter Bartsch:** In the following years, we intend to take concrete steps towards decarbonization and some other relevant targets. With these two objectives, we will certainly be making a significant contribution to overcoming the global challenges.

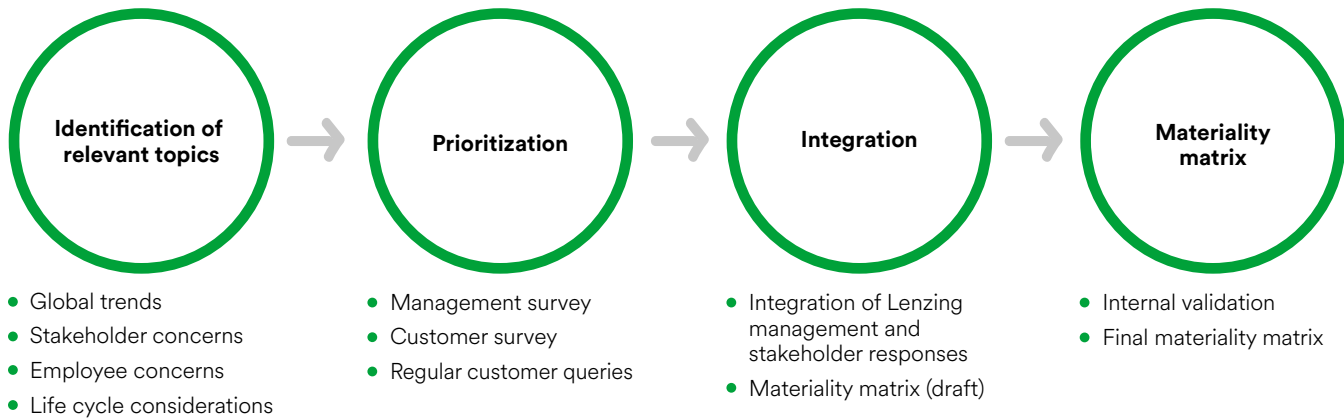
**Robert van de Kerkhof:** We will continue to play a leading role – by really driving lyocell fibers and going beyond fibers. We want to generate trust and awareness and to strive for maximum transparency. We aim to make Lenzing products more competitive in terms of sustainability. As a sustainability leader, we must collaborate with partners here in standardizing our industry to a greater extent with regard to sustainability issues, in defining specific objective parameters, and in enabling new standards.



# Materiality Analysis

Lenzing's "Naturally positive" sustainability strategy was launched in April 2017. The strategy was preceded by a comprehensive materiality analysis conducted for the first time in 2015.

**Development of materiality matrix**  
**figure 2/1**



The Lenzing Group's materiality matrix was developed in four stages: In the first step, around 50 global Societal, Technological, and Resources trends for the present and future were identified using the STaR methodology. Information from Lenzing employees was collected at the Sustainability Day in October 2014, attended by employees from different management levels and business functions including the Lenzing Management Board. Furthermore, Lenzing regularly interacts with different stakeholders on various topics. The information gathered during the course of all these activities helped to define a list of relevant topics.

Secondly, for each relevant topic, a brief description in terms of impacts, risks, opportunities, expectations and current performance was developed. A survey with these descriptions was sent to employees from different management levels, business functions, and various Lenzing sites around the world. This management survey helped us to create internal prioritization of topics. A separate survey was also sent to key customers in order to understand key challenges and expectations. Besides customer survey inputs, queries received from customers concerning various sustainability topics were also used to prioritize the relevant topics.

In a third step, the internal and external prioritizations were combined to create a materiality matrix in order to formulate the main aspects for the sustainability strategy. In a fourth step, the materiality procedure was reviewed by denkstatt, a sustainability consultancy in Austria, in order to create the final materiality matrix, which sets the scope of the sustainability strategy as well as the scope of this report.

The material topics identified in the analysis were found to be significant for Lenzing and its stakeholders due to the following impacts and reasons:

## Wood sourcing

This is one of the most significant topics for the Lenzing Group because wood is the main raw material for making LENZING™ fibers. Responsible wood sourcing is important for many of Lenzing's stakeholders, such as brands, retail customers, and NGOs, due to growing pressure on forests from increasing use of wood for energy and material needs.

## Sustainable innovations

Many of the sustainability challenges can only be addressed with innovation, which is the core strength of the Lenzing Group. For example, downstream value chain impacts, such as water pollution in conventional dyeing or the textile waste problem, can be avoided by innovative net-benefit products such as TENCEL™ Modal Eco Color or TENCEL™ Lyocell fibers with REFIBRA™ technology.

## Energy use, climate change and air emissions

Pulp and fiber production are energy-intensive processes. Therefore, energy use, climate change, and other air emissions are a priority for the Lenzing Group and its customers due to their far-reaching impacts on society and ecosystems.

## Water use and pollution

Water use and pollution are highly relevant for the textile industry due to increasing water scarcity and pollution in many parts of the world.

## Chemicals and toxicity

There are increasing concerns about the use of hazardous chemicals from the textile industry and their disposal in the natural environment. Multi-stakeholder initiatives, in cooperation with fiber manufacturers, are developing guidelines for responsible production. Industry initiatives, such as Zero Discharge of Hazardous Chemicals (ZDHC), are developing tools and processes aimed at safer use of chemicals and reducing emissions.



### Customer satisfaction and product responsibility

Customer satisfaction and product responsibility are two integral aspects of utmost priority for the Lenzing Group's long-term success and business growth.

### Sustainable materials and Life Cycle Assessment (LCA)

To improve practices in the industry, the impacts need to be understood holistically by considering complete value chains. Consequently, leaders in the industry and multi-stakeholder initiatives are increasingly using metrics based on LCA, such as the Sustainable Apparel Coalition's Material Sustainability Index (MSI). We at Lenzing believe in systemic approaches and use LCA to support decision-making in the business.

### Waste and circular economy

There is a global need to use resources more efficiently and to utilize their value to the maximum possible extent. Circular economy is becoming increasingly important for the textile industry. Limiting and decoupling environmental impacts from growing global consumption are new challenges for the industry. Lenzing addresses these challenges by developing new sustainable technologies and products, connecting the biological and the industrial cycles of the Circular Economy approach with its development of TENCEL™ Lyocell fibers with REFIBRA™ technology partly based on recycled raw material. The biorefinery concept represents the biological cycle of the circular economy concept. These approaches avoid waste. However, the remaining waste should be managed effectively to reduce impacts further.

### Value chain transparency and improving practices

Responsible labor practices, protection of human rights and community wellbeing are vital aspects for a company's license to operate and to support the social pillar of sustainable development. Management systems provide necessary guidance for operating facilities in an environmentally and socially responsible manner. Transparent communication of where the products are made, how they are made and how well the facilities are managed are very important aspects in improving value chain transparency and thus the sustainability of the industry. Industry leaders and many multi-stakeholder initiatives such as the Sustainable Apparel Coalition, Zero Discharge of Hazardous Chemicals, Canopy, and Textile Exchange, are working on these issues to improve the industry. Lenzing fully supports these initiatives with its strategic focus on partnering for systemic change.

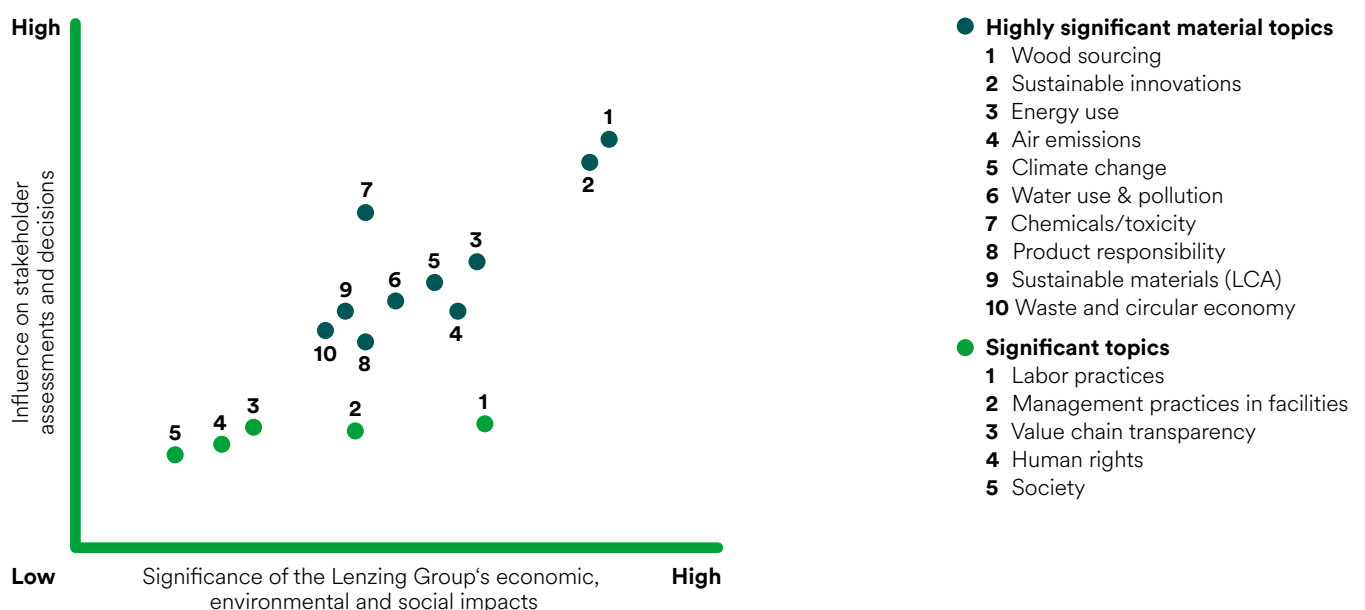
### Review of materiality matrix in the reporting year

During the course of systematic implementation of the Lenzing sustainability strategy, several workshops were held to develop sustainability targets at different Lenzing Group production sites in 2017. At these workshops, the materiality matrix was reviewed with site management and representatives from different business functions. No changes were suggested for the materiality matrix as it already covers all the significant issues for each site.

As part of ISO 9001:2015 and ISO 14001:2015 implementation in the Lenzing Group, a process was launched to update the context analysis by involving all relevant business functions and sites. In the reporting year, a context analysis workshop was held with teams from Safety, Health and Environment (SHE), Sustainability, Commercial Excellence, Market Intelligence, Strategy, Quality, Risk Management, Pulp and Co-Products. The updated context analysis will serve as a foundation for reviewing and updating the materiality matrix in future. [102-44, 102-47, 103-1]

Within the EPEX Quality Consistency Program (QCP), Lenzing continuously improves process and raw material consistency, which leads to a reduction in waste.

Materiality matrix figure 2/2





# The Strategy of the Lenzing Group

Since the introduction of sCore TEN corporate strategy two and a half years ago the Lenzing Group has followed a group strategy that stands for a consistent performance orientation (scoring), the strengthening of the core business (core) and the company's long-term growth with specialty fibers. The heart in the logo represents the corporate values and culture which were developed as part of the strategy process. They form the fertile ground for the success of the Lenzing Group.

The primary objective of this strategy is to protect and expand Lenzing's leading role in the dynamic growth market for wood-based cellulose fibers. Lenzing concentrates on the most promising segments of the specialty fiber business and works closely together with its customers along the entire value chain to develop new and highly innovative product applications.

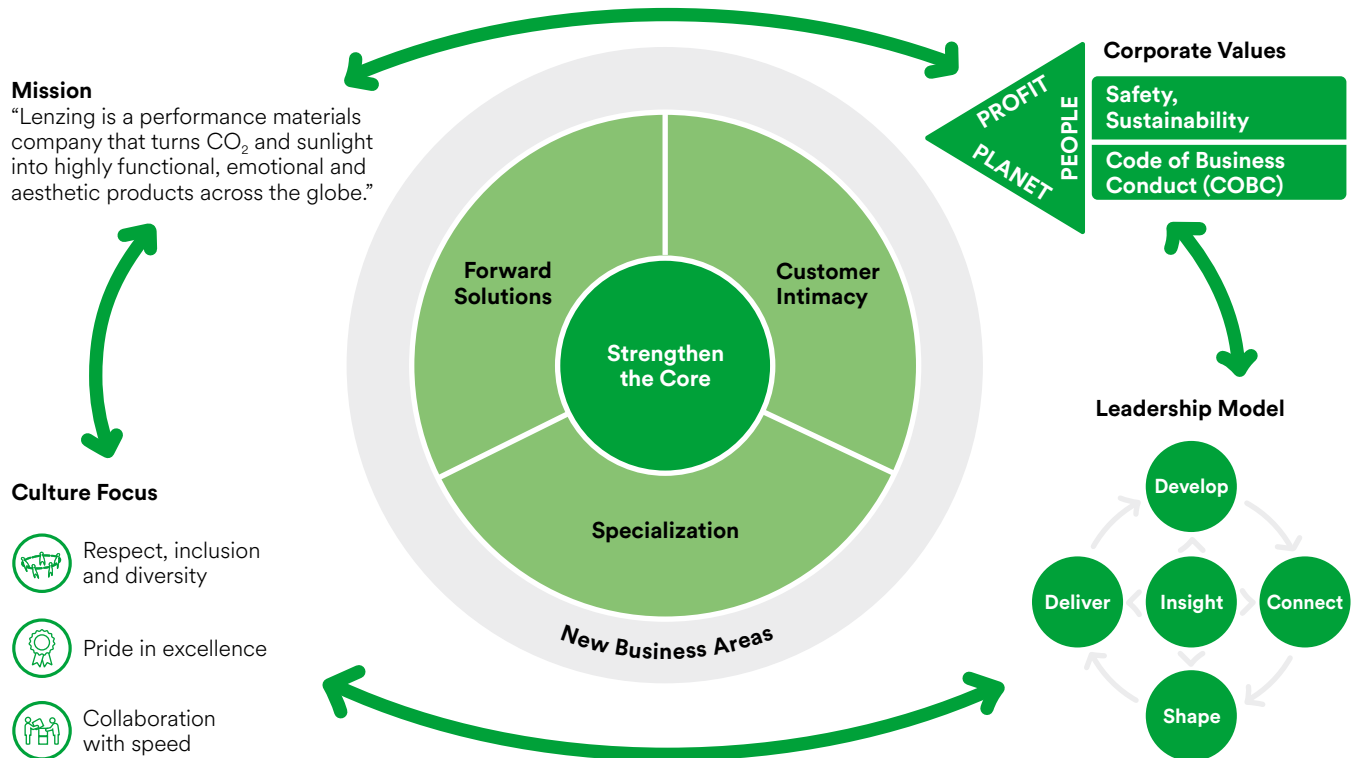
Lenzing expects the demand for wood-based cellulose fibers will increase five to six percent each year by 2020, meaning twice as fast as the global fiber market. This expansion will be driven primarily by steady population growth and rising prosperity in the emerging markets. The per capita textile consumption in the emerging markets is projected to rise by 50 percent from 2010 to 2020. In the industrialized countries, the use of nonwovens will benefit from the rising demand for hygiene products and is expected to grow twice as fast as the textile market.

## **sCore TEN is based on five strategic directions:**

- Strengthen the core: A greater share of Lenzing's pulp requirements – roughly 75 percent – will be secured by backward integration through an increase in the Group's own pulp production volumes and/or the expansion of strategic cooperations. Quality and technology leadership will also be expanded.
- Customer intimacy: In order to increase its proximity to customers, Lenzing has established regional competence centers for product innovation in Hong Kong and is planning further steps to strengthen cooperation with its customers.
- Specialization: By 2020 Lenzing plans to generate 50 percent of its revenue with eco-friendly specialty fibers like TENCEL™ and VEOCEL™ and with other LENZING™ specialty fibers. Following the decision in favor of a further plant in Mobile (USA) and the securing of land in Prachinburi (Thailand) for the construction of a state-of-the-art lyocell fiber production plant, the further expansion of Lenzing's production capacity for LENZING™ Lyocell fibers will be based on market requirements.
- Forward solutions: Lenzing intends to expand its research and development activities in selected areas along the value chain by means of new pioneering technologies. The latest examples of successful R&D innovations are REFIBRA™ technology and TENCEL™ Luxe filaments.
- New business areas: Lenzing will use its core expertise to develop new attractive business areas over the medium- to long-term.

**[102-15]**









## Lenzing's sustainability strategy

“Naturally positive”, the Lenzing Group's sustainability strategy, was developed as a result of the materiality analysis conducted in 2015 and 2016. It focuses on those sustainability areas where Lenzing has greatest impact in creating a more sustainable world and is the basis for Lenzing's approach to contribute to the Sustainable Development Goals (SDGs) of the United Nations.

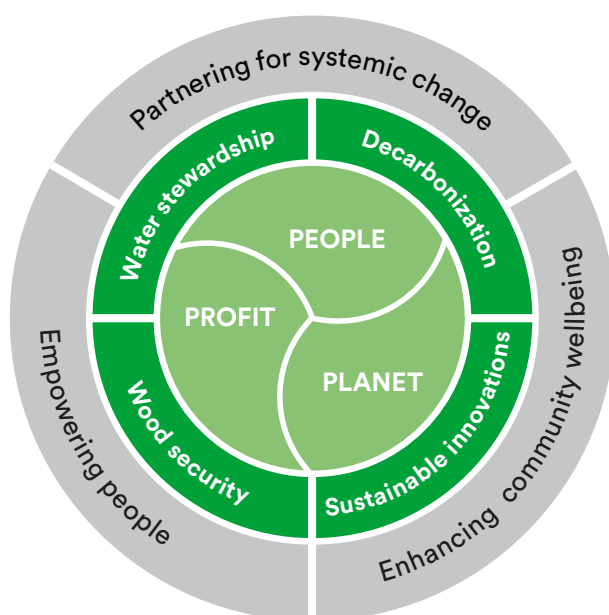
### Our sustainability vision

Our passion is to make sustainable fibers available to the growing world. This creates more positive impacts and benefits for people and the planet. It also ensures our economic success.

### Our sustainability mission

The Lenzing Group balances the needs of society, the environment and the economy and is a sustainability leader in its industry. As a leader, 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 chains 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 for People – Planet – Profit figure 2/4



Within the dimensions People – Planet – Profit, Lenzing's sustainability strategy defines four main challenges where the Lenzing Group substantially contributes to creating more positive impacts and benefits. This is the essence of our Naturally positive thinking.

- Wood security
- Water stewardship
- Decarbonization
- Sustainable innovations

A successful implementation of this thinking requires supporting areas to reinforce our spheres of influence. These include [102-11]:

- Empowering people
- Partnering for systemic change
- Enhancing community wellbeing

## Our focus areas

### Wood security

Growing global demand for wood-based biomass and alternative land use put pressure on the world's forests which provide fresh water, oxygen, climate regulation, flood resilience, biodiversity, recreation, and valuable raw materials to society.

Wood is the most important natural resource for the Lenzing Group. Therefore our focus is on sustainable sourcing through certifications, responsible consumption and highly efficient use of wood through biorefinery, supported by internal and external expertise. We promote conservation solutions to protect ancient and endangered forests. Innovation of alternative cellulose sources is a strategic priority for the Lenzing Group, for example textile recycling.

### Water stewardship

Water is a precious resource and its increasing scarcity in many parts of the world constitutes a threat to people as well as to economic development. Some natural fibers, e. g., cotton, and textile supply chains create water impacts through high water consumption and pollution.

Lenzing's wood-based cellulose fibers consume on average much less water than irrigated cotton, so Lenzing encourages its partners to blend LENZING™ Lyocell fibers into their products, which improves their water footprint.

Due to their biodegradability, LENZING™ fibers do not contribute to the marine litter and microplastic problem caused by synthetic materials. For a more detailed discussion see chapter 5, page 78. Innovations that omit steps in the textile value chain can substantially reduce water consumption and pollution. Lenzing provides fibers with a low water impact for the growing world and innovates products that avoid water impacts in the downstream value chain.



## Decarbonization

Climate change is one of the most pressing challenges of our generation, calling for collaborative solutions all along the value chain.

Pulp and fiber production are energy-intensive processes and consequently we are committed to reducing specific CO<sub>2</sub> emissions of the Lenzing Group, as well as its energy providers, pulp suppliers, and the downstream value chain through sustainable innovations. In fact, LENZING™ fibers consume less energy and, as a consequence, emit less CO<sub>2</sub> than comparable products in the market. In this way, Lenzing provides a choice for customers to opt for products that protect the climate.

We support forest conservation solutions as a means of storing carbon.

## Sustainable innovations

The current rate of population growth and consumption will substantially increase the environmental and social impact of our industry. Sustainable innovations are those that improve the prosperity of our society within the limits of our planet. Therefore the Lenzing Group goes beyond efficiency improvements, driving systemic change through forward solutions and business models on a large scale. This includes continuous improvement of our existing technologies and processes and innovating new technologies.

Lenzing's net-benefit products and offerings assist our customers in replacing resource-intensive and polluting alternatives, in improving their product footprint, and in reducing their supply chain risks.

# The supporting areas

## Empowering people

People are at the core of our business success. People who take ownership and feel able to take positive action drive a successful transformation to a more sustainable society and economy. The Lenzing Group therefore empowers its employees and motivates partners along the value chain to be change-makers and drivers of sustainability.

## Partnering for systemic change

Complex global sustainability challenges call for a collaborative approach to designing systemic solutions, involving many stakeholder groups. Transparency is a prerequisite for fostering trust and long-term relationships.

Consequently, 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 takes leadership in multi-stakeholder initiatives such as the Sustainable Apparel Coalition (SAC), to support the creation and implementation of systemic solutions. The Lenzing Group periodically informs about its sustainability performance and the progress being made.

## Enhancing community wellbeing

The Lenzing Group's various production sites operate in their respective ecological, social and economic environments. The Lenzing operations and their regional partners are mutually dependent, sharing opportunities, but also challenges. Community wellbeing is therefore a prerequisite for the company's license to operate.

As a good corporate citizen, the Lenzing Group promotes beneficial development of the communities and regions where it operates. This is achieved through safe and eco-friendly operations, fair employment practices and contribution to local economic development and community life (see chapter 6 and annex).

## Target setting process

Lenzing's "Naturally positive" sustainability strategy was developed over the period 2015/2016. The strategy was created by involving managers from different functions and top management in several meetings and workshops.

In December 2016, it was approved by the Lenzing Group Management Board and published in the 2016 Sustainability Report. It was agreed that targets would be developed in phases in the following years.

In 2017, under the leadership of the Chief Commercial Officer (CCO) and the Chief Technological Officer (CTO) as co-chairs, an Advisory Committee was formed, comprising of the heads of different functions (e. g., Safety, Health and Environment (SHE), Research and Development, Operations, Human Resources, Strategy, Commercial Excellence, etc.). With the guidance of this committee, the approach was defined and several management workshops were held at the production sites in Asia and Europe. These workshops helped to formulate targets for individual sites and were used to derive Group-level phase-1 sustainability targets. These phase-1 targets are communicated in this 2017 report (see page chapter 2, page 27).

The project will continue further, preparing phase-2 targets to cover all the strategic focus areas defined in the Lenzing Group "Naturally positive" Sustainability Strategy.



# Lenzing commits to sustainable growth

Lenzing's phase-1 sustainability targets<sup>1</sup>

figure 2/5

## Target 2<sup>2</sup>

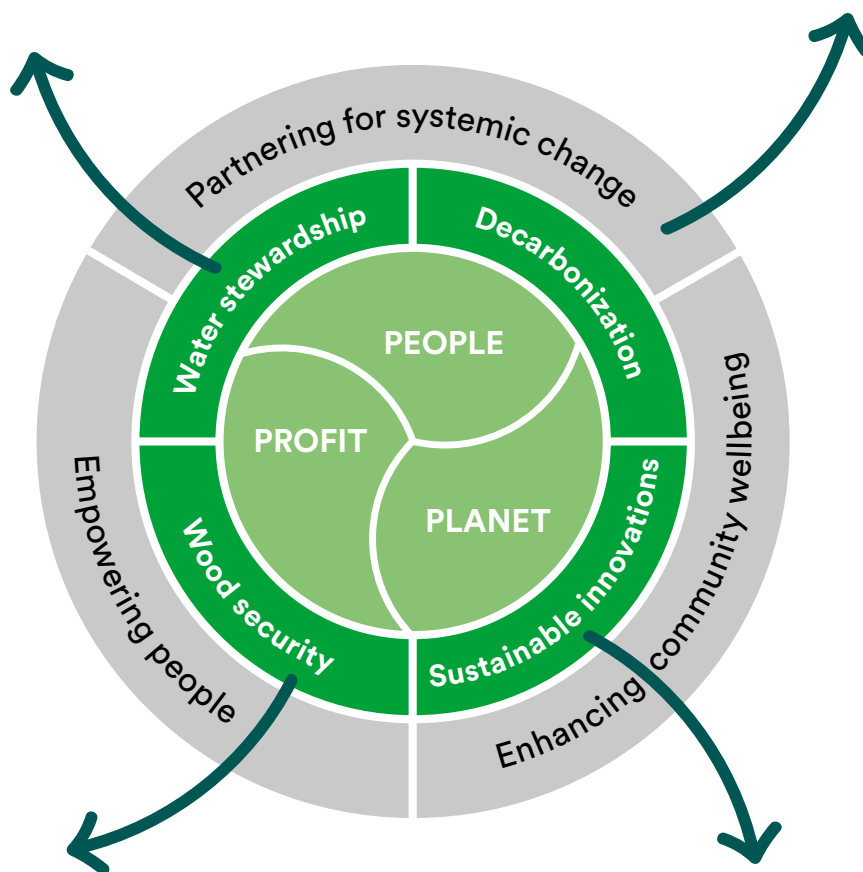
To improve Lenzing Group's specific<sup>4</sup> wastewater emission by 20 percent by 2022

## Target 4

To assess the sustainability performance of 80 percent of the Lenzing Group's "most relevant suppliers"<sup>3</sup> by 2022

## Target 5

To improve transparency by implementing the Higg Facility Environmental Module (FEM 3.0) at all sites by 2019



## Target 3

To implement conservation solutions – start an afforestation project in 2018

## Target 1<sup>2</sup>

To improve the Lenzing Group's specific sulfur emissions by 50 percent by 2022

1) These targets and commitments are applicable for the existing organizational structure and ownership of the Lenzing Group, i.e. current capacity and owned operations in 2014. If any structural changes in ownership, such as buying of a new plant, happen then these targets will be reviewed and reformulated considering the new context of the Lenzing Group.

2) These two targets will allow us to meet the EU Ecolabel criteria for all Lenzing production sites. Baseline for the targets is 2014.

3) Most relevant suppliers comprise 80% of the Lenzing Group's purchasing spend.

4) Specific emissions are defined as emission per unit of production by Lenzing Group (i.e. pulp and fiber production volumes).



**Target 1: To improve the Lenzing Group's specific sulfur emissions by 50 percent by 2022**

The production sites in Lenzing (Austria) and Nanjing (China) already have low sulfur emissions and EU Ecolabel certifications. The Lenzing Group will invest in improving the recovery systems and close the loop of sulfur chemicals and strives to minimize sulfur emissions in its viscose process, especially at PT. South Pacific Viscose (SPV), the Indonesian viscose production site. Improvement is expressed as kg sulfur/ton of pulp and fiber production. The baseline is 2014. This action will reduce the Group's sulfur emissions substantially and help SPV to achieve EU Ecolabel status by 2022. With this, all Lenzing Group's viscose sites will meet the voluntary EU Ecolabel standard.

**Target 2: To improve Lenzing Group's specific wastewater emission by 20 percent by 2022**

Fibers from Lenzing have lower water impacts than the generic fibers according to Higg MSI. In the context of our focus on continuous improvement, the Lenzing Group will invest in upgrading its wastewater treatment infrastructure to further reduce wastewater emissions from the Lenzing Group by 20 percent by 2022. This reduction will be expressed in chemical oxygen demand (COD) in kg COD/ton of pulp and fiber production. The baseline is 2014.

**Target 3: To implement conservation solutions – start an afforestation project in 2018**

Lenzing has a long history of sourcing wood and pulp responsibly and is high ranked by the Canopy benchmarking. Lenzing is committed to protecting ancient and endangered forests, improving the health and biodiversity of global forests and supporting the afforestation of degraded areas. The Lenzing Group will initiate and finance a first conservation solution by replanting degraded land in Albania (Southern Europe). This project will involve a nursery, training for local communities, and monitoring of forest growth over a long period.

**Target 4: To assess the sustainability performance of 80 percent of the Lenzing Group's "most relevant suppliers" by 2022**

Lenzing values long-term partnerships and believes in systemic change. The Lenzing Group has several thousand suppliers. The most relevant suppliers (representing 80 percent of Lenzing's purchasing spend) are selected based on their potential environmental and social sustainability impacts and risks. The Lenzing Group uses EcoVadis as an assessment platform. The selection criteria for relevant suppliers include the following:

- Country-related risks (e.g. child labor, human rights)
- Key chemical and pulp suppliers
- Energy providers
- Service providers/contractors (companies disposing of hazardous waste)
- Logistics providers (esp. handling chemicals)

**Target 5: To improve transparency by implementing the Higg Facility Environmental Module (FEM 3.0) at all sites by 2019**

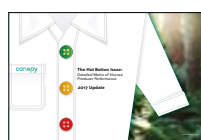
Lenzing strives to improve the management practices of its operations in the context of its continuous improvement process. Implementing Higg – FEM 3.0 will improve the transparency and reduce the risks for the Lenzing Group and its value chain partners. Benchmarking by facility type allows the Lenzing site managers to compare their performance against that of their peers.

## Higg Facility Environmental Module

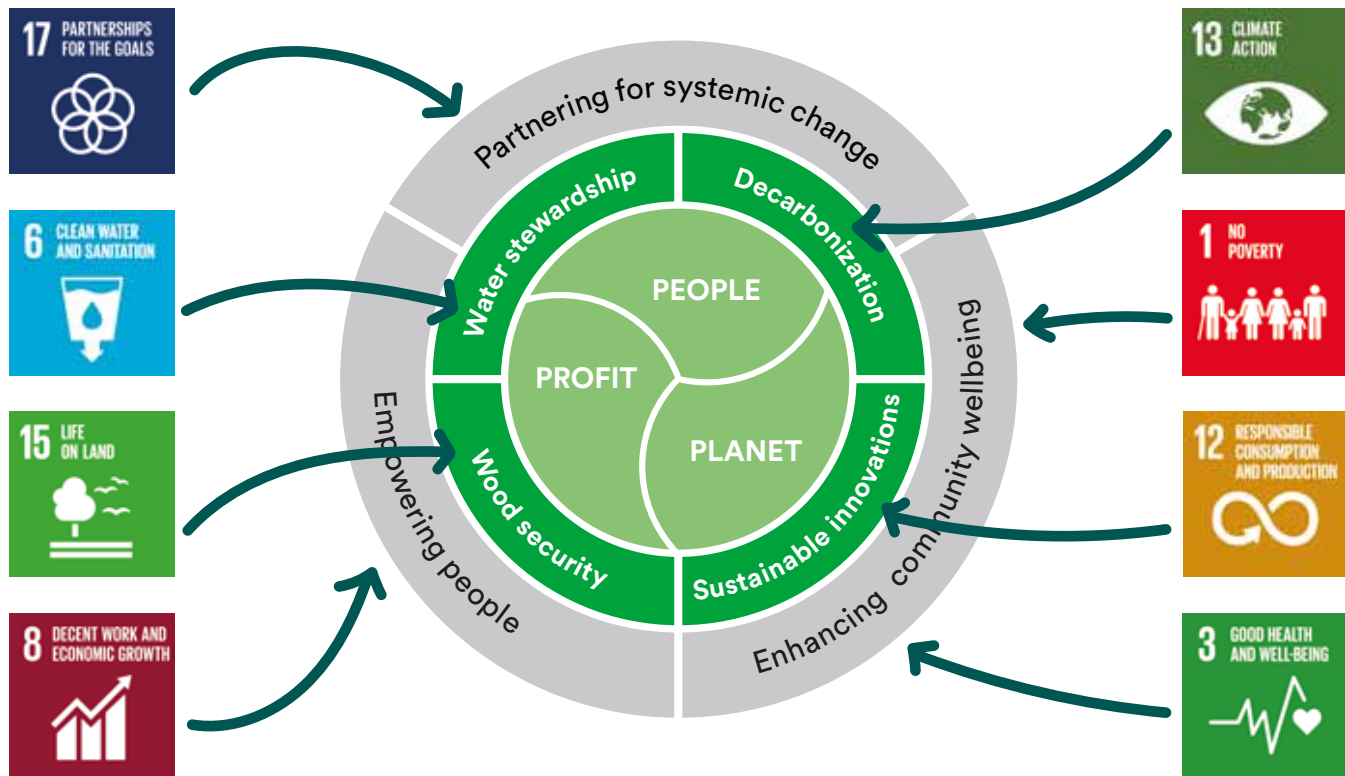
**Higg Facility Tools measure environmental and social sustainability impacts in manufacturing facilities around the world. Users conduct the assessments at least once a year, and these assessments are then verified by on-site assessors who are approved by the Sustainable Apparel Coalition (see below). The Higg Facility tools create opportunities for open conversation among supply chain partners so businesses at every tier in the value chain perform better collectively.**

## Commitment to intensify stakeholder activities

Lenzing is committed to driving the sustainability improvement of the textile and nonwoven industry with its participation in the following multi-stakeholder initiatives to bring systemic change: World Economic Forum (WEF), Sustainable Apparel Coalition (SAC), Textile Exchange (TE), Canopy, Circular Fibres Initiative (an initiative of the Ellen MacArthur Foundation), Science Based Targets' Apparel Sector Guidance by World Resources Institute (WRI).







Lenzing's materiality assessment resulted in the "Naturally positive" sustainability strategy with four focus areas complemented by three supporting areas. Strategic efforts in these areas support the following SDG's:

- **SDG 12 Responsible consumption and production**
- **SDG 13 Climate change**
- **SDG 15 Life on land**
- **SDG 17 Partnerships for the goals**
- SDG 1 No poverty
- SDG 3 Good health and wellbeing for people
- SDG 6 Clean water and sanitation
- SDG 8 Decent work and economic growth

For the Lenzing Group, SDG 12, 13, 15 and 17 are particularly important because their themes address those fields of the company's activity where Lenzing can have the most positive impact. Sustainable sourcing, efficient use of raw material, longstanding experience with biorefineries, life-cycle based thinking along the value chain and a long pipeline of innovative and sustainable products are some of the most important keywords for SDG 12, "Responsible consumption and production". For further information, see chapter 3 (Sustainable sourcing), chapter 4 (Efficient production), and chapter 5 (Sustainable innovation and products).

With our longstanding practice of responsible sourcing, in particular with regard to the main raw material, wood, Lenzing contributes towards SDG 15, "Life on land". Lenzing has set itself the target of engaging in the improvement of degraded land in Albania, a country where forest improvement and training of forest expertise is a high priority. For further information, see chapter 3 (Responsible sourcing) and page 26 (Targets).

With our commitment to the strategic area of "Partnering for systemic change" and our numerous leading activities in multi-stakeholder dialogs, Lenzing contributes substantially towards SDG 17, "Partnerships for the goals". For further information, see page 31 (Stakeholder dialog).

Fiber and pulp production are energy intensive processes. Lenzing's path towards CO<sub>2</sub> reduction, energy efficiency and clean sources of energy contributes to SDG 13, "Climate change". Furthermore, Lenzing's strategic sCore TEN target of 75 percent own pulp production based on self-sufficient renewable energy concepts, and the resulting above-average use of biobased energy support SDG 13. For further information, see chapter 2 (Targets) and chapter 4 (Efficient production).

SDG 1 "No poverty", SDG 3 "Good health and wellbeing for people", SDG 6 "Clean water and sanitation", and SDG 8 "Decent work and economic growth", are important goals which Lenzing addresses by operating its business in a sustainable way. Owing to the nature of the company, the Lenzing Group decided to focus its activities to specific regional challenges. Learn more about SDG 1, 3, and 8 in Chapter 6 (Responsibility for People). For SDG 6 see chapter 4 (Efficient production).



# Risk management

During the course of preparing the company risk report, sustainability-related risks and perspectives were discussed in depth with relevant Group functions and operations. Pulp and fiber production require highly complex chemical and technical processes that cause risks for people, including internal staff, visitors, neighboring communities, and all those in the value chain dealing with Lenzing's products. Furthermore, the chemical and technical processes constitute risks for the environment at and around the production sites as well as potential negative impacts for value chain partners processing Lenzing fibers, such as water contamination or odor. These potential impacts could negatively affect the success of the Lenzing Group and its reputation.

## Risks from operational activities

### Health and safety risks

There is the risk of injury and fatality for employees and contractors at work for the Lenzing Group, and people in neighboring communities to be affected by accidents and exposure to hazardous chemicals. Lenzing's "Heartbeat for Health & Safety" program duly considers these risks, providing a strategic approach for mitigation, precautionary measures and extensive training to avoid these risks.

### Environmental risks

Risks for the environment surrounding Lenzing's production sites arise through the use of certain chemicals and large quantities of water. They also include risks typical of the fiber industry owing to the use of high pressures and temperatures in production. Lenzing addresses these risks through technological leadership and works steadily to improve safety and environmental standards by applying voluntary benchmarks, such as the EU Ecolabel. The sustainability strategy and the proposed targets will continuously improve the Lenzing Group's performance and address these risks.

### Product related risks

There is a risk that poor product quality can lead to technical or environmental problems for the processing steps in the downstream value chain. Furthermore, product safety may be compromised due to contamination, causing problems in the value chain, such as potential health consequences for employees or customers. Lenzing mitigates this risk with appropriate precautions in the production process as well as regular quality controls at the end of the fiber production process. Lenzing strives to obtain product certification and recognized product labels wherever appropriate to maintain the highest standards (see chapter 5, page 82).

### Climate change risks

There is increasing concern in society and industry due to such impending climate change problems as rising sea level, the increasing frequency and intensity of natural disasters, wild fires etc. Pulp and fiber production are energy-intensive processes and contribute to this risk. Due to their far-reaching impacts on society and ecosystems, energy use and climate change are a priority. The Lenzing Group is continuously seeking ways to improve its energy efficiency as well as to choose low carbon or renewable fuels for its operations and is working on setting clear CO<sub>2</sub> emission targets. Lenzing is sponsoring and participating in the textile sector

guidance for setting science-based targets project spearheaded by the World Resource Institute (WRI). [201-2]

## Business relationship risks

### Supply chain risks

All suppliers are obliged to comply with Lenzing's Supplier Code of Conduct. Nevertheless, there is a risk that suppliers do not comply with these regulations and that this will be detrimental to Lenzing and its stakeholders along the value chain. Supply chain risks may also arise from disruption caused by flooding, drought, etc. Lenzing is implementing EcoVadis-based supplier sustainability assessment and using this as a basis for mitigating any supplier-related risks. Assessment of strategic and most-relevant suppliers is one of the sustainability targets.

### Legal and compliance risks

Although Lenzing has established strict compliance rules with all relevant internal and external regulations, there is a risk that these regulations may be violated. This could lead to problems for those stakeholders who trust Lenzing to comply with all relevant regulations. These risks can be minimized through intensive training of employees and periodic evaluation.

### Branding risks

There is the risk of lacking or incomplete IP and branding protection for Lenzing's products. Lenzing mitigates this risk with dedicated departments for Branding and IP Protection.

## Market and regulatory risks

### Risk of losing technological leadership

There is the risk that new and better production technologies will affect the cellulose fiber market and that these will not be available to Lenzing and its customers. This is counteracted by a series of strategic measures in the context of implementing the sCore TEN strategy as well as Lenzing's above-average R&D investments. Lenzing is vigilant and continuously monitors the market to maintain its leadership with technological breakthroughs.

### Market risks

The global fiber industry is dependent on such external factors as the general economic situation, consumer behavior, and trade policy decisions. These factors lead to a cyclical business development, which can negatively affect the earnings expectations of Lenzing shareholders and the employment situation at Lenzing. Lenzing works consistently against cyclicity by implementing its strategy of focusing more on non-cyclical specialty products.

### Risk of stricter regulations

Due to the far-reaching impacts of global warming on society and ecosystems, governments and other stakeholders may respond with stricter regulations, higher CO<sub>2</sub> trading prices, taxation of CO<sub>2</sub> emissions, or increased involvement in customers' CO<sub>2</sub> saving schemes. This may impact the Lenzing Group's business success. Lenzing takes account of potential carbon taxes in its investment planning and actively seeks alternative energy sources. [102-15]

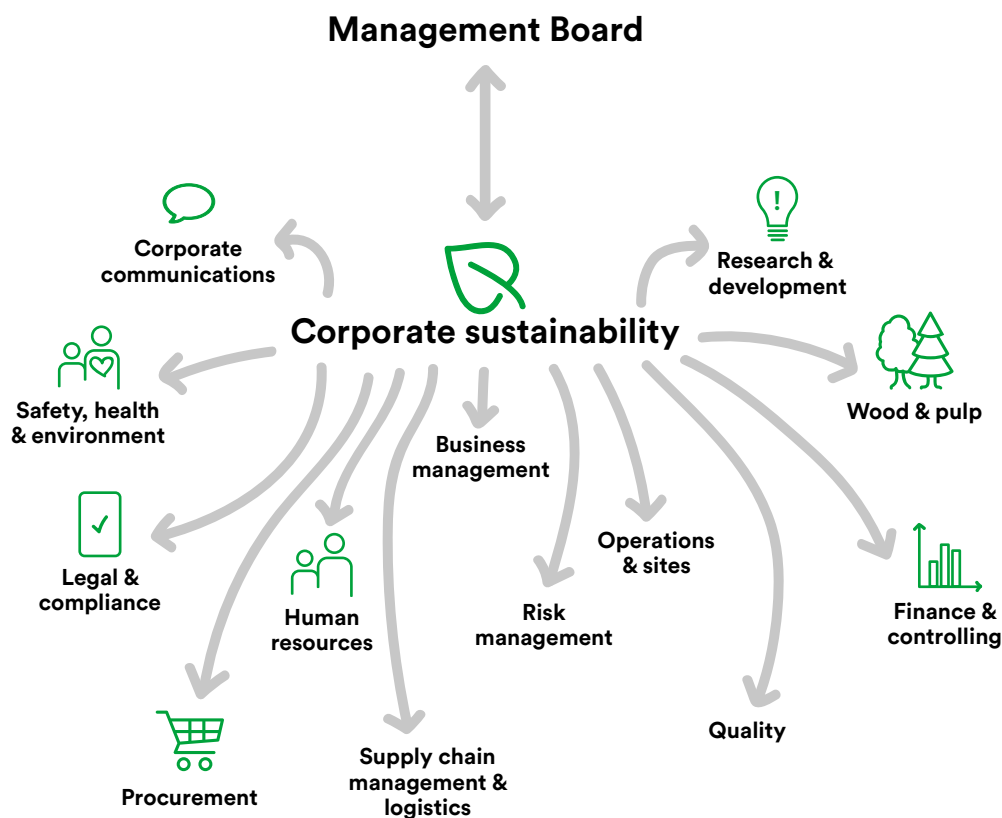


# Sustainability governance

Corporate Sustainability reports directly to the Chief Commercial Officer in the Management Board. [102-18]

## Sustainability organization

Organizational embedment of the corporate sustainability function  
**figure 2/7**



In the reporting year, alignment between the sCore TEN corporate strategy and the “Naturally positive” sustainability strategy was further pursued and translated into the first measurable sustainability targets for the whole Lenzing Group. In order to improve integration of Lenzing’s sustainability agenda in the organization and to define medium and long-term sustainability targets for the company, ongoing education and communication work was undertaken with all relevant business functions.

## Policies, directives, and guidelines

A comprehensive range of policies define behavioral standards for all employees. These include the Global Code of Business Conduct (CoBC) as a guiding principle, the Lenzing Global Supplier Code of Conduct (SCoC), the Policy on Human Rights and Labor Standards, the Whistleblower Directive, the Policy for Safety, Health and Environment (SHE), Wood & Pulp Policy, the Sustainability Policy, the Quality Policy and IP Directive. An updated version of the Business Code of Conduct was published in January 2017.

## Certifications

Lenzing operates its production facilities with a view to sustainable development – in economic, ecological and social terms. Certifications provide important and objective information about the status of an organization with regard to its systems and products. Accordingly, business partners and customers can be sure that the corresponding quality, environmental, and safety standards are adhered to. All fiber and pulp production sites are certified in accordance with system certifications ISO 9001, ISO 14001 and OHSAS 18001. Responsible wood and pulp sourcing is certified by the Forest Stewardship Council® (FSC®) and the Programme for the Endorsement of Forest Certification™ (PEFC™).



# Stakeholder dialog

In the reporting year, the Lenzing Group continued to maintain intensive and proactive contact with many relevant stakeholders. This is of key importance in proving and maintaining the company's market leadership and preparing for changing environments. Lenzing is strategically committed to bringing systemic change and therefore establishes partnerships with different stakeholder groups in order to further develop the fibers industry.

The continuous stakeholder dialog included workshops and webinars with customers, one-on-one discussions, training sessions, interviews, surveys, education, joint product developments, web platforms, roadshows, regular media relations, trade shows and conferences, press interviews, risk assessments and audits. [102-43]

## Key stakeholder groups figure 2/8 [102-40]



Engaging in a dialog means respecting the stakeholders. Each dialog starts with providing transparent information. This helps stakeholders to form an educated opinion, to assess risks, and helps to avoid misunderstandings by building trust. Furthermore, continuous stakeholder relationships help to solve existing tensions and avoid potential conflicts.

The different business functions are integrated into individual stakeholder dialogs. Apart from the Lenzing sustainability team, the managers of the different business areas are important players who drive the company's proactive approach towards ongoing stakeholder dialogs. [102-40]

## Key stakeholders 2017

The key stakeholders for the Lenzing Group are those who are potentially affected by its operations, how the company conducts its business and how Lenzing addresses strategic priorities. Lenzing regards them as strategic partners who have significant interest in and impact on areas that are most material to Lenzing. [102-42]

The issues discussed with the different stakeholder groups were essentially within the framework of Lenzing's materiality analysis. Main topics in 2017 were:

- Responsible sourcing, in particular sustainable sourcing of wood and pulp
- Responsible fiber production
- Trends such as Circular Economy, science-based target setting
- Environmental issues such as climate change, waste, emissions, water management
- Transparency and supply chain mapping
- Raw material assessments (definition of sustainable raw materials)
- Life Cycle Assessment
- Health and safety
- Innovation
- Human rights
- Labor rights
- People and community

Lenzing's most important stakeholder dialogs in 2017 were those with the following organizations:

### Sustainable Apparel Coalition (SAC)

Lenzing is a founding member of the Sustainable Apparel Coalition (SAC), which is the apparel, footwear and home textile industry's foremost alliance for sustainable production.

In 2017, Lenzing contributed to SAC for the development of tools, such as the footprint tool (LCA) and the further improvement of the Higg Material sustainability index (MSI).

The Coalition's main focus is on building the Higg Index, a standardized supply chain measurement tool for all industry participants to understand the environmental, social, and labor impacts of producing and selling their products and services. By measuring sustainability performance, the industry can address inefficiencies, resolve damaging practices, and achieve the environmental and social transparency that consumers demand. The initiative is transforming the apparel, footwear, and home textiles industry through system-wide collaboration, supply chain transparency, and pioneering assessment tools.

### Canopy<sup>8</sup>

Raw material security, and particularly the responsible sourcing and purchasing of the key raw materials in cellulose fiber production, wood and pulp, is one of Lenzing's strategic focus areas for sustainability. Consequently, collaboration with the non-profit environmental organization Canopy, which leads an initiative of 125 global fashion, designer, and retail brands to protect the world's ancient and endangered forests from ending up in textiles, constitutes a cornerstone of Lenzing Group stakeholder activities.

For further information about Lenzing and Canopy in 2017, see chapter 3, page 40.

<sup>8</sup>) Canopy Planet Society



### **Circular Fibres Initiative (an initiative of the Ellen MacArthur Foundation)**

The Circular Fibres Initiative brings together industry leaders and other key stakeholders to collaborate and innovate towards a new textile economy, based on the principles of a circular economy.

Lenzing contributes to this ambitious initiative by providing its industrial perspective and insights, including its vast experience in the textile industry and its game-changing TENCEL™ Lyocell fiber with REFIBRA™ technology, the first cellulose fiber featuring recycled material on a commercial scale.

For further information see chapter 5, page 73.

### **World Economic Forum (WEF)**



The World Economic Forum works with its constituents to make sustained positive change through a series of System Initiatives.

Lenzing has been a Forum Member Advisor with the WEF since fall 2016. CEO Stefan Doboczky contributed to various sessions at the Davos meetings in 2017 and 2018. Subsequently Lenzing became a member of the CEO Climate Leaders group and is regularly contributing to the work of this group. Lenzing's activities, as defined within the four areas of its "Naturally positive" sustainability strategy partly tie in with the initiatives defined by WEF, such as "Shaping the future of energy", "Tropical Forest Alliance 2020", and "Environment and natural resource security".

Lenzing is part of the Alliance of CEO Climate Leaders: towards a new way of doing business. The Alliance of CEO Climate Leaders is a group of chief executive officers who believe the private sector has a responsibility to become involved in cutting greenhouse gas emissions. This includes leading the way towards a low-carbon economy, which helps people and communities stand up to the effects of climate change. This coalition, created by the World Economic Forum, aims to speed up companies' search for answers to climate change across all their work.

### **Textile Exchange**

Textile Exchange (TE) 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 caused by industry. Lenzing has a seat on the Executive Board as Vice-Chair and participates in various working groups throughout the year. In the reporting year, Lenzing participated in Textile Exchange's 2017 Textile Sustainability Conference held near Washington, D.C. in October. This was the largest conference held by the NGO to date

attended by over 500 people from 37 countries and 328 different companies. In particular, Lenzing took part in the "New Reporting Metric" session and the "Manmade Cellulosics Round Table", a new, annual multi-stakeholder event. It brought together experts from industry and NGOs to act collectively and to incubate new ideas. Lenzing supports the idea of discussing industry topics on a pre-competitive level, collaborating and educating towards a more sustainable future of the industry. [102-13]

The organization promotes the adoption of preferred fibers and materials, integrity and standards and responsible supply networks and publishes an annual "Preferred Fiber and Materials Market Report". The report measures and ranks the usage of fiber and materials with improved social or environmental impacts among participating companies.

In 2017, TENCEL™ Modal fibers and LENZING™ ECOVERO™ fibers were newly added to the preferred fibers list. Together with Lenzing's previously listed TENCEL™ Lyocell fibers, three Lenzing products are now listed as "preferred fibers", i.e. they are acknowledged as having a better sustainability profile.

Featuring 95 major textile and apparel companies, including some of the world's most renowned brands and retailers, the 2017 issue was the largest report released by Textile Exchange to date, representing a 14 percent increase in participating companies over 2016's report and a 76 percent increase over 2015's.

### **World Resources Institute (WRI)**

The Lenzing Group has initiated collaboration with the WRI on a sector guidance for the apparel sector on setting science-based targets.

A science-based target is a greenhouse gas emissions reduction target aligned with the latest climate science. The Science-Based Targets initiative (SBTi) champions science-based target setting as a powerful way of boosting companies' competitive advantage in the transition to the low-carbon economy. For further information, see chapter 4, page 61.

In the SBTi, the World Resources Institute teams up with other organizations, including Carbon Disclosure Project (CDP) and World Wide Fund for Nature (WWF), in order to

- Identify barriers for apparel companies to set SBTs and provide recommendations to address these barriers
- Create specificity and consistency in how apparel companies set SBTs, where possible
- Define and provide examples of best practices
- Explore opportunities for companies to collaborate in reducing emissions

A final draft for stakeholders is planned for April 2018, and publication for October 2018.

Lenzing is part of the initiative and contributes with expert input, feedback on drafts, and financial support.

The World Resources Institute has the mission "to move human society to live in ways that protect the Earth's environment and its capacity to provide for the needs and aspirations of current and future generations." It is engaged together with businesses and many other stakeholders in six global challenge areas: climate, energy, food, forests, water, and cities.



### Info box 2/1

The **World Economic Forum** (WEF) is a Swiss nonprofit foundation, based in Cologne, Geneva. Recognized by the Swiss authorities as an international body, its mission is cited as „committed to improving the state of the world by engaging business, political, academic, and other leaders of society to shape global, regional, and industry agendas“.

The Forum is best known for its annual meeting at the end of January in Davos, Switzerland. The meeting brings together some 2,500 top business leaders, international political leaders, economists, and journalists for up to four days to discuss the most pressing issues facing the world.

### Info box 2/2

In 2017, Lenzing launched a dedicated sustainability newsletter which was published three times and provided information for employees and interested stakeholders alike.

### The Lenzing Group's Naturally positive Sustainability Newsletter figure 2/9



## Overview stakeholders and memberships

### Employees

One very special stakeholder group is Lenzing staff. Transparency, collaboration, and sharing of information make them key testimonials for credible Lenzing Group sustainability performance.

In 2017, e-learning modules and sustainability training material were developed. Internal webinars and events were held to discuss sustainability issues and train the staff. On occasion of the target-setting project to develop Lenzing's sustainability targets, production sites in Asia and Europe were visited. At these meetings, intensive discussion of sustainability issues contributed to raising the awareness of Lenzing staff.

Employees table 2/1

Stakeholder interest	How we engage	Activities
Fair employment conditions, respect and collaboration, safe & healthy working environment, transparent information, job security, long-term & sustainable thinking	Works councils/ trade unions	Regular meetings, sharing information on work conditions, remuneration, etc.
	Internal communication	Regular town hall meetings, corporate media (newsletters, TV cooperation, screens, online magazines, etc.), workshops, presentations to sites & functions, internal sustainability training, site visits

### Media

Transparent and open communication are essential prerequisites for a successful, globally operating, publicly listed company like the Lenzing Group. Increasing digitalization increases the significance of media as stakeholders for the company.

Media table 2/2

Stakeholder interest	How we engage	Activities
Understanding and ongoing public information regarding the development of Lenzing	Corporate Communications Marketing Communication Brand Management Business Management	Press relations with general and trade media, press conferences, product launches, interviews, collaboration with the local TV station in Lenzing, social media communication

### Investors

As a listed company, Lenzing receives a large number of sustainability inquiries and engages in a continuous dialog with the investor community. Lenzing's investors are expressing growing interest in ESG issues and want to know about Lenzing's exposure to climate risk, the company's efficiency in using natural resources, product stewardship, health and safety issues, etc.

Investors table 2/3

Stakeholder interest	How we engage	Activities
Better understanding of the business to minimize investment risk	Investor Relations department supported by Sustainability department Cercle Investor Relations Austria (C.I.R.A) board membership	Roadshows Quarterly result conference calls Investors' days and conferences Stock exchange info days Site visits One-on-one's (IR and Board)

### Local communities/neighbours

Both locally and internationally, the Lenzing Group takes its social responsibility as a corporate citizen seriously, and makes a major contribution to the common good in the three dimensions of sustainability.

Local communities/neighbours table 2/4

Stakeholder interest	How we engage	Activities
Safety, job creation, prosperity, clean environment in terms of water, air, noise; ethical standards, compliance, paying fair taxes	Site management maintains regular contact with community representatives Community department of PT, South Pacific Viscose, dedicated to promoting community engagement.	Regular events, presentations and discussions (neighborhood meetings) with communities around Lenzing's production sites in various settings Microcredit program at Cicadas, Purwakarta etc, see chapter 6

### Direct customers & value chain partners

Customer intimacy and responsiveness to customer needs are part of Lenzing's sCore TEN strategy. Relationships are geared to the long term and often extend over many decades.



**Direct customers & value chain partners table 2/5**

Stakeholder interest	How we engage	Activities
Innovative, sustainable and differentiating products, long term and trustful partnerships, open and transparent collaboration, reliability	Sales, Business Development, Corporate Sustainability, Technical Customer Service	Ongoing regular exchange on a wide range of sustainability topics, customer events and workshops about quality, product development, innovation, supply chain management, site visits, trend forecasts, color cards, fabric and product development, exhibitions, specialist conferences newsletters, blogs

## Retailers & brands

The Lenzing Group is shifting its focus from B2B to B2B2C. Retailers and brands are key stakeholders and customers for the company, which is situated at the upstream end of the value chain. Retailers and brands are the key link to the end consumer.

**Retailers & brands table 2/6**

Stakeholder interest	How we engage	Activities
Innovative, sustainable and differentiating products, long term and trustful partnerships, open and transparent collaboration, reliability	Business Development, Key account managers, Corporate Sustainability, Brand Management	Ongoing regular exchange on a wide range of sustainability topics, LCA data, site specific data, supply chain management, customer events and workshops about quality, product development, innovation, joint projects on product development, sourcing, product launches, visits, conferences, exhibitions

## Suppliers

The responsible purchasing of primary and raw materials for fiber and pulp production plays a crucial role for the Lenzing Group. Against the backdrop of the global issue of deforestation and land degradation, particular importance is attached to responsible wood and pulp sourcing. Good and transparent business relationships with our suppliers are key to promoting and improving a sustainable supply chain.

**Suppliers table 2/7**

Stakeholder interest	How we engage	Activities
Long-term and trustful partnerships, open and transparent collaboration, fair pricing, reliability	Purchasing department Global Pulp & Wood EcoVadis assessment	Audits and supplier assessments, site and forest visits, specialist conferences

## Industry associations

Stakeholder interest: leadership and participation to change for the better, support industry interests, develop and shape standards, collaboration.

**Industry associations table 2/8**

Association	Membership	Activities
ACPP - Association of the Pulp and Paper Industry (Czech Republic)	Member	Participating actively to support negotiations with government, trade unions and international organizations
AFBW – Allianz Faser-basierende Werkstoffe Baden-Württemberg e.V.	Member	Exchange and cooperation for industrial applications relevant topics

Association of Small and Medium-Sized Enterprises and Crafts of the Czech Republic	Member	Cooperation with the government, individual ministries, and over recent years has initiated a host of statutory measures which are helping to shape the business environment in the country
Austrian Business Council for Sustainable Development (RespAct)	Member	Conferences, discussion groups, working groups, speeches
Austrian Fibers Institute	Presidency, main sponsor	Participation in Dornbirn GFC (Global Fiber Congress, formerly Man-Made Fibre Congress)
Austropapier - association of Austrian Pulp and Paper Industry	Member	Austropapier is a cooperation of all Austrian pulp and paper producers. Main topics covered: recycled paper, safety, energy, research and development, health protection, forest management, communication, environment, transport, forest fire protection
The Bremen Cotton Exchange	Member	Connection to the cotton industry as a partner in textile world
CEFIC - European Chemical Industry Council	Member	Sharing expertise and participating in dialog
C.I.R.A. - Cercle Investor Relations Austria	Board Member	Cercle Investor Relations Austria (C.I.R.A.) is the interest group for investor relations in Austria, comprising companies, investors, and all interested individuals on the capital market. The objectives of the association are continuous improvement, internationalization, and professionalization of investor relations in Austria, as well as the advancement and further development of the Austrian capital market.
CIRFS - European Man-Made Fibres Association	Board member Vice presidency	Heading and participating working groups. Providing expertise in different topics (technical regulations, trade, environmental and sustainability standards of the EU authorities, etc.)
EDANA - European Disposables and Non-wovens Association	Board Member	EDANA and INDANA regularly organize global events and meetings to address environmental issues within the nonwovens industry
INDA - Association of the Nonwoven Fabrics Industry	Member	As an active member, Lenzing is dedicated to participating in various working groups hosted by the two leading non-woven industry associations. Lenzing engages in innovations and sustainability-related topics for wood-based cellulose fibers in the nonwovens supply chain and addresses circular economy topics, such as waste minimization and biodegradability
European Textile Platform (ETP)	Member	Participating actively to support different working groups as well as textile strategy on EU level.
International Bureau for Standardisation of Man-Made Fibers (BISFA)	Member	Association of man-made fiber producers to establish the world wide standardization of terminology, test methods, delivery conditions and other technical rules for fibers and yarns and secondly to advise national authorities and governmental bodies in disputes or at request.
ITMF - International Textile Manufacturers Federation	Member	Sharing business relevant information
IVC - INDUSTRIE-VEREINIGUNG CHEMIEFASER E.V.	Member	Representative of major man-made fiber manufacturers in Germany, Austria and Switzerland Exchange and cooperation on fiber relevant topics
IV - Industriellen Vereinigung	Member	Participation in Federal Board meetings and various working groups to develop thoughtful leadership positions
IVGT - Industrieverband Veredlung - Garne - Gewebe - Technische Textilien e.V.	Member	Exchange and cooperation for topics relevant for industrial applications
MaxTex - network for sustainable textiles	Member	Participating actively



National wood cluster (Czech Republic)	Member	Cooperation on innovating and further development of activities that improve conditions for doing business in the wood industry and strengthen the links between research, universities and businesses
ÖZEPA - Österreichische Vereinigung der Zellstoff- und Papierchemiker und -techniker (Austrian association of pulp and paper chemists)	Member	Participating in working groups, (environmental, maintenance, safety, energy, human resources)
Packbridge – a professional network for the packaging industry	Member	Exchange, cooperation and networking for topics relevant for the packaging industry
Plattform FHP (Forst - Holz - Papier)	Member	Austrian platform for the value chain collaboration of forestry, wood industry, and pulp and paper industries. Lenzing actively participates in several working groups.
Technical Association of the Pulp and Paper Industry Czech and Slovak Republic	Member	Cooperation on fiber product related topics
Wood for Life Foundation (Czech Republic)	Member	Promote wood as a domestic renewable raw material for everyday use, protect renewable resources for future generations. Wood for Life Foundation helps strengthen the responsible attitude of the public towards the environment.

### Multi-stakeholder organizations/initiatives

Stakeholder interest: Leadership and participation to change for the better, develop and shape new tools and standards, collaboration, drive sustainable business practices and take responsibility.

**Multi-stakeholder organizations/initiatives table 2/9**

Association	Membership	Activities
Circular Fibres Initiative (Ellen MacArthur Foundation)	Core Partner	Providing industrial perspective in the textile industry (focus on circular economy)
Dialog Textil-Bekleidung DTB	Board member	Participation in working groups and conferences, presentations, providing fiber-specific expertise
Eurocoton	Board Member	European spinning and weaving industry association
Sustainable Apparel Coalition (SAC)	Founding member	See description in chapter 2, page 31
Textile Exchange (TE)	Vice-Chair on the Executive Board	Participation in working groups and conferences, ongoing cooperation, providing fiber-specific expertise.
Land Use Change Guidance Pre-competitive consortium convened by Quantis	Contributor	Lenzing is one of the contributors to this consortium (over 40 private companies, governments and NGOs) with the goal of developing a scientifically accurate reference to support companies in accounting for the climate change impacts of their work on sustainable forests and agriculture.
The Textile Institute	Member	Exchange, cooperation and networking for technical textiles relevant topics
World Apparel Lifecycle Database (WALDB)	Contributor	Support for the collection of data for a robust and credible database for environmental impact assessment and footprinting in the fashion industry.
World Economic Forum	Contributor	Participation in Annual Meeting in Davos and contribution to working groups and initiatives
Zero Discharge of Hazardous Chemicals (ZDHC)	Contributor	Sharing of fiber-specific expertise for tool development

### Nonprofits

Stakeholder interest: Drive a sustainable industry, change for the better, leadership

**Nonprofits table 2/10**

Association	Activities
Canopy Planet Society	Protection of ancient and endangered forests – see chapter 3, page 40.
Fairtrade	Member of Fairtrade Textile Advisory Group (TAG) – Lenzing fibers listed as sustainable fibers under the Fairtrade Textile Standard
Forest Stewardship Council® (FSC)	Member: active role providing key input
Programme for the Endorsement of Forest Certification™ (PEFC) Austria	Founding member: participation in working groups
SETAC-Society of Environmental Toxicology and Chemistry	Exchange of know-how, sponsoring of LCA award to encourage young scientists
Water Footprint Network	Inputs on water aspects in viscose process and sustainability issues in viscose industry
World Resources Institute (WRI)	Science based targets guidance for the apparel industry – expert input, feedback on drafts, financial support

### Academia

Stakeholder interest: Industry insights, market development analysis

**Academia table 2/11**

Institution	Activities
DITF - Deutsche Institute für Textil- und Faserforschung (German institutes of textile and fiber research)	Regular activities regarding the measurement and evaluation of fibers and fabrics for selected applications
EPNOE (European Polysaccharide Network of Excellence)	Regular contribution to network activities, exchange with European top institutes
Hohenstein Institutes	Long-time co-operation in the field of comfort and performance assessment
Hong Kong Polytec	Ongoing co-operation about the evaluation of various fabric properties
Mistra Future Fashion	In 2017, Lenzing AG joined as an advisory stakeholder taking an active role providing key input in research theme meetings, workshops and program meetings.
North Carolina State University, USA	Lenzing is member of the COMPETE consortium for the evaluation of comfort and performance of textiles
Technical University of Ostrava, Economics faculty	Long-term co-operation. Common projects, students training at the Paskov pulp plant.
University of Natural Resources and Life Sciences, Vienna	A long-standing cooperation. Earlier work centered on the water footprint of fibers and raw materials, and the sustainability of forest resources. Currently, a PhD thesis "Sustainability in Wood Sourcing" (see box in chapter 3 on page 48).
University of Innsbruck	Regular cooperations in various fields, also in joint R&D projects
Wood K plus	Long-term co-operation. Ongoing R&D projects on technologies to gain new valuable co-products from the pulp process and to increase yield of existing co-products.

### Governments

**Governments table 2/12**

Stakeholder interest	Activities
Job creation, prosperity, clean environment in terms of water, air, noise, ethical standards, compliance, paying fair taxes	Annual Report, Sustainability Report, provision of company data required to be published. At the various Lenzing Group production sites, the management maintains ongoing relationships with relevant local government bodies, authorities, and stakeholders. See chapter 6.

[102-12, 102-13, 102-40, 102-42, 102-43]



Responsible

sourcing



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# Sustainable procurement management

The Lenzing Group actively takes responsibility for the socio-economic environment and nature. Safety and sustainability are corporate values of Lenzing and form an integral part of the sCore TEN business strategy. Lenzing cooperates with partners who take responsibility for their employees, use environmentally friendly production processes and develop their business in a sustainable manner.

The Lenzing purchasing organization operates in accordance with the ethical, ecological, social and economic principles described in the company's Code of Business Conduct (CoBC). Lenzing aims to minimize purchasing-specific risks such as major price fluctuations and supply bottlenecks through reliable, longterm supply relationships and active supplier management. Identifying compliance-relevant risks and taking measures to minimize those risks are handled and supported by Lenzing's compliance management system.

Apart from taking account of economic criteria, the selection and evaluation of suppliers is also based on environmental, social, and governance standards (ESG). The Lenzing Group puts a strong focus on its corporate values as part of its sCore TEN strategy. One guiding principle in this context is that the way business is done is as important as the business itself. In 2016, the Lenzing Group updated its Global Code of Business Conduct (CoBC) and its Global Supplier Code of Conduct attaching greater importance to compliant and sustainable business conduct. Implementation of these codes has been ongoing in 2017 and will be completed in 2018.

## Global Supplier Code of Conduct

In order to do business with Lenzing, suppliers are expected to abide by the Supplier Code of Conduct and all applicable laws. Suppliers must ensure that their organization is set up in compliance with this code.

The Global Supplier Code of Conduct outlines Lenzing's expectations for supplier conduct with regard to health and safety at work, labor and human rights, environmental protection, ethics, and management practices. Lenzing's suppliers are obligated to provide safe working conditions, to treat employees with respect, to act fairly and ethically, and to use environmentally responsible practices wherever they manufacture products or perform services on behalf of the Lenzing Group. By setting strict requirements, the Global Supplier Code of Conduct helps promote an environmentally and socially conscious supply chain.

### What does Lenzing expect from its suppliers?

Lenzing engages and works with suppliers to define and implement policies for social responsibility and environmental improvements and to establish their own internal compliance management systems. Performance in social and environmental responsibility will be considered as criteria determining supplier preference ratings. Lenzing reserves the right to assess suppliers on the basis of (external) supplier assessment tools.

## Supplier assessment

Lenzing selects relevant suppliers depending on their potential sustainability risks. Lenzing defines relevant suppliers as those showing an elevated sustainability risk potential based on their size and volumes in our supplier portfolio.

Selection criteria for relevant suppliers:

- Country-related risks
- Key-chemical and pulp suppliers
- Energy providers
- Service providers/contractors
- Logistic providers

As a result, the most relevant suppliers were selected, who represent 80 percent of global purchasing volume including pulp, but excluding wood. For wood suppliers, EcoVadis is not a suitable tool due to the different economic structure of the supply chain with a high number of small forest owners, and specific ecological and societal issues. Therefore the assessment of supplier sustainability follows a specific scheme as lined out in chapter "Responsible wood sourcing for the Lenzing pulp mills".

### Targets

Sustainability assessment of relevant suppliers according to our selection criteria by an external auditor:

- 2017: 50 percent of relevant suppliers to Lenzing site (Austria) – fulfilled above target
- 2018: 50 percent of relevant Europe & Americas suppliers
- 2022: 80 percent of relevant Lenzing Group suppliers

### EcoVadis tool introduced

In 2016 Lenzing decided to invite all suppliers to complete the EcoVadis survey in order to obtain a ranking and to be able to evaluate their sustainability performance. EcoVadis provides reliable CSR (corporate social responsibility) ratings and scorecards covering 21 CSR indicators, built on the three pillars of people, process and platform.

The Lenzing Group was also subjected to this assessment as a supplier in 2017. The survey asked questions on four separate themes which cover different CSR issues. Each theme is annualized according to three key indicators: policies, actions and results. The result for the Lenzing Group was 67/100 points which is "Gold status". Although this is a very good result, there is still some room for improvement. The assessment will be repeated every year.

### Highlights – EcoVadis Gold status for Lenzing Group<sup>9</sup>

- **Sustainable procurement:** The Lenzing Group is in the top one percent of suppliers assessed by EcoVadis in the category "Manufacture of man-made fibres".
- **Labor practices:** The Lenzing Group is in the top five percent of suppliers assessed by EcoVadis in the category "Manufacture of man-made fibres".

<sup>9</sup> Source: EcoVadis report, 06 December 2017



- **Fair business practices:** The Lenzing Group is in the top 14 percent of suppliers assessed by EcoVadis in the category “Manufacture of man-made fibres”.
- **Environment:** The Lenzing Group is in the top 29 percent of suppliers assessed by EcoVadis in the category “Manufacture of man-made fibres”.
- **Overall:**
  - › The Lenzing Group is in the top 3 percent of suppliers assessed by EcoVadis in the category “Manufacture of man-made fibres”.
  - › The Lenzing Group is in the top 2 percent of suppliers assessed by EcoVadis in all categories.

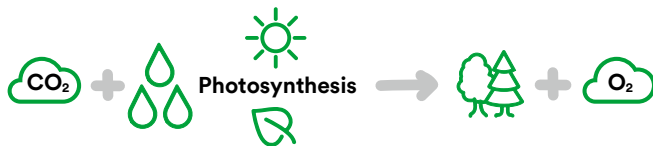
#### Wood and pulp supplier management

In the case of wood and pulp procurement, Lenzing relies on the wood certification schemes Forest Stewardship Council® (FSC®) and Programme for the Endorsement of Forest Certification Schemes™ (PEFC™) for supplier sustainability management. Only in case of non-certified suppliers, Lenzing conducts on-site audits based on FSC® and PEFC™ criteria. Strategic suppliers are evaluated periodically. Through cooperation with EcoVadis Lenzing is seeking to standardize assessments and auditing of suppliers also in the wood and pulp sector.

## Wood & pulp

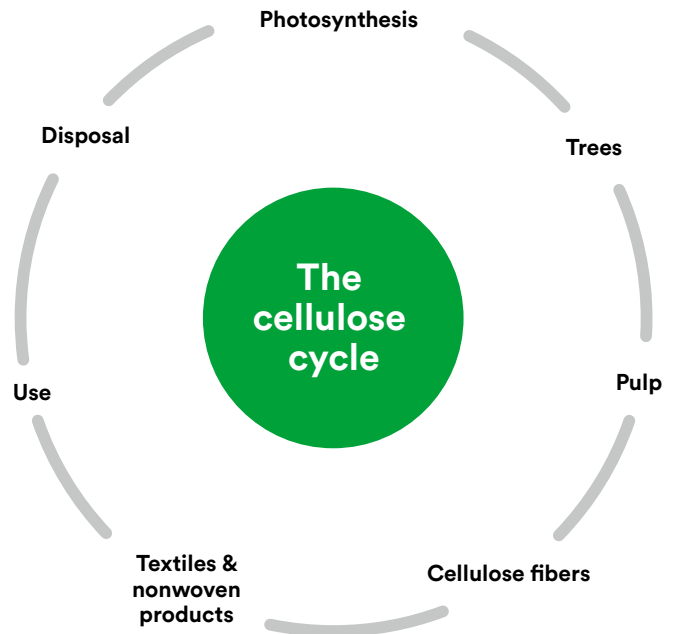
LENZING™ fibers are part of a closed natural material cycle. It starts with photosynthesis, the bio-chemical process that produces the organic building blocks for all life on earth from carbon dioxide and water by utilizing energy from the sun. One of its major products is the most important biological construction material, cellulose.

#### The principle of photosynthesis figure 3/1



This biopolymer is used by the Lenzing Group for fiber production, and ultimately at the end of their useful lives the fibers can biodegrade to their original compounds, carbon dioxide and water.

#### The cellulose cycle figure 3/2



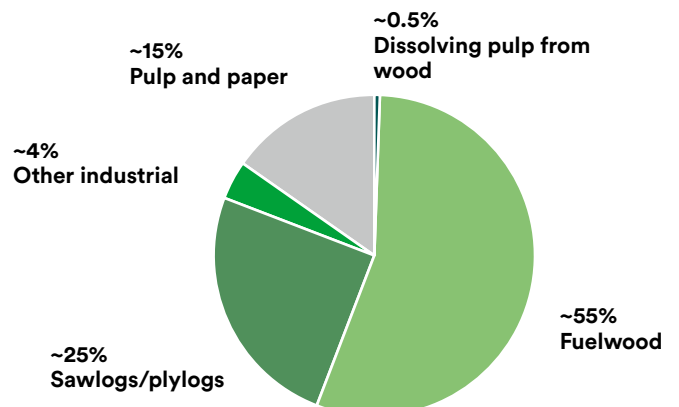
## Global wood harvest and use

Each year approximately 180 million tons of pulp are produced globally, constituting only a small proportion of annually renewable cellulose resources, which are estimated to be approximately 1,500 billion tons per year<sup>10</sup>. Estimated proportions of wood utilization are shown in figure 3/3. More than half of the world's round wood harvest is used directly for energy. This proportion is increasing, driven by population growth with rising fuelwood requirements, as well as increased demand for renewable energy also in industrial countries.

#### Global wood market

Dissolving wood pulp uses currently about 0.5% of the global wood harvested (Lenzing estimates based partly on statistics of the United Nations' Food and Agriculture Organization)

figure 3/3



<sup>10</sup>) Klemm et al, 2005



Industrial wood accounts for about 45 percent of round wood. Around 15 percent of global wood is processed into pulp. The lion's share of industrial pulp is destined for the paper industry. The fiber industry accounts for 2-3 percent of total pulp production<sup>11</sup> or 0.5 percent of global wood use. Considering the available cellulose resources, dissolving wood pulp can be sourced in a sustainable way, and has a high potential for growth that is ecologically sustainable<sup>12</sup>. Future growth of the wood-based fiber industry can be sustained by growing forest resources in certain regions of the world. However, the Lenzing Group is aware of deforestation issues and committed to protecting existing ancient and endangered forests through its wood and pulp policy, certification, and forest conservation solutions.

The total worldwide forest area amounted to 39.99 million square kilometers in 2015.<sup>13</sup> This area declined by 1.29 million square kilometers in the period 1990 - 2015. Deforestation primarily occurred in tropical countries as a result of illegal logging, whereas forest areas in Europe, North America and China actually expanded.

The demand in forest products is predicted to triple in the year 2050<sup>14</sup> in the context of a shift to a bioeconomy, based on renewable resources instead of fossil fuels, in which a large share of materials in the economy would be made of forest-based resources. This expansion of forests goes hand in hand with mitigation of climate change. To meet this demand in a responsible way, forests must be sustainably managed and used.

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) stated:<sup>15</sup>

*"In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit. .... The combined effects of reduced deforestation and degradation, afforestation, forest management, agro-forestry and bioenergy have the potential to increase from the present to 2030 and beyond".*

Sustainable and responsible forest use, backed by various certifications, plays a crucial role in forest conservation. Additionally, there is a large potential for restoration of degraded land by replanting and sustainably managing forests, according to recent studies by FAO and World Resources Institute (WRI).<sup>16</sup>

## Lenzing's Wood and Pulp Policy

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

Controversial sources include wood which has been harvested:

- Illegally
- From forests of high conservation value, including ancient and endangered forests, and habitats of endangered species
- From plantations established after 1994 through significant conversion of natural forests or converted to non-forest use
- From forests or plantations growing genetically modified trees
- In violation of traditional, community, and/or civil rights
- In violation of any of the ILO<sup>17</sup> Core Conventions as defined in the ILO Declaration on Fundamental Principles and Rights at Work

In order to protect and preserve ecosystems and biodiversity in the world's remaining ancient and endangered forests, Lenzing is committed to avoiding the use of wood and dissolving pulp from regions such as:

- Canadian and Russian Boreal forests
- Coastal temperate rainforests
- Tropical forests and peatlands of Indonesia
- The Amazon
- West Africa

In cases where Lenzing does source wood and pulp containing such wood from the aforementioned regions, Lenzing strives (i) to ensure that it be certified at a minimum by the Forest Stewardship Council® (FSC®), (ii) to ensure that science-based conservation planning is supported for this area, and (iii) to support conservation solutions that protect ancient and endangered forests. **[304-2]**

Regular risk-assessments, audits and on-site visits as well as independent third-party certification of sustainable forest management programs ensure compliance with Lenzing's Wood and Pulp Sourcing Policy.

If Lenzing discovers that it sources wood or pulp from controversial sources, it will first engage the supplier to encourage practices consistent with Lenzing's wood and pulp policy. If the response is unsatisfactory the supplier will be eliminated with a reasonable lead time. A few such cases occurred in recent years.

Lenzing strives to establish long-term partnerships with its wood and pulp suppliers, and seeks to do its business personally and directly with forest owners and pulp mills.

### CanopyStyle Initiative – dialog with brands and NGOs

Raw material security, and particularly the responsible sourcing and purchasing of the key raw materials in cellulose fiber production, wood and pulp, is one of Lenzing's strategic focus areas for sustainability. Consequently, collaboration with the non-profit environmental organization Canopy<sup>18</sup>, which leads an initiative with 125 global fashion, designer, and retail brands<sup>19</sup> to protect the world's ancient and endangered forests from ending up in textiles, constitutes a cornerstone of Lenzing Group stakeholder activities.

<sup>11</sup> Lenzing estimates, based partly on FAO (United Nations' Food and Agricultural Organization) statistics

<sup>12</sup> Piotrowski 2016; FAO, 2016 (Forestry in a low-carbon future)

<sup>13</sup> Food and Agriculture Organization of the United Nations: Global Forest Resources Assessment 2015

<sup>14</sup> WBCSD 2010

<sup>15</sup> IPCC 2007

<sup>16</sup> FAO 2016, and WRI 2018

<sup>17</sup> International Labour Organization

<sup>18</sup> Canopy Planet Society

<sup>19</sup> Status: 5. December, 2017



Lenzing maintains a continuous dialog with members of the CanopyStyle Initiative. As a leading global producer of wood-based fibers, Lenzing fully supports Canopy's roadmap by constantly improving its sustainable sourcing practices and strengthening the company's leadership by planning contributions to global forest conservation.

In Canopy's latest Hot Button Report<sup>20</sup>, published in November 2017, Lenzing achieved a high group "green shirt" ranking (20.5 buttons) proving that there is a very low risk of sourcing wood from ancient and endangered forests when using Lenzing fibers.

**Canopy shirt ranking figure 3/4**



### Transparency

Full points for transparency are only awarded if the disclosure of supplier data is provided publicly. For compliance reasons, Lenzing discloses supplier data to Canopy and Rainforest Alliance and – upon request – to brands under confidentiality agreement. This provides transparency to assess the risks by Canopy and Rainforest Alliance and to prove that Lenzing does not source from any critical source.

### Traceability

Lenzing supports traceability for these fibers from wood source through production to the final product. This is realized in TENCEL™ Lyocell fibers with REFIBRA™ technology and LENZING™ ECOVERO™ specialty viscose fibers. Value chain partners can identify these LENZING™ fibers in fabrics and yarns giving brands and retailers confidence on the cellulosic content in their garments. Furthermore, Lenzing has a fabric certification and licencing scheme to map the value chain in order to support brands and retailers.

### Lenzing shows leadership in key areas

*"Lenzing has recently updated its Wood and Pulp Policy to include a preference for FSC® certified fiber. The company is demonstrating leadership by promoting the protection of ancient forests and the need for sustainable sourcing in various platforms and forums. There are two additional areas where Lenzing is inspiring its peers, they were one of the first companies to complete the CanopyStyle audit and as noted above they are first to market with a product that contains recycled fabric in the product feedstock. Additionally, Lenzing has committed to engage Canopy as they look to expand their business operations to learn of issues and opportunities on potential trial and/or new raw material sources prior to entering contractual agreements. This has been highlighted during the audit process and Canopy is looking forward to this upfront exploration of sourcing options becoming a reality."* (Source: Hot Button Report, November 2017)

Lenzing maintains an ongoing dialog with Canopy and follows a clear roadmap which includes the following key steps:

- ✓ Showing leadership to encourage peers in the industry
- ✓ Continuing with Lenzing's implemented policy to avoid sourcing from ancient and endangered forests and other controversial sources
- ✓ Preferring FSC® certified pulp and wood
- ✓ Opening up books for CanopyStyle audits and Rainforest Alliance verifications
- ✓ Driving innovation and using alternative cellulose feedstock-based fibers (recycling, agricultural residues) – see chapter Sustainable Innovations and Products (page 70)
- ✓ Lenzing is working to ensure that its planned expansion and growth is consistent with the CanopyStyle initiative
- ✓ Creating conservation legacies and helping to mitigate climate change: In accordance with the defined Lenzing Group target of Forest Conservation, a first afforestation project combined with a contribution to forest sustainability education has been approved
- ✓ Developing and implementing verification and tracking systems

## Dissolving wood pulp in the Lenzing Group

Shaping of cellulose pulp into fibers requires a special quality of pulp, referred to as dissolving pulp, which has to meet different requirements to those for paper pulp. Among others, dissolving wood pulp must have a higher pure cellulose content of over 90 percent, lower impurity levels, be bleached to a higher level of brightness, and have a more uniform molecular weight distribution. Two main technologies are employed for dissolving pulp: the Prehydrolysis Kraft (PHK) process – and the Sulfite process (for further information regarding pulp production processes, see chapter 4 – Biorefinery).

The Lenzing Group produces more than half the pulp it requires at its sites in Lenzing (Upper Austria) and Paskov (Czech Republic). Sufficient quantities of wood are purchased for this purpose. In addition to its own pulp production, Lenzing procures pulp on the global market, mostly within the framework of long-term supply contracts.

One of the core objectives of the sCore TEN strategy is to increase the Group's own pulp production volumes. Lenzing is investing in debottlenecking its pulp facilities as a first step to increase its pulp backward integration to around 75 percent of its pulp needs.

### Info box 3/1

The CanopyStyle Initiative is led by environmental not-for-profit Canopy which, to date, has supported over 125 brands, designers and retailers in the implementation of their policies. A small subgroup of brands, currently comprising H&M, M&S, Inditex/Zara, EILEEN FISHER and Stella McCartney, are known as "CanopyStyle Leaders for Forest Conservation," and provide vision, strategic insights, inspiration and active leadership to the initiative.

<sup>20</sup>) Canopy 2017. <http://canopyplanet.org/canopy-media/updated-hot-button-issue-for-2017/>

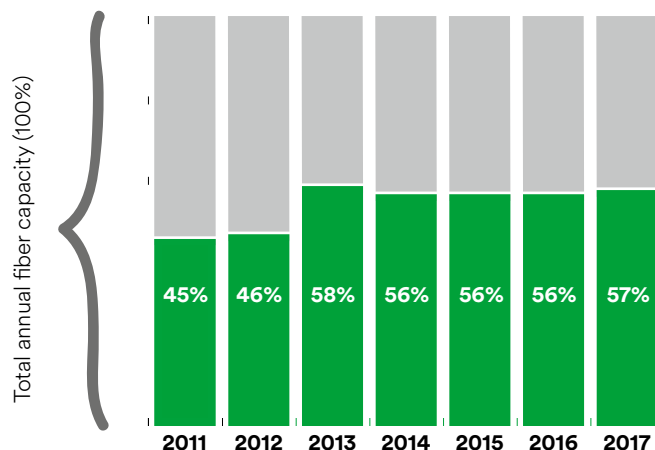


## Own pulp production as percentage of annual fiber capacity

Basis: Pulp produced by Lenzing Group

figure 3/5

- > 50% secured by own pulp production
- Remaining pulp is secured through long-term contracts



Lenzing attaches great importance to maintaining and establishing long-term, transparent business partnerships with its wood and pulp suppliers. Lenzing strives to do business personally and directly with forest owners and pulp producers.

The Lenzing Group's strategic objective is to increase its own pulp capacities to supply 75 percent of its requirements from the current level of 57 percent (figure 3/5).

The raw material supply of Lenzing's non-integrated fiber sites is additionally secured through long-term supply contracts and procurement on the market. A dedicated subsidiary of the Lenzing Group, Pulp Trading G.m.b.H., manages purchasing of the pulp for the entire group, ensuring transparency and consistency with the relevant policies.

The recently introduced EcoVadis<sup>21</sup> system which independently evaluates suppliers is also applied to Lenzing's external pulp sources.

The market for dissolving pulp only consists of a limited number of producers and Lenzing only purchases from a very small number of these, with whom it has long-standing relationships. Most importantly, cooperation with some of these suppliers has been ongoing for decades.

The main market pulp production regions for the global market are Europe, North America, South America, China and South Africa. For further information regarding the Lenzing Group's current own production and market pulp supply, see table 3/1. Lenzing's market pulp is mainly produced from eucalyptus, but also acacia, aspen, birch, maple, and southern pine.

Precise figures for the absolute amount of wood purchased and market pulp sourced cannot be provided for confidentiality reasons. As an indicative estimate, total fiber sales of nearly 1 million tons relate to a pulp input of about the same amount. The amount

of wood required to produce this pulp cannot be stated exactly, especially with different processes and sources applied by our suppliers. Assuming an estimated pulp yield from wood of 40 percent (see figure 4/2, page 55), a rough estimate for the total wood input is about 2.5 million tons (dry matter) for both Lenzing's own production and purchased pulp. [301-1]

### Info box 3/2

#### The Land Use Change Guidance: Accounting for Greenhouse gas emissions in the supply chain

"...is a pre-competitive consortium, convened by Quantis, of contributors from over 40 private companies, governments and NGOs with the goal of developing a scientifically accurate reference to support companies in accounting for climate change impacts of their efforts on sustainable forests and agriculture."

Lenzing Group contributes to this project by feedback on drafts, content contributions through Wood K plus and a financial contribution. The project has entered a pilot phase during which some participants test the draft guidance.

21) EcoVadis supplier assessment; see section "Chemical sourcing"



## Wood and pulp supply in the Lenzing Group table 3/1

pulp supply, from own production and market pulp (2015-2017)

Wood sourcing region	Central Europe	Europe	South Africa	North America
Wood sourcing countries	See figures 3/8 and 3/9	Mainly Scandinavia and Baltic states, Russia	South Africa	USA
Forest type according to FAO(**)	Semi-natural forest	Semi-natural forest	Plantation	Semi-natural forest
Wood species (most important)	Beech, spruce	Birch, aspen, beech	Eucalyptus sp., Acacia sp.	Southern pine, maple, aspen
Forest certificates	PEFC™, FSC®	PEFC™, FSC®	FSC®	FSC®, PEFC™, SFI
Verification audit	Rainforest Alliance(*)			
Wood procurement by	Lenzing Group pulp mills (Paskov and Lenzing)	Pulp Suppliers(*)		
Pulp produced by	Lenzing Group pulp mills (Paskov and Lenzing)	Pulp Suppliers		
Pulping process	Sulfite	Sulfite/Kraft		
Bleaching process	Totally chlorine free (TCF)	Elemental chlorine free (ECF)		

(\*) Rainforest Alliance audit reports: <http://www.lenzing.com/en/responsibility/ecological-responsibility/wood-and-pulp/responsible-sourcing/rainforest-alliance-audit.html>

(\*\*) FAO 2003 (Carle and Holmgren 2003)

## Wood and pulp certification in the Lenzing Group

Lenzing's wood procurement management system ensures that all wood is sourced from demonstrably legal and sustainably managed sources. In order to demonstrate that wood sourcing complies with Lenzing's high standards, the company relies on FSC® and PEFC™ certification systems for verification purposes. More than 99 percent of wood and pulp used by the Lenzing Group is either certified by FSC® and PEFC™ or inspected in line with these standards. Additional verification within the framework of the CanopyStyle Initiative by Rainforest Alliance was started in 2016 and finalized in 2017, and the Lenzing Group was the first cellulose fiber producer to successfully complete this verification.

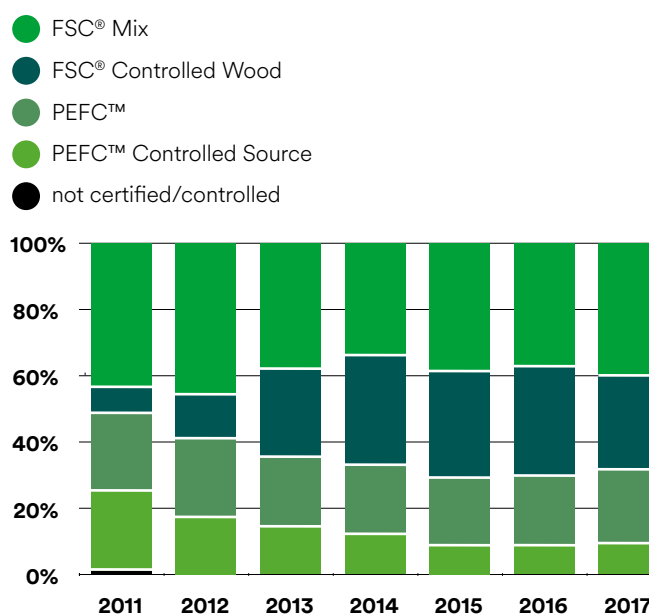
The certification status of all wood input into Lenzing's production – direct through own procurement for the owned pulp mills, and indirect through market pulp suppliers – is shown in figure 3/6. The relative increase in the FSC® Controlled Wood category is due to the increase in internal pulp volume from the Biocel Paskov mill. For wood sourced from Central Europe, PEFC™ is used based on strict and strictly enforced national forestry laws, whereas FSC® certification of forests is not widespread in this region. Lenzing site has the onsite certification of PEFC™ as the main certificate for more than a decade. This is now complimented with an FSC® CoC (chain of custody) certificate. As supply is still in its beginnings, the majority remains for the time being FSC® controlled Wood and PEFC™ certified material. Note that fiber production of the Lenzing Group increased by 30 percent between 2011 and 2017.

### Certification status of total wood and pulp used by Lenzing production sites,

own and purchased pulp (2011-2016)

Basis: Pulp volumes used by Lenzing for fiber production  
Non-certified pulp was used for R&D purposes.

figure 3/6 [308-1]



Please refer to page 44, table 3/2 for explanations of certifications.



## Certification status of wood table 3/2

explanations for above figure 3/6

Certification status	Description
FSC® Mix	Certified material which is mixed with FSC® controlled wood material according to the credit or percentage system (see also <a href="http://www.FSC.org">www.FSC.org</a> for details). Lenzing Group uses the credit system.
FSC® Controlled Wood	Controlled wood sources are sources that meet the minimum requirements accepted by FSC®. These include implemented due diligence systems comprising risk assessments and on-site audits based on the FSC® standard.
PEFC™	PEFC™ certified
PEFC™ Controlled Source	Controlled wood sources are sources that meet the minimum requirements accepted by PEFC™. These include implemented due diligence systems comprising risk assessments and on-site audits based on the PEFC™ standard.

The Lenzing Group has been verifiably committed to the certification of its raw material sources for more than 20 years. Lenzing's first wood procurement policy dates back to 1995. Lenzing was a founding member of PEFC™ Austria. The company boasted FSC® Group certification as long ago as 2010. As of 2016, all Lenzing Group sites are certified in accordance with the FSC® Chain of Custody standard. For the highlights of these achievements, see the 2016 Sustainability Report, figure 3/11 on page 39.

In 2017, the Lenzing Group

- Was the first cellulose fiber producer to pass the verification audit of the Canopy-Style initiative by Rainforest Alliance
- Received green shirt ranking in Canopy's Hot Button Report 2017
- Joined the Forest Stewardship Council® (FSC®) as a member, contributed to the the 2017 General Assembly, and is in touch with the initiative "Fashion and FSC®- from forest to consumer"

## Certification status of Lenzing operations – Chain of Custody table 3/3

Site	Country	Main Products	FSC® CoC Certification	PEFC™ CoC Certification
Lenzing	Austria	Viscose, modal, lyocell fibers	✓	✓
Paskov	Czech Republic	Dissolving wood pulp	✓	✓
Purwakarta	Indonesia	Viscose fibers	✓	not applicable
Nanjing	China	Viscose fibers	✓	not applicable
Heiligenkreuz	Austria	Lyocell fibers	✓	not applicable
Grimsby	United Kingdom	Lyocell fibers	✓	not applicable
Mobile	USA	Lyocell fibers	✓	not applicable

As the Lenzing Group is a company driven by innovation, the further development and expansion of its raw material base is an important part of ongoing activities. This includes the raw material wood as well as development and investigation of alternative, non-wood based, cellulose sources. Within the scope of these activities, Lenzing reserves the right to use and investigate small amounts of raw material that are submitted to a due diligence procedure largely following FSC® guidelines, although it may not yet be fully certified. This proportion of pulp is described as "non-certified" in the "Certification status" figure 3/6.

In Central Europe, the Lenzing Group needs to procure wood other than that certified to FSC® or PEFC™. This proportion of wood is shown in the "Certification status" figure as "PEFC™ controlled source". Since forestry operations in Central Europe are generally small scale, some small forest owners harvesting wood as an

additional income do not participate in a certification process. However, experience shows that their ownership of the forest is for the long-term with a very cautious harvesting behavior. In addition, strict forest laws and enforcement in Central Europe make sure that forest owners have to follow sustainable management, and Lenzing's wood and pulp policy is part of all contracts. In very rare exceptional cases, suppliers who do not comply to these rules are delisted. Consequently, Lenzing also purchases reliable but limited quantities of wood from owners of small forests.



## Sustainability aspects of wood sourcing

Lenzing's main sourcing areas for wood – directly for its own pulp mills, and indirectly through pulp suppliers – are Europe, especially Central Europe, and South Africa, covering together the majority of the wood sourced. Therefore, in the following considerations, regionally specific information on sustainability aspects is provided for these model regions.

### Maintenance and enhancement of forest resources

This aspect is the classical way of looking at forest resources, using the indicators of forest area, growing stock and age structure/size of tree. More recently, surveying approaches based on satellite data have been added to the methods of assessment.

### Climate protection

Forestry is an important area of action for climate protection. Every tree absorbs carbon dioxide from the atmosphere, converts it into organic polymers and stores it for the long term in living trees, and forest soil. Accordingly, not only forests, but also forest-derived products, such as buildings and furniture made of wood, as well as textile products in extended use, are important carbon reservoirs that make a significant contribution to reducing the CO<sub>2</sub> content in the atmosphere<sup>22</sup>. Several studies in Central Europe concluded that managed (semi-natural) forests have a greater positive impact on climate protection than natural forests without wood utilization<sup>23, 24</sup>.

The main contribution here, apart from carbon storage, is the better carbon balance of wood-based materials and energy compared to other natural sources, such as crude oil or coal for the same products and services<sup>25</sup>.

### Water resources

The impact of forests and wood on water resources is a frequently asked question. Water is a precious resource and its scarcity in many parts of the world is a threat. Lenzing only uses wood derived from sustainably managed semi-natural forests or plantations for its fiber production. Natural and semi-natural forests either have no negative impact or only a minimal negative impact on the natural water supply. They are part of the natural hydrological cycle and, as such, do not consume water<sup>26</sup>. On the contrary, forests stabilize streamflow, thereby providing protection from floods and assuring water supplies in times of low rainfall. Forested catchments supply 75 percent of the used freshwater, and the more a catchment is forested, the lower the cost of water treatment<sup>27</sup>.

Regarding the wood from eucalyptus plantations, Lenzing recognizes that there is concern about the ground water use of eucalyptus plantations. Eucalyptus trees utilize water for building up biomass much more efficiently than other cultivated plants<sup>28</sup>. The plantations need no artificial irrigation, except for the nurseries<sup>29</sup>.

In South Africa, numerous studies addressing the water use of plantations are well documented, and further afforestation is limited by legislative restrictions<sup>30</sup>. Plantations in South Africa are

only operated in regions with sufficient natural moisture to enable growth of the plants.

### Biodiversity in forests and plantations

Plantations reduce the deforestation pressure on natural (primary) forest areas by providing wood as an alternative to sourcing it from natural forests. Plantations with FSC® certification must fulfil management criteria to protect biodiversity, as documented, e.g., in the Plantations Review process<sup>31</sup>. The management practices include a certain percentage of set-aside conservation areas. In South Africa, some 80 percent of the land reserved for plantation forestry is certified to the standards of the FSC®. Approximately 25 percent of this land is not planted with trees, but conserved for biodiversity<sup>32</sup>. Two natural ecosystems are in focus: grasslands and wet lands. Both are included in conservation and regeneration programs run by plantation growers on their owned and/or managed land<sup>33, 34</sup>. **[304-2]**

For semi-natural forests in Central Europe, forestry laws have long since prioritized biodiversity protection in forest management, in order to balance the demand for wood sourcing with nature conservation. The study by Paillet et al.<sup>35</sup>, a comprehensive review of 49 papers (meta-analysis) on species richness comparing the differences between managed and unmanaged forests in Europe is probably the main authority on this issue. The main conclusion is “a small, marginally significant effect of forest management on total species richness. Species richness tended to be higher in unmanaged than in managed forests (+6.8 percent), but the response varied widely among taxonomic groups”. (page 108)

Potential conflicts between forest management and nature protection have been studied in some regions in a very long-term view, comparing managed forests and areas set aside for conservation without wood utilization<sup>36</sup>. In the region of Thuringia in Germany, the formal records on species richness go back 250 years. There, the biodiversity in managed forests was shown to be higher than in unmanaged forests. For endangered species with special habitat requirements, protection measures other than non-management are required.

Another example study describes the beneficial impacts of sustainable forest management on biodiversity in Northern Germany<sup>37</sup>. The report documents the high biodiversity in managed forests, and shows that the national strategy in Germany (established in 2007) for a multi-functional forestry and towards more natural forest ecosystems has already led to improvements.

22) WBCSD 2010; FAO 2016 p. xvii

23) Taverna et al., 2007

24) Braun et al., 2016

25) FAO 2016, xvii and 123

26) Sutterlüty et al., 2016

27) WBCSD forest solutions, 2014

28) Davidson, 1993

29) Sappi, 2016

30) Albaugh et al., 2013

31) <https://ic.fsc.org/en/certification/processes-and-reviews/archived-processes/plantations-review>

32) PAMSA 2016 (<http://www.thepaperstory.co.za/celebrating-trees-wood-and-water-this-arbor-week-4-10-september/>)

33) PAMSA 2016 (<http://www.thepaperstory.co.za/celebrating-trees-wood-and-water-this-arbor-week-4-10-september/>)

34) Sappi 2017 (<https://cdn-s3.sappi.com/s3fs-public/Sappi-FAQs-Forests-and-wetlands.pdf>)

35) Paillet et al. 2010

36) Schulze and Ammer, 2015

37) Ministries of Agriculture of Brandenburg and Mecklenburg-Vorpommern, 2010



Ecosystem services

To describe the links between the natural environment, e.g., forests, economic activities, and society, the concept of ecosystem services<sup>38</sup> is increasingly being used. Multi-stakeholder initiatives, such as the Natural Capital Coalition, industries such as the Kering Group in their Environmental Profit and Loss Accounting, and governments<sup>39</sup> promote the concept as a holistic view of the dependencies. Info box 3/3 provides an overview of the functions of forest ecosystems associated with the provisioning of wood.

Sustainability indicators for forests and plantations used in wood production beyond the classical measures based on volumes and forest area, as described above, are an increasingly significant issue in the discussion concerning sustainable fibers. Consequently, Lenzing supports a scientific study conducted by the Wood K plus Competence Center (see Info box 3/4 page 48).

Societal aspects, especially human rights

Lenzing’s Wood and Pulp Policy<sup>40</sup> refers to societal aspects, especially human rights, in wood sourcing covered by the wood certification systems used by Lenzing, FSC® and PEFC™. They ensure that traditional, community, and civil rights are observed, and that labour conditions comply at least with ILO Core Conventions as defined in the ILO Declaration on Fundamental Principles and Rights at Work.

Lenzing’s Policy on Human Rights and Labour Standards<sup>41</sup> has the commitment to hold suppliers to the same high standards that are observed internally. [103-2]

Sustainable basis for wood sourcing in Europe

Following centuries of forest overexploitation in Europe, the silvicultural principle of sustainability was developed 300 years ago by German foresters to ensure an adequate supply of wood<sup>42</sup>. This means trees are only felled at the rate at which they can grow back. At present, European forests are growing steadily in size. Strict forest laws are enforced in Central Europe, safeguarding the sustainability aspects. Note that these laws obviously apply to all forest owners in a country, unlike voluntary certification schemes which cover only the participants.

To promote sustainable forest management in Europe, the Forest Europe political process was initiated in 1990 by the Ministerial Conference on the Protection of Forests in Europe, which includes 46 states. A set of indicators grouped in six different criteria was derived to measure the sustainability performance of European forests, and to set targets for improvement<sup>43</sup>. The latest update on the state of Europe’s Forest was published in 2015<sup>44</sup>.

A study conducted by the University of Natural Resources and Life Sciences in Vienna (BOKU) documents the development of quantitative indicators for the years 1990 to 2015, based on FAO forest statistics<sup>45</sup>. Approximately 42 percent of the land area of the EU-28 consists of forested land. The comparable figure for Austria is about 48 percent<sup>46</sup>. Forest areas in Austria alone grew in size by more than 80.000 hectares during this period.<sup>47</sup> Forested areas in the main countries from which Lenzing sources wood for its own pulp mills increased in size by 5.1 percent and growing stock increased by 33 percent. Timber harvesting in these countries accounts for approx. 65-70 percent of the annual net growth (net annual increment, NAI), which equals two-thirds of the sustainably available potential.

Functions of forest ecosystems info box 3/3

Ecosystem services	
Supporting Nutrient recycling (CO <sub>2</sub> , oxygen, nitrogen, etc.) Soil formation Primary production	Provisioning Wood · Fresh Water · Food · Air cleaning · Hunting
	Regulating Climate regulation · Streamflow regulation and flood protection · Soil erosion protection · Avalanche and mudflow protection · Stone guard · Noise protection · Wind protection
	Cultural Aesthetic · Spiritual · Educational · Recreational (traditional hiking, mountain biking, cross country skiing, mushroom picking, berry collecting, relaxation and stress relief, etc.)
Biodiversity Habitat for wildlife, insects and plants	

38) World Resources Institute, 2005

39) Forest Europe 2016b, Work program

40) <http://www.lenzing.com/en/responsibility/ecological-responsibility/wood-and-pulp-policy.html>

41) [http://www.lenzing.com/fileadmin/template/pdf/konzern/nachhaltigkeit/Lenzing\\_human\\_rights\\_policy.pdf](http://www.lenzing.com/fileadmin/template/pdf/konzern/nachhaltigkeit/Lenzing_human_rights_policy.pdf)

42) Von Carlowitz, 1713

43) [http://foresteurope.org/wp-content/uploads/2016/11/III.-ELM\\_7MC\\_2\\_2015\\_MinisterialDeclaration\\_adopted-2.pdf](http://foresteurope.org/wp-content/uploads/2016/11/III.-ELM_7MC_2_2015_MinisterialDeclaration_adopted-2.pdf)

44) Forest Europe, 2016a: State of Europe’s Forests 2015

45) Schwarzbauer & Wittmann 2016

46) Forest Europe 2016 a. State of Europe’s Forest 2015

47) Schwarzbauer & Wittmann 2016

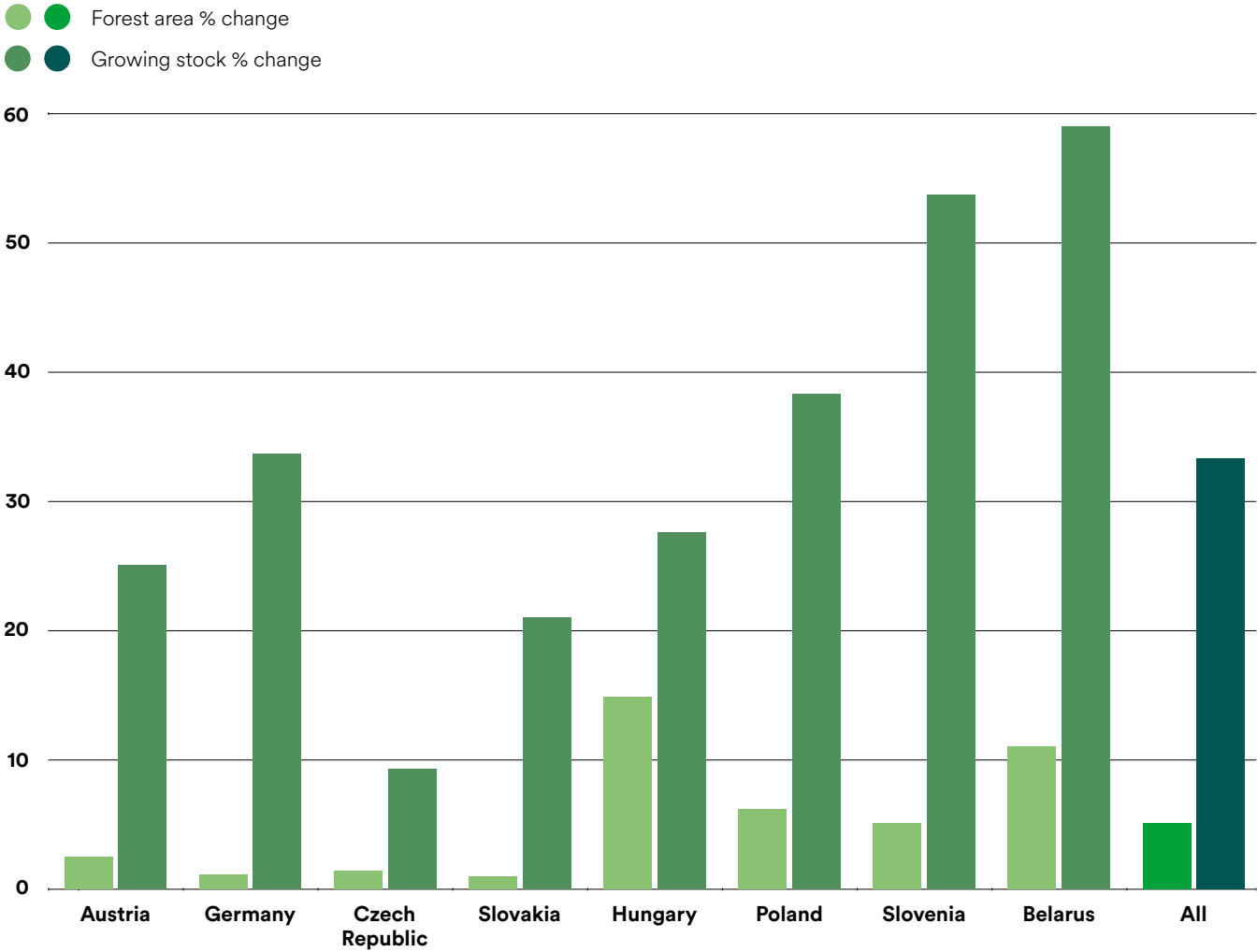


European forests play a key role in the stability of ecosystems. In addition to protecting soil from erosion, forests regulate the local climate and water supply, and sustain biodiversity. Moreover, they provide a service for society as recreational areas and a basis for tourism in many regions. All these functions can be provided in parallel to controlled wood extraction.

**Wood sourcing countries for the Lenzing Group’s own pulp production\***

Development of forest sustainability indicators, 1990-2015. „All“ is a weighted average of the country data.

**figure 3/7**



\* Source: Schwarzbauer & Wittmann 2016, based on FAO statistics “Growing stock-Poland”: 2000-2015. “Growing stock-All” without Poland – no data for 1990



#### Info box 3/4

##### Competence Center “Wood K plus”

Many Austrian companies and scientific bodies that are active in the forest and wood sector have bundled their strengths in the Kompetenzzentrum Holz. It is a leading research institute in the area wood and wood-related renewable resources in Europe. Its core competences are materials research and process technology along the entire value chain – from raw materials to finished products. It develops methods and basic principles and performs applied research on the economy-science interface.

##### Strategic dissertation “Sustainability in Wood Sourcing”

The project supported by Lenzing aims to achieve an in-depth understanding of the dimensions of sustainability (ecology, economy, society) of global sourcing of wood and the related perceptions in society. Sustainable forest management as a concept has been contested in the debate on environmental governance.

Scientific literature, sustainability reports of companies, and publications of NGOs are analyzed systematically in terms of content and by the method of discourse analysis. As an intermediate result it can be seen that depending on the interests of the stakeholders, different criteria, methods and standards, definitions and assessment of sustainability are applied.

In scientific publications, marked differences in the research focus between industrial countries and developing countries are observed. Studies conducted in the developed countries predominantly focus on the environmental issues (e.g., forest health, climate change, etc.) while the studies conducted in the developing countries or “Global South” have a stronger emphasis on the socio-economic issues, like the role of forest management for poverty alleviation. In a globalized forest-based sector it is, therefore, challenging to meet the stakeholders’ sustainability demands because the requirements are unique to local socio-economic structures.

In the developed industrial countries of the Northern hemisphere, concepts of bio-economy are growing fast, and issues around the energetic use of wood are in focus. This evokes new challenges for the sustainability assessment of the supply chain in the global forest-wood sector in a holistic view. Aspects of sustainability assessment where approaches and methods that are still a matter of debate have been identified. Land use and land use change, climate change (e.g., the correct credits for carbon sequestration), water stewardship, and biodiversity are aspects where scientific

debate and political debate regarding the basis for regulatory decisions are ongoing.

The goal of the project is to gain a more comprehensive understanding of the broad spectrum of interests from the various stakeholder groups involved in to sustainable wood sourcing. This can, in the long run, help to form a basis for more harmonized assessment criteria in the sustainability of wood sourcing.

## Responsible wood sourcing for the Lenzing Group pulp mills

The wood processed in Lenzing (Austria) and Paskov (Czech Republic) is procured by a team of experts who are educated and well-trained foresters, and have reliable long-term relationships with their suppliers. Currently, about 700 suppliers deliver wood to Lenzing sites. As well as a large number of private owners, important sources include the state forests of Austria, Germany, Czech Republic, and Slovakia, which have strong political commitments to sustainable management of their forests, and supply about 40 percent of the wood to the Lenzing Group. Sustainability criteria have long since been crucial for the selection of suppliers, and are formalized in each purchasing contract. Lenzing’s sourcing policy has been agreed upon by all suppliers in personal communication. Regular formal audits are conducted, but even more important is the ongoing, day-to-day informal, personal contact between Lenzing’s procurement team and suppliers. In case of severe findings regarding sustainability aspects, a contract with a supplier can be terminated. This has been necessary in some cases where the issues were not remedied.

In order to ensure short transport distances and short delivery times, almost all the wood required originates either from the country where the pulp is produced or neighboring countries wherever possible. The proportion of regional wood supply is 98 percent for the Lenzing site and 92 percent for the Paskov site for 2015-2017. Strict European forest regulations and reliable enforcement of these regulations and laws also guarantee the sustainability of Lenzing’s supply partners. [204-1]

The Lenzing site uses mainly beech wood plus small amounts of other hardwoods, and spruce, whereas the Paskov plant utilizes spruce wood. Lenzing primarily makes use of timber generated by thinning, which is unsuitable for high-grade products, for example in the furniture industry.

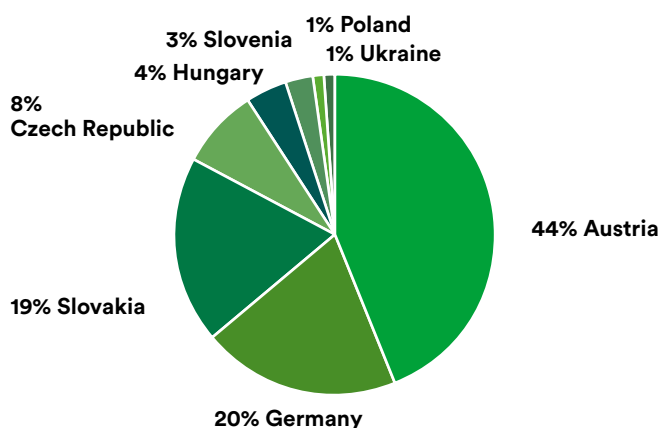
In wood-sourcing countries, the percentage of broadleaf forest, especially beech, is increasing<sup>48</sup>, as forests are being returned to a more natural mix. The area devoted to spruce cultivation is decreasing, although growing stocks are still increasing in many countries due to low felling rates. Utilization of beech wood to manufacture fibers provides relatively high value creation as compared to energy use, so it is an important 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<sup>49</sup>.

48) Schwarzbauer & Wittmann, 2016

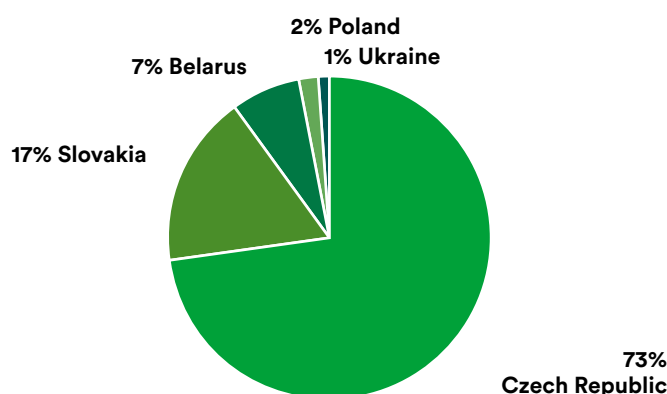
49) Niederemair et al., 2007



**Wood sourcing for Lenzing site pulp mill**  
 beech and spruce, by country, average 2015-2017  
 figure 3/8



**Wood sourcing for Paskov site pulp mill**  
 spruce roundwood and chips, by country, average 2015-2017  
 figure 3/9



## Alternative cellulose sources in the Lenzing Group

All plants contain cellulose. Therefore in principle, any plant-derived material can serve as a source for cellulose and also for dissolving pulp for fiber making.

Lenzing is constantly observing the development of potentially new, alternative cellulose sources and has undertaken extensive research into many different alternative, non-wood cellulose sources. Studies have been conducted on sources such as annual plants, by-products such as straw, and bamboo. Experience from the paper industry with these sources is of limited use, as the requirements for quality and purity of dissolving pulp is very different.

Compared to these alternatives, the large-scale production of cellulose in a sustainable and renewable way is best sourced from wood. 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. The environmental profile of growing bamboo on a large scale appears not generally to be satisfactory. Annual plants contain mineral components that have to be removed to produce high quality dissolving pulp. Typically this purification requires the use of aggressive chemicals, and causes waste issues. On the other hand, in woody plants like trees, these mineral components are concentrated in the bark, which is easily removed in the first stage of the process. Many sources from annual plants are only available in the harvesting season and difficult to store for year-round supply. Cotton linters, as used in the viscose industry in some regions, also requires a pulping process using substantial amounts of chemicals, and energy to make dissolving pulp. As most cotton linters pulp facilities are not up to state of the art, resource use and emissions as well as waste can be high for cotton linters pulp. So, viewed comprehensively, the best way to source high quality cellulose today is from sustainably managed forests.

One important exception is the use of recycled cellulose from cotton textile waste, which is processed into TENCEL™ branded Lyocell fibers with REFIBRA™ technology. See chapter 5, page 73 for this product.



## Criteria and highlights in the report “Austria’s forests 2017” table 3/4

Criterion	No. of Indicators	No. of Targets	Highlights
1: Contribution to climate protection	4	4	Large stocks of wood Forests are most important carbon sinks
2: Health and vitality	5	14	Forest damage is a continuous challenge
3: Productivity and economic aspects	9	14	Wood increment exceeds consumption
4: Biodiversity	14	32	Diversity of tree species improving. Share of deadwood nearly doubled since 1990s High share of protected forests: 21.5% of forest area under nature conservation law
5: Protective functions	5	5	The protective effect of forests safeguards human habitats – soil, water, infrastructure
6: Social and economic	21	45	The use of wood promotes climate protection and green economy Exports from value-added chain of forest products is one of the most important items of Austria’s foreign trade
7: Austria’s international responsibility for sustainable forest management	6	7	Austria takes big efforts to promote sustainable forestry on the international level

### Info box 3/5

#### Austria’s Forests 2017

In Austria, as a response to the work of Forest Europe to define criteria for sustainable forest management and setting targets for improvement, the Austrian Forest Dialog (Walddialog) compiled the report Austria’s Forests 2017. The Austrian Forest Dialog is a policy development process involving 85 organizations, including forest owners, government and non-government organizations, as well as industry associations. Lenzing supports this activity through its membership in the industry association “Forst Holz Papier”. The criteria and indicators were developed for Austria on the basis of the Pan-European Criteria and Indicators for Sustainable Forest Management (SFM) in order to monitor the progress in sustainable forest management ([www.foresteurope.org](http://www.foresteurope.org)). The Criteria describe various aspects of sustainable forest management and contain sets of indicators. For the indicators, targets are set and monitored.

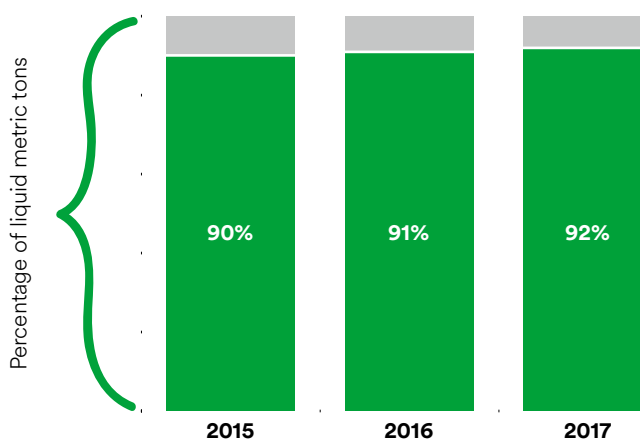
## Chemical sourcing

In general, the chemicals used can be divided into two main categories: bulk chemicals, which are mainly sourced regionally, and „special“ or rare chemicals that are sourced globally. The most important chemicals used – amounting to approx. 85 percent of the overall purchase volume – are: caustic soda (NaOH), carbon disulfide (CS<sub>2</sub>), sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), sulfur (S), sulfur dioxide (SO<sub>2</sub>), softening agents, flame retardants, modifiers, N-methylmorpholine N-oxide (NMMO), titanium dioxide (TiO<sub>2</sub>), zinc sulfate (ZnSO<sub>4</sub>). Figures for chemical sourcing cannot be provided for confidentiality reasons. Around 90 percent of the chemicals are sourced regionally on group level. Regionally means from the same country or from neighboring countries. [204-1]

### Regionality of purchased chemicals

figure 3/10 [204-1]

● Volume of regionally\* purchased chemicals



\* regionally: home country + neighbouring countries



## Chemical suppliers

All of the Lenzing Group's suppliers must comply with the Lenzing Supplier Code of Conduct. This code was implemented in 2012 and has applied to every order since, so 100 percent of suppliers are covered. A new Supplier Code of Conduct was developed in 2016 and implementation was ongoing throughout 2017. It will apply to all suppliers when their contracts are renewed in future. 80 percent of all purchased chemicals are sourced from fewer than 30 suppliers. The relationship with these suppliers is characterized by high stability.

All suppliers are evaluated with regard to sustainability in the production chain. In addition to regular audits, Lenzing conducts specific evaluations of both new and established suppliers with regard to sustainability and compliance with environmental and safety standards. With the support of external experts, suppliers are interviewed on a regular basis and evaluated with regard to environmental and safety aspects. Subsequently, a final assessment is conducted, which influences the overall supplier assessment and constitutes a major criterion for sustainable cooperation with suppliers.

In 2016, the Lenzing Group began implementing the EcoVadis supplier evaluation tool. This will be the main tool for supplier evaluation as regards sustainability performance and will improve transparency for all supplier assessments. Furthermore, new criteria for assessing the environmental and sustainability parameters of suppliers were introduced in 2017.

In past supplier assessments, no violations of environmental, social, or ethical standards have been found that could have led to cancellation of existing supplier contracts. **[308-1]**

## Caustic soda purchasing

Different processes exist for producing caustic soda (NaOH) – membrane, diaphragm, and mercury technology. According to EU guidelines, production facilities in the EU employing mercury technology must be closed by the end of 2017. In anticipation of the upcoming regulation, Lenzing has in the recent years already been purchasing its caustic soda requirements in Europe almost exclusively from facilities employing membrane technology, due to strategic and sustainability considerations. The sites in Asia have already phased out caustic soda from mercury technology completely. From mid 2018 on, all Lenzing Group sites will receive caustic soda exclusively from mercury-free technology.

# Logistics in the supply chain

Lenzing Group is working to improve the sustainability aspects and impacts of logistics by the continuous improvement approach, and by exploring innovative concepts which can lead to major steps for lower impact in the future.

In 2017, the switch from North route to deep South route (Piraeus) for European exports was implemented, and is expected to contribute CO<sub>2</sub> emission reduction by 1,200 tons per year for Lenzing site alone which is due to reduced ocean distance by 3,000 nautical miles (+1,100 km by rail distance). **[308-2]**

The Lenzing Group continuously strives in its logistics to switch from road to rail for long-haul routes.

For the remaining road transport, the logistics team explored improvement potentials in several areas, such as for example extended collaborations to avoid empty run of fleets by triangulation, or the reduction of the number of truck trips by re-designing the logistics network of product flows, and by the use of higher volume trailers. The switch from diesel to to liquified natural gas (LNG) as a fuel where possible was also examined.

Regarding sea transport, using the services of liquified natural gas (LNG) vessels was looked into. Participating in a sustainability initiative called "Good shipping" was considered. The main focus of this initiative is to change the marine fuel mix to cleaner (bio-)fuels. The setup of a credit system for biofuels use is part of its activities.

The commitment to any of these initiatives will depend on the assessment of the impacts and tradeoffs, and evaluation with regard to upcoming overarching sustainability targets.



Efficient

production





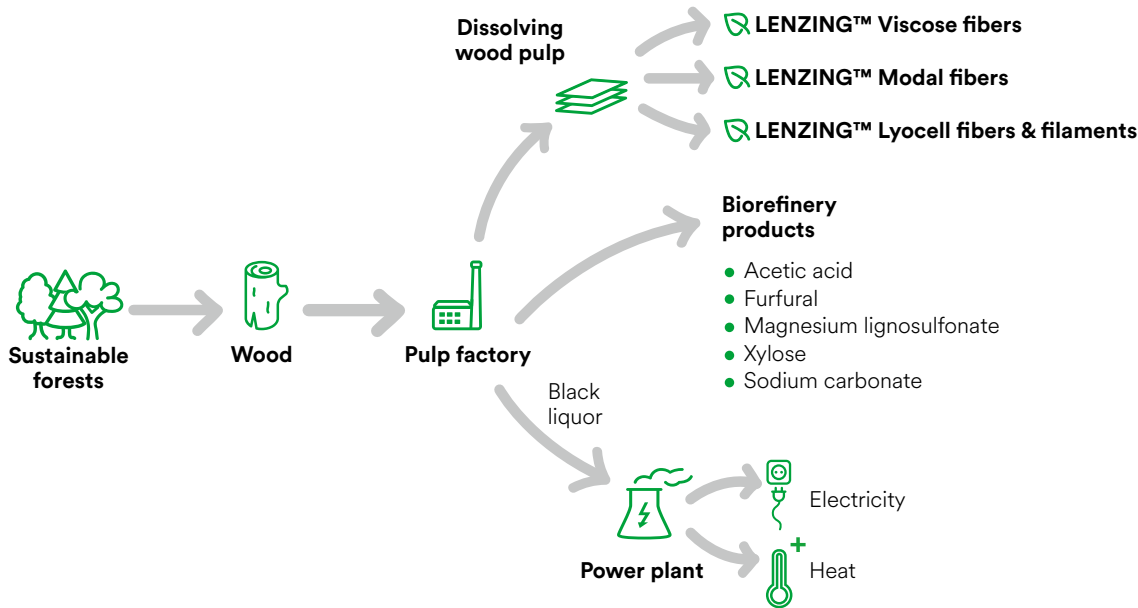


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# Biorefinery

The biorefinery concept  
figure 4/1



Dissolving wood pulp is the most important raw material used in producing Lenzing’s wood-based cellulose fibers. The Lenzing Group operates two pulp production plants at the Lenzing site (Austria) and in Paskov (Czech Republic). The biorefinery concept ensures that 100 percent of wood constituents are used to produce fibers, biobased chemicals, and bioenergy, thus maximizing value creation from an economic and environmental perspective.

The key principles of Lenzing’s biorefinery concept are cascading wood use and circular economy:

- Use wood and its constituents as substitutes for oil-based products (recarbonization)
- Use wood constituents multiple times along the value chain
- Produce biobased chemicals, such as acetic acid, furfural and xylose, to help increase the total material yield from wood as well as value creation
- Recover and reuse process chemicals – this is a key contributor to sustainable success and profitability
- Create useful products that are recyclable and therefore bind CO<sub>2</sub> as long as possible.

Lenzing has invested in the biorefinery concept for decades now, making it a forerunner in the production of biorefinery products at an industrial scale.

## Pulp

### Lenzing biorefinery plant

The facility in Lenzing (Austria) is the largest integrated dissolving wood pulp and wood-based cellulosic fiber production plant in the world. Integrated dissolving wood pulp and fiber production not only provides exceptional economic benefits, it also offers many ecological advantages and savings compared to non-integrated mills. For instance, there is no need for transportation because of the short distances involved, which itself eliminates the need for energy-intensive drying and packaging of pulp.

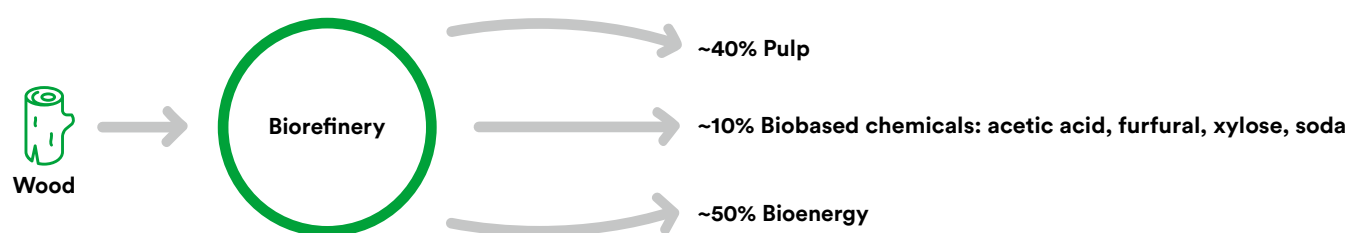
The Lenzing plant produces the pulp required for fiber production on site. Traditionally, the wood for the pulp made at the Lenzing site consists mainly of red beech. The logs are de-barked, chipped and treated in a cooking liquor of magnesium bisulfite. The cellulose – around 40 percent of the wood – is separated off as raw pulp in this process. This pulp is then washed and screened to remove the residual cooking liquor, knots, and most impurities. The raw pulp is then bleached in a totally chlorine-free (TCF) process and turned into pulp sheets or flakes. The other wood constituents remain within the thin liquor together with other cooking chemicals. Marketable biorefinery products such as acetic acid, furfural, and xylose are obtained in further processing steps. More than half of the wood is transformed into pulp and other biobased products. The cooking chemicals are recovered and recycled from the remaining liquor.

Pulp production at the Lenzing site is not only self-sufficient in terms of meeting its own energy needs; it actually produces surplus energy. This surplus energy (steam and electricity) is used on site, for instance for fiber production.



## Highly efficient use of the raw material wood at the Lenzing Group's biorefineries

figure 4/2



### Paskov biorefinery plant

The raw material base for the facility in Paskov (Czech Republic) is spruce wood in form of logs and chips. The magnesium bisulfite production process is similar to that at the Lenzing site (Austria). Wood chips are cooked in the acid and magnesium base to remove constituents such as lignin and hemicellulose, which dissolve into the liquor. The insoluble remainder is crude unbleached pulp. This pulp is then washed and screened. Further, deeper removal of lignin and hemicellulose is performed by means of alkali extraction and a TCF bleaching process. After final fine screening, the pulp is dried in sheets, baled, and dispatched.

During the conversion of this plant from paper pulp to dissolving wood pulp in 2013, additional measures to reduce emissions into the air and water were taken. The power supply concept also underwent major changes. Two state-of-the-art boilers for incinerating pulp leachate were built and burning of coal was stopped completely, with renewable energy resources – pulp leachate plus wood and bark residue – being used instead as fuel. Natural gas is no longer used in normal operations; only for starting up units and extraordinary situations. The Paskov site is completely self-sufficient in terms of heat and electricity generation. The company supplies surplus electricity to the public grid.

### Fact sheet pulp production in the Lenzing Group table 4/1 [301-1]

Site	Lenzing	Paskov
Capacity 2017 (tons per year of air dry pulp @ 10% moisture/90% dry matter)	300,000	275,000
Biorefinery products	Acetic acid, furfural, xylitol, magnesium lignosulfonate, soda (sodium carbonate)	Magnesium lignosulfonate, soda (sodium carbonate)
Use of energy surplus	In integrated fiber production at site	Electricity delivered to public grid
Main wood source	Beech	Spruce
Sustainability features	TCF bleaching, high share of bioenergy (97%)	TCF bleaching, high share of bioenergy (98%), coal-free
Production technology	Magnesium bisulfite	
Pulp cooking chemicals used	Magnesium oxide, sulfur dioxide, sodium hydroxide	
Bleaching chemicals used	Oxygen, ozone, hydrogen peroxide	

### Pulp bleaching

Bleaching is necessary to yield a dissolving pulp quality suitable for viscose, modal and lyocell fiber production. Most dissolving pulp producers use elemental chlorine free (ECF) pulp bleaching processes. Lenzing, however, was a pioneer in the industry with environmentally friendly pulp bleaching. Since 1992, the Lenzing pulp production plant in Austria has produced pulp without using any chemicals containing chlorine, but with oxygen-based substances instead. The technology at both plants satisfies the Best Available Technology standards of the European Union<sup>50</sup>.

The elimination of chlorine makes Lenzing pulp extremely environmentally compatible and sustainable while maintaining the high quality required for fiber production. Totally chlorine free (TCF) pulp is the basis for TCF fibers produced in Lenzing (Austria), something exceptional in the industry.

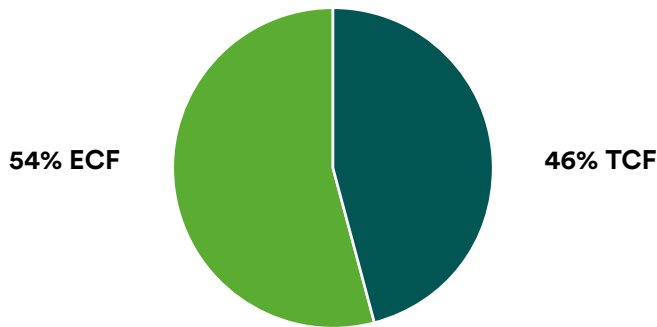
50) Suhr et al., 2015



### Lenzing Group: pulp sources according to bleaching

Basis is pulp used for fiber production, from own pulp production as well as purchased pulp.

figure 4/3



## Biobased chemicals and co-products

Lenzing markets the biorefinery products from pulp production and the co-products from its fiber production, thereby making a major contribution to optimum utilization of the natural resource wood. This underlines the corporate ambition to achieve ecological sustainability by careful resource management and extensive reductions in emissions.

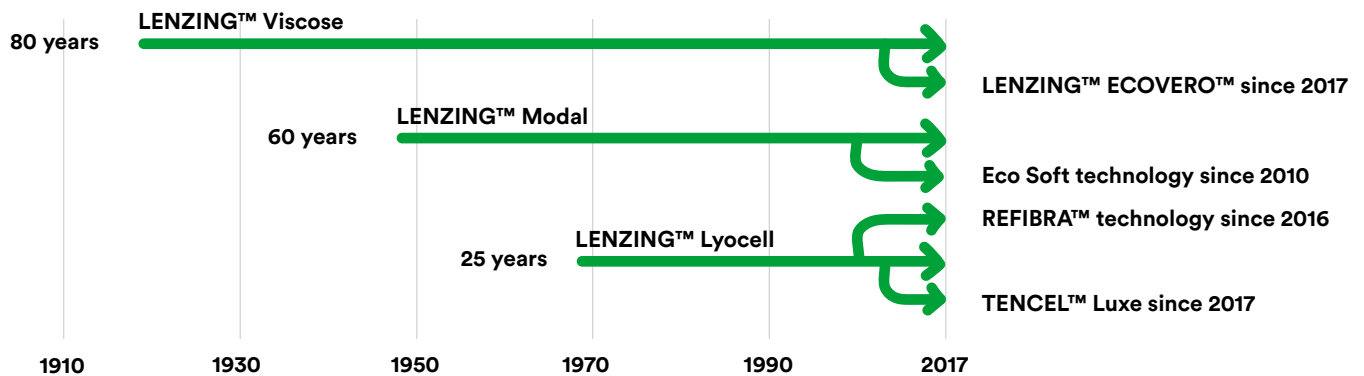
Biobased chemicals and co-products table 4/2

Product	Description	Users
Acetic acid	Acetic acid is a clear, colorless liquid with a pungent odor, produced as a biorefinery product of pulp production from beech wood. It is recovered in several process steps and turned into high-quality, food-grade acetic acid. The product is free from solids and of a high purity, making it suitable for human consumption.	<ul style="list-style-type: none"> <li>Food industry</li> <li>Pharmaceutical and cosmetics industry</li> <li>Chemical industry</li> <li>Solvents</li> <li>Textile industry</li> </ul>
Furfural	Furfural is a clear, yellowish liquid with a characteristic odor of almonds. Furfural is produced as a biorefinery product of pulp production from beech wood. It is released in a double distillation process. This guarantees the removal of contaminants and a product of highest purity.	<ul style="list-style-type: none"> <li>Primary product for furfuryl alcohol</li> <li>Solvent in the refining of lubrication oil</li> <li>Solvent for anthracene and resins</li> <li>Distillation of butadiene</li> <li>Herbicide production</li> </ul>
Magnesium lignosulfonate	Lignines constitute one of the most common natural substances. The release liquor generated during pulping in the acid magnesium bisulfite process is evaporated to attain a solid matter content of approximately 60 percent. Natural magnesium lignosulfonate, which readily dissolves in water, is brown in color and used amongst other things as a fixing and pelletizing auxiliary agent and as a dispersing and annealing agent in the concrete industry.	<ul style="list-style-type: none"> <li>Animal food industry</li> <li>Ceramics industry</li> <li>Production of fireproof bricks</li> <li>Tanning agent industry</li> <li>Chipboard and fiberboard industry</li> <li>Auxiliary materials for the construction industry</li> <li>Fertilizer industry</li> </ul>
Sodium carbonate (soda)	Soda is a white, free flowing, odorless granulate, which is used in many industrial applications.	<ul style="list-style-type: none"> <li>Glass industry</li> <li>Pulp and paper industry</li> </ul>
Xylose (wood sugar)	Extracted from pulp cooking liquor and processed into xylitol at the Danisco Austria GmbH facility on site. A naturally occurring sweetener with all the taste and sweetness but only half the calories of sugar, xylitol leaves no aftertaste and protects teeth from cavities.	<ul style="list-style-type: none"> <li>Sweetener in food and pharma industry</li> </ul>
Sodium sulfate	Sodium sulfate is produced as a co-product during viscose and modal fiber production. The white crystalline powder undergoes further processing.	<ul style="list-style-type: none"> <li>Detergent, cleaning-agent, and glass industry</li> </ul>



# Overview of fiber technologies

## Lenzing Group: Technological competence in fiber production [figure 4/4](#)



Lenzing's high-quality fibers are supplied to the textile and non-woven industry as well as for industrial applications.

### Lenzing Group: Technological competence in fiber production

Lenzing's quality and innovative strength contribute to shaping global standards for the wood-based fiber industry. With 80 years of experience in pulp and fiber production, the Lenzing Group combines three major fiber process technologies on a commercial scale:

- Viscose (rayon) process (staple fibers)
- Modal process (staple fibers)
- Lyocell process (staple fibers)

On the basis of the lyocell process, two new pioneering technologies have been developed within the last two years: the REFIBRA™ recycling technology, and the new Eco Filament technology for the production of TENCEL™ Luxe filament. With both technologies Lenzing underlines the company's shift to becoming a true specialty player in wood-based fibers. Lenzing intends to expand the filament capacity at its Austrian Lenzing site over the coming years and has started the basic engineering work. **[102-2]**

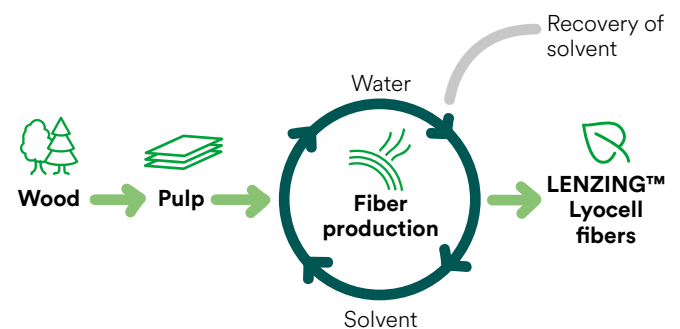
### Lyocell fiber

Lyocell fiber is the latest generation of wood-based cellulosic fiber. It has been produced at a commercial scale for 25 years. The generic fiber name is lyocell, the branded products from Lenzing are marketed as TENCEL™ and VEOCEL™ fibers.

The initial idea in developing the lyocell process was to derive cellulose fibers from pulp without relying on the chemically complex viscose process.

### LENZING™ Lyocell production process

[figure 4/5](#)



### A simple physical process

Similar to viscose fiber production, pulp derived from the renewable raw material wood is processed in producing LENZING™ Lyocell fibers.

In contrast to the traditional chemical viscose process, the lyocell process involves direct dissolution of cellulose pulp in the organic solvent NMMO<sup>51</sup>. No carbon sulfide is used. Much smaller quantities of caustic soda and sulfuric acid are required as compared to viscose production. This physical process also simplifies production. Only two cycles need to be closed. Recovery needs to be extremely effective in light of the high solvent costs. Lenzing has developed recovery rates surpassing 99 percent to make the process economically viable. Furthermore, the process water is recycled. These two closed loops result in very low emissions to the environment. The amount of waste generated during the production process is very low thanks both to closed loops and to lower consumption and higher utilization of chemicals and raw materials.

Lenzing also developed technological measures to minimize the process energy required in lyocell production. The second

51) NMMO – N-Methylmorpholine N-oxide is an aqueous, biodegradable, organic solvent



generation plant installed at the Lenzing site (Austria) includes new heat recovery systems to reduce energy consumption compared to the former plant design. In principle, due to the generally simple process requiring less effort to close the loops, the total energy use of a lyocell fiber production plant is lower than that of a viscose plant with equal capacity.

Similar to viscose and modal fibers, finishing agents are applied to the lyocell fibers at the end of the production process, to improve their running and gliding properties for further processing.

Use of lyocell fiber offers great advantages from an environmental perspective compared to other cellulosic fibers. Compared to the viscose process, the lyocell process is much less resource intensive and leads to a significant reduction in chemical use due to conversion of pulp into fiber in a closed-loop physical process.

### Lenzing's viscose and modal fiber production

Viscose fibers are produced in a chemical-technological process that involves multiple steps.

Pulp is steeped in a sodium hydroxide solution and converted to alkali cellulose. The addition of carbon disulfide causes cellulose xanthate to form. The xanthate is dissolved in diluted sodium hydroxide solution, filtered, deaerated, ripened and metered through spinnerets into a regenerating bath. Thereafter, the fibers are stretched, cut, desulfurized, and bleached with a sodium hypochlorite or hydrogen peroxide solution.

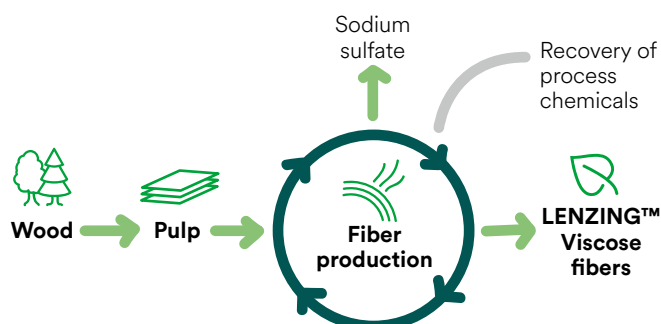
The fibers are repeatedly washed between the individual subsequent treatment steps. After the last wash, finishing agents are applied to ensure the running and gliding properties for further processing.

The adhesive properties of the fibers are adjusted in such a way that common types of processing for textile or nonwovens production can run ideally. The effect is similar to using a fabric softener when washing household laundry. A mixture of gliding agents, adhesive agents, and antistatic is used. All these agents are completely biodegradable.

As a final step, the fibers are dried and pressed into bales. Zinc is precipitated and recovered from the wastewater. Sulfur-containing gases generated during spinning are collected and recovered once again in the purest form as the chemicals carbon disulfide and sulfuric acid for reuse. The co-product sodium sulfate is produced from the input chemicals sulfuric acid and sodium hydroxide solution and recovered.

### LENZING™ Viscose production process

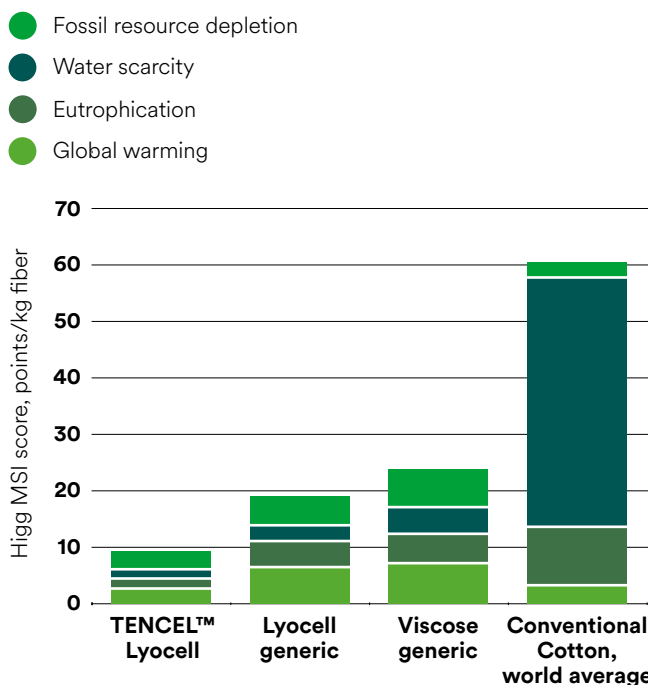
figure 4/6



Modal fibers are produced in a modified viscose process. The special characteristic of LENZING™ Modal fibers is improved washability due to greater tenacity compared to viscose fibers, especially when wet, which in turn gives textiles improved dimensional stability. It stands apart with its exquisite softness and is the preferred fiber for high-quality innerwear and similar products.

### Comparison of environmental impacts of TENCEL™ Lyocell fibers vs. generic viscose and conventional cotton cultivation, world average

figure 4/7



As figure 4/7 shows, the MSI score for TENCEL™ Lyocell fibers is several times lower than that for generic viscose and conventional cotton. Especially when compared to conventional cotton, the much lower impact on water scarcity of lyocell fibers is remarkable.

These results were 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, the results here show impacts from cradle to fiber production gate.

The MSI score of TENCEL™ Lyocell fibers is still based on the LCA data from the year 2010. Therefore, technical innovations like the new lyocell plant in Lenzing (in operation since 2014) or the new REFIBRA™ technology based on the recycling of cotton scraps are not yet considered in this assessment.



# Responsible viscose production

The following description explains the responsible viscose production criteria and how Lenzing satisfies them.

**LENZING™ ECOVERO™ and LENZING™ Original branded specialty Viscose fibers fulfill all the criteria of “Responsible Viscose” and provide a solution to improve the sustainability of the industry**  
**table 4/3**

Responsible viscose criteria	Evidence for LENZING™ ECOVERO™ and LENZING™ Original fibers
<b>1. Responsible wood and pulp sourcing:</b> Wood and pulp used in the viscose production process should come from sustainably managed forests and plantations.	<b>Evidence 1:</b> FSC®/PEFC™ certified and controlled sources, and Rainforest Alliance verification of the entire wood and pulp supply.
<b>2. Responsible production and closed-loop process:</b> Viscose production requires chemicals that need to be handled safely and effectively to reduce the human health and ecological impacts. Proper recovery and emission treatment equipment is required to prevent air and water emissions and close the loops in the viscose process. For further details, see closing the loop section, page 66.	<b>Evidence 2:</b> LENZING™ ECOVERO™ and LENZING™ Original Viscose fibers are available with EU Ecolabel (see page 82).  Higg MSI score for LENZING™ Viscose fibers shows substantially better performance than generic viscose  Zero Discharge compliant annex 6 of OEKO-TEX® Standard 100
<b>3. Safety and health for workers and community:</b> Management practices such as safety trainings, safety walks & talks, safety and environmental management systems are required to run the process effectively and to make continuous improvements. This avoids health risks for employees and the community.	<b>Evidence 3:</b> ISO 14001, OHSAS 18001 at all viscose sites
<b>4. Quality and product safety:</b> Quality is a key pillar of sustainability and product responsibility. Without quality, no product is sustainable, since it will not satisfy the intended function. Products must be safe to use and meet the purity requirements for the respective application.	<b>Evidence 4:</b> ISO 9001, OEKO-TEX® Standard 100, Food contact compliance (ISEGA), Medically Tested - Tested for Toxins
<b>5. Fiber identification/traceability in the value chain:</b> Customers and consumers can support sustainable products if they have information about how and where the products are made. Traceability of fibers in the final product ensures that they originate from responsible resources, thereby preventing counterfeiting by unscrupulous producers. In the long run, this will help improve the overall sustainability of the industry thanks to informed decision-making by all parties involved.	<b>Evidence 5:</b> Fiber identification technology for LENZING™ ECOVERO™ fibers.  LENZING™ Original fibers are available with fiber identification upon request.
<b>6. Substantiated claims for sustainability communication:</b> Communication is essential for improving transparency. Responsible producers take communication seriously and help their customers and final consumers to use sustainable products with substantiated claims.	<b>Evidence 6:</b> Marketing/Branding support

LENZING™ ECOVERO™ and LENZING™ Original branded viscose fibers are available from Lenzing (Austria) and Nanjing (China) sites. The Lenzing Group's Indonesian operation is striving to meet these criteria by 2022.



## Management approach

In 2016, the Lenzing Group launched a Group-wide program entitled “Enterprise Excellence” (EPEX<sup>52</sup>) to continuously improve internal processes. The EPEX initiative involves all employees and is designed to prepare the company to meet future challenges. In line with the sCore TEN business strategy, the positive corporate culture is being further strengthened, accompanied by an improvement in essential systems and processes.

The program extends beyond production, and now also encompasses areas such as human resources, engineering, safety, and quality. Other non-production areas will be included in the future.

A crucial core element is the linkage of safety, quality, and efficiency. Many improvements have an impact on all three of these aspects, and the systematic approach is very similar. A generally applicable improvement process covers both day-to-day performance and continuous improvement. It is implemented on all levels and in all areas of the Lenzing Group.

The sCore TEN business strategy defines the objectives Lenzing wants to achieve in the EPEX program, for example safety or quality targets. Topics such as pulp, water, chemicals, energy, climate protection, emissions to air and water, and waste are covered under this EPEX program throughout all the Lenzing Group’s production sites. This provides guidance to determine losses and realize improvement potentials. The Lenzing Group published its sustainability strategy in 2017 and launched a process for setting qualitative and quantitative targets with Group-wide alignment for focus areas and material topics.

All fiber and pulp production sites are certified in accordance with ISO 9001, ISO 14001, and OHSAS 18001 system certifications.

In the following sections, the key material topics of Lenzing will be discussed, using data from the 2014 – 2017 reporting period.

[103-2]

**Certification status in the Lenzing Group table 4/4**

	ISO 9001	ISO 14001	OHSAS 18001
Lenzing (Austria)	✓	✓	✓
Heiligenkreuz (Austria)	✓	✓	✓
Grimsby (United Kingdom)	✓	✓	✓
Mobile (USA)	✓	✓	✓
Purwakarta (Indonesia)	✓	✓	✓
Nanjing (China)	✓	✓	✓
Paskov (Czech Republic)	✓	✓	✓

<sup>52</sup>) EPEX is implemented using the World Class Operations Management (WCOM) approach



## Energy and climate protection

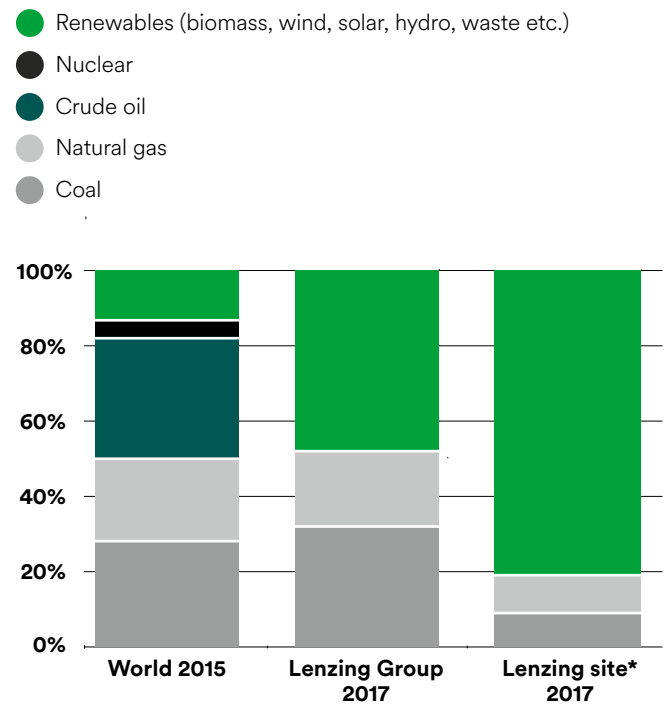
Pulp and fiber production are energy-intensive processes. Lenzing is committed to improving energy efficiency and reducing CO<sub>2</sub> emissions for global climate protection. Lenzing considers emissions along the value chain. CO<sub>2</sub> emissions are reduced by utilizing efficient energy conversion technologies for heat and electricity generation, improving energy consumption in production, and working together with energy suppliers who provide energy to the Lenzing Group.

The “Enterprise Excellence” (EPEX) continuous improvement program serves as the core management approach to achieving this objective. On the energy supply side, improvements in energy efficiency are achieved by using renewable fuels in power production. For instance, the Paskov pulp plant (Czech Republic) has successfully phased out coal use and it became the first coal-free site in the Lenzing Group. This site has not only achieved energy self-sufficiency, but also provides excess energy from bioenergy sources to the local Czech grid.

Similarly, the pulp plant in Lenzing also supplies excess energy to fiber production on site. Due to the vertical integration of pulp and fiber production, energy is used highly efficiently at this site. In addition, this site has a waste incinerator with energy recovery, which disposes of unrecyclable municipal solid waste (MSW) from the local region and supplies the recovered energy to fiber production (see Info box 4/2, page 62). All these attributes lead to lower consumption of fossil fuels for fiber production, so this site has a higher share of renewable energy, around 80 percent, in its overall energy consumption.

At the Lenzing site, the ongoing increase in pulp production due to debottlenecking will lead to a higher energy surplus, which will be used for Lenzing site fiber production, thereby further reducing use of fossil fuels. **[103-2]**

**Energy sources of the world, Lenzing Group and Lenzing site\*  
figure 4/8**



\* incl. RVL

Sources: IEA 2017, Lenzing AG

Includes own energy generation and from energy providers, excluding grid power which is a minor fraction of total Scope 1 and 2 energy consumption of 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.

On the energy demand side, Lenzing is reducing process energy consumption through various projects addressing optimization, efficient planning, and reduction of losses. A Quality Consistency Program (QCP) helps to systematically improve the process and raw material consistency. This reduces waste and produces more fibers from fewer resources. This program also increases the quality of products. The QCP program also helps cross-learning from different sites and improves the operations of the Lenzing Group globally. Lenzing also participates in EU-funded projects by collaborating with universities and research organizations to increase resource efficiency in more innovative ways. For example, the EU-funded MORE<sup>53</sup> project has improved the operation of evaporators, resulting in fuel and cost savings.

All these efforts have helped to achieve around 2.4 percent savings in specific primary energy consumption and around 3 percent reduction in specific CO<sub>2</sub> emissions in the Lenzing Group during the reporting period.

53) This project has received funding from the European Union's Seventh Framework Program for research, technological development and demonstration under grant agreement No 604068.



## Primary energy consumption of the Lenzing Group table 4/5 [302-1, 302-3]

	2014	2015	2016	2017
Primary energy consumption <sup>1</sup> (million GJ)	41.052	40.846	40.753	39.965
Fossil primary energy (million GJ)	22.824	22.173	22.183	21.946
Renewable primary energy (million GJ)	18.228	18.673	18.570	18.019
Specific primary energy consumption <sup>2</sup> (Index in percentage based on GJ/t, 2014=100%)	100%	98.7%	98.6%	97.6%

1) Lenzing reports both direct and indirect energy use. According to the GHG protocol, scope 1 covers direct energy consumed within the Lenzing Group and scope 2 covers the energy bought from energy suppliers and national grids. 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, water, wind etc.) are included.

2) All specific indicators in this chapter are reported per unit of production.

## Greenhouse gas emissions of the Lenzing Group table 4/6 [305-1, 305-2, 305-4]

	2014	2015	2016	2017
Total greenhouse gas emissions, CO <sub>2</sub> eq. (million metric tons)	1.78	1.72	1.71	1.73
Direct emission i.e. Scope-1 (million metric tons)	1.19	1.16	1.19	1.18
Indirect emission i.e. Scope-2 (million metric tons)	0.59	0.55	0.52	0.55
Specific GHG emissions <sup>3</sup> (index in percentage based on metric tons of CO <sub>2</sub> eq./t, 2014=100%)	100%	96%	95%	97%

3) Includes both scope 1 and 2 emissions from all greenhouse gases, expressed as CO<sub>2</sub> 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 our facilities belongs to scope 3, according to the GHG protocol, so they should not be included here. However, some sites in the Lenzing Group produce chemicals themselves, namely H<sub>2</sub>SO<sub>4</sub> and CS<sub>2</sub>, leading to a higher energy demand and scope 1+2 CO<sub>2</sub> emissions of the Lenzing Group than companies that do not produce chemicals themselves. This is relevant for all indicators. Scope 1 emissions are calculated from emission factors from EU ETS and scope 2 emissions are based on energy supplier-specific emission factors and average grid emission factors from ecoinvent (www.ecoinvent.org), a life cycle in inventory database.

The Lenzing Group considers emissions all along the value chain. Consequently, the company engages with its pulp suppliers to reduce their CO<sub>2</sub> emissions, even though pulp suppliers do not contribute to scope 2 emissions. Lenzing's innovative products also reduce the footprint of business partners along the value chain (chapter 5). Therefore, the Lenzing Group reduces CO<sub>2</sub> emissions along the value chain. Table 4/7 shows how Lenzing contributes to climate change reduction along the value chain. [305-5]

### Info box 4/1

#### Best practice at Lenzing site: Incineration of municipal solid waste with energy recovery

- Electricity and heat from residual materials
- Maximum utilization of energy sources

Lenzing contributes significantly to sustainable waste management at its production site in Austria.

Together with Energie AG (Austria), a state-of-the-art plant for thermal utilization of sorted and prepared waste materials is being operated at the Lenzing site.

Annually, around 300,000 tons of sorted plastic waste, rejects, biological sludge, and overflows from waste processing plants are taken to a thermal processing plant and transformed into electricity and heat. All year round, the energy is used with a high level of energy efficiency.

The circulating fluidized-bed technology used in this connection creates optimum

incineration conditions for the materials employed. This, together with the sophisticated dry and wet waste-gas purification plant and the downstream catalyst, guarantees a high level of environmental compatibility.

Air with a low concentration of CS<sub>2</sub> from the viscose fiber plant is captured and used as combustion air for the waste incineration plant, thereby achieving another major improvement in air quality at the Lenzing site.

By operating the incineration plant with residual materials, Lenzing is in a position to substitute approximately 75 million m<sup>3</sup> of natural gas per year. In addition to the benefits for the national economy, this is also of considerable ecological relevance. According to the Emissions Trading Scheme (ETS), incinerators that use more than 50 percent municipal solid wastes are excluded from the ETS. Therefore, the CO<sub>2</sub> emissions from the incinerators are not considered as fossil CO<sub>2</sub>, and consequently energy from waste is included under renewables in figures 4/8.



**Lenzing's contribution to reducing climate change impacts / to decarbonize along the value chain table 4/7 [103-2]**

Position in the value chain	Topic relevant to climate change	Details	Lenzing Group Contribution
Sourcing of wood and pulp	CO <sub>2</sub> sequestration in sustainably managed forests and plantations	Sustainably managed forests absorb more carbon, thus acting as a net sink. In Europe, forest areas and growing stock are increasing.	Wood sourcing from sustainably managed forests and active engagement with pulp suppliers for improvements and other stakeholder activities (e.g. Wood K plus studies)
	Adaption of forests to climate change	Share of beech increases in Europe, but uses are limited	Economic valorization of beech wood for dissolving wood pulp production by Lenzing (higher value added than fuel wood use)
	CO <sub>2</sub> emissions from deforestation	Make sure that no deforestation occurs in the supply chain.	Lenzing wood and pulp sourcing policy, forest certificates (FSC®, PEFC™), implementing Canopy pathway and ranked as a leader of Canopy Style Initiative
Pulp production	Renewable energy use	100% utilization of wood components to produce pulp, co-products and energy. No waste of wood	Lenzing pulp mills are self-sufficient and use bioenergy from the biomass (black liquor) remaining after pulp production, moreover excess energy is used for fiber production or to feed national grid.
Fibers production	Avoiding fossil fuel use	Energy use and chemicals	High and increasing use of bioenergy and renewable electric power. Energy efficiency improvements, shifting from coal to natural gas. Integrated pulp and fiber production
Textile manufacturing	CO <sub>2</sub> emissions in textile manufacturing	Fossil fuel use	Avoiding resource intensive conventional dyeing process with the use of LENZING™ Modal Eco Color (a dope-dyed fiber). This reduces the energy use and lowers CO <sub>2</sub> emissions in the value chain. LENZING™ Modal Eco Color is a net-benefit product(*).
Product use	CO <sub>2</sub> emissions from textile care	Fossil fuel use for power generation	Fast drying products (TENCEL™ Lyocell/PES, TENCEL™/wool blends) and products which need less frequent washing reduces power consumption in the use phase.
End of use	Recycling	Avoiding waste and virgin materials	Lyocell fibers with REFIBRA™ technology are made by partly using textile scraps, this avoids textile waste and virgin fiber production
	Waste incineration with energy use	Bio-based CO <sub>2</sub>	Incineration of LENZING™ fibers lead to release of biobased CO <sub>2</sub> emissions which are considered as CO <sub>2</sub> neutral.
	Anaerobic digestion with energy recovery	Biogas production	For example, workwear made from LENZING™ fibers that are digested and the resulting biogas can be used for energy purposes. This shows potential of biodegradability and energy recovery.

**Indirect contributions to avoid climate change impacts**

Production of natural fibers	Use of fossil fuels	For production of agrochemicals and fuels for machinery	By blending with wood-based fibers, climate change impacts of the final products can be reduced.
	Agricultural emissions	N <sub>2</sub> O from fertilizers, methane from animals	
Production of synthetic fibers	Use of fossil fuels	For energy, and material basis	By replacing synthetic fibers with wood-based fibers, climate change impacts of the final products can be reduced.
Production of chemicals	Use of fossil fuels	For energy, and material basis	Biorefinery co-products from Lenzing pulp mills replace products from fossil sources: Acetic acid, furfural etc.
Driving industry through stakeholder initiatives			Lenzing participates and contributes to projects that address climate change: 1. Apparel guidance for science-based targets (SBT) organized by WRI 2. UNFCCC Climate Action in Fashion

(\*) Terinte et al. 2014



## Water use

Lenzing uses water for processes and cooling purposes and is committed to improving the water-related impacts at its production plants and all along the value chain.

Water is used prudently at the production sites. The aim is to close loops and reuse the water. For example, the Paskov plant (Czech Republic) has a closed-loop cooling water system and therefore requires little make-up water to compensate for losses. Lenzing's lyocell process uses around one third of the water required by the viscose process. Consequently, further expansion of lyocell fiber capacities will reduce the Lenzing Group's specific water consumption in the long term.

Lenzing considers water issues in the upstream and downstream value chain of its products. The Lenzing Group aims to contribute wherever it can influence matters directly or indirectly. The table 4/12 summarizes how Lenzing contributes in different steps of the value chain. Lenzing helps its customers to reduce their water-related impacts by providing LENZING™ fibers that can replace more water-intensive fibers and avoid the most polluting steps in the value chain, such as dyeing.

Specific amounts of water extracted and returned were reduced by around 5 percent and 3 percent respectively, as shown in table 4/9, during the reporting period in the Lenzing Group. [103-2]

### Water use in the Lenzing Group table 4/8

million m <sup>3</sup>	2014	2015	2016	2017
Water intake/extracted	117	115	110	111
Surface water	103	101	98	98
Ground Water	13	14	12	13
Water returned <sup>8</sup>	108	105	103	105
Wastewater effluent	64	62	62	62
Cooling water returned to rivers etc.	44	43	42	43

8) Water is discharged/returned to the water bodies from where it was extracted, such as local rivers. The quality of the discharged water complies with local legislations.

### Specific water use in the Lenzing Group table 4/9 [303-1, 306-1]

	2014	2015	2016	2017
Specific water intake/extracted (Index in percentage based on m <sup>3</sup> /t, 2014=100%)	100%	98%	94%	95%
Specific water returned (Index in percentage based on m <sup>3</sup> /t, 2014=100%)	100%	97%	95%	97%

### Water effluents

Process water is treated by biological wastewater treatment plants (WWTPs). The Lenzing Group has WWTP facilities at all its sites except Grimsby (Great Britain). However, the wastewater situation at Grimsby complies with local legal regulations as well as the EU Water Framework Directive.

At the Lenzing site (Austria), organic chemicals from waste streams, which would otherwise cause higher Chemical Oxygen Demand (COD), are converted into valuable biorefinery products of pulp milling, namely acetic acid, furfural, and xylose. This is one example of best practices where waste is converted into useful products, thereby avoiding water pollution. Sulfate emissions mainly originate from the viscose process, lyocell has lower sulfate emissions. COD emissions originate from pulp and fiber production processes and are part of the Lenzing Group's sustainability targets (details in chapter 2, page 27).

During the reporting period, amine emissions have reduced compared to 2016. However, they are higher than 2014. [103-2]



## Absolute emissions to water\*\*\*\* table 4/10

	2014	2015	2016	2017
COD after WWTP (t)	6,022	6,078	6,224	6,131
SO <sub>4</sub> after WWTP (t)	173,191	166,268	168,309	165,264
Amines after WWTP (t)	198	223	239	224

\*\*\*\* Wastewater from Nanjing site (China) is treated by an external service provider. Therefore, Lenzing does not have operational control over this wastewater treatment. Consequently, emissions to water from this site are not reported here. In this report, SO<sub>4</sub> emissions are reported based on calculation from 2014-2017 to improve quality. However, in 2016 report, they were based on measurement. (Restatement [102-48])

## Specific emissions to water table 4/11 [306-1]

	2014	2015	2016	2017
COD after WWTP (Index in percentage based on kg/t, 2014=100%)	100%	100%	103%	102%
SO <sub>4</sub> after WWTP (Index in percentage based on kg/t, 2014=100%)	100%	95%	96%	96%
Amines after WWTP (Index in percentage based on kg/t, 2014=100%)	100%	112%	120%	113%

## Lenzing's contribution to reducing water-related impacts along the value chain table 4/12

Position in value chain	Relevance	Details	Lenzing Group contribution
Direct contribution of Lenzing where we have influence			
Sourcing	Water in forests and plantations	Forests are part of the natural hydrological cycle and contribute to the availability of fresh water. Lenzing's pulp suppliers practice efficient water management in their plantations.	Lenzing considers water issues in wood and pulp sourcing; Lenzing works with stakeholders to understand better management of water and impacts of water (e.g. research on water impacts, contribution to stakeholders' water footprint studies).
Production of wood-based fibers	Water use in pulp and fiber production	Process water, cooling water and emission to water	Water use is diligently managed in all production facilities. Efficient wastewater treatment plants minimize water pollution.
Manufacturing	Water use in textiles manufacturing	Process water, wastewater emissions	Lenzing's products, e.g. LENZING™ Lyocell fibers, LENZING™ Modal Color fibers with Eco Color technology, reduce consumption and pollution of water in the dyeing step.
End of Use	Waste to landfill, marine litter		Lenzing products are compostable and biodegradable in soil and marine environments, so they do not contribute to the marine litter problem.
Lenzing's indirect contribution to avoiding water impacts			
Production of natural fibers	Water use in agriculture	Irrigation in water-scarce areas	By blending LENZING™ fibers into natural cellulose fibers requiring irrigation, water impacts of final products can be substantially reduced.

\* Sutterlüty 2016, Water Footprint Network 2017a, 2017b

## Chemicals

The EPEX continuous improvement program also covers efficient use of chemicals, recovery, and reuse. The local Safety, Health, and Environment (SHE) managers are responsible for ensuring that the list of process chemicals is kept up to date with impending regulations. Process chemicals include all substances required to manufacture our products, and those with which products come into contact.

Research and development projects assess potential risks for people and the environment associated with potential use of new materials. New chemicals are only cleared for large-scale technical deployment when their safe use and compliance with all legal specifications is ensured.

During pulp, viscose, modal, and lyocell fiber production processes, important chemicals such as sulfuric acid, sodium sulfate, sulfur dioxide, carbon disulfide, zinc sulfate and NMMO are recovered or transformed. In some cases the recovery rate is very high, for

example NMMO used in lyocell fiber production has a recovery rate higher than 99 percent. [103-2]

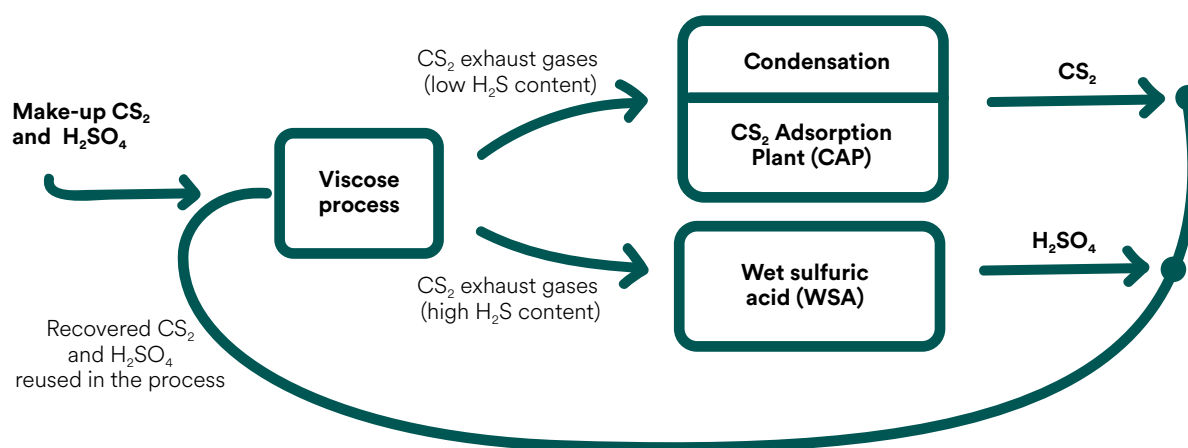
### Closing the loops in the viscose process: best practice

In the viscose process, carbon disulfide (CS<sub>2</sub>) and caustic soda (NaOH) are used to dissolve cellulose pulp to form the spinning dope. During this process, some CS<sub>2</sub> is transformed into hydrogen sulfide (H<sub>2</sub>S). When regenerating the dissolved pulp in an acid spin-bath as fiber, CS<sub>2</sub> and H<sub>2</sub>S are released as exhaust gases at different locations along the production process. As shown in figure 4/9, the three recovery systems required to close the loop and to safely handle these waste streams are:

1. Condensation unit
2. Wet Sulfuric Acid Plant (WSA) and
3. CS<sub>2</sub> Adsorption Plant (CAP)

CS<sub>2</sub> exhaust streams with low H<sub>2</sub>S content are treated in the condensation unit as well as in the CS<sub>2</sub> adsorption plant (CAP) to recycle CS<sub>2</sub>. CS<sub>2</sub> exhaust gas streams with higher H<sub>2</sub>S contents are preferably recycled as H<sub>2</sub>SO<sub>4</sub> via catalytic oxidation in wet sulfuric acid plants (WSA).





Without a WSA plant, H<sub>2</sub>S-rich gas cannot be handled safely, so it is a hazard to human health. The recovered CS<sub>2</sub> in the condensation process and CAP plant and the H<sub>2</sub>SO<sub>4</sub> produced in the WSA plant are directly reused in the viscose process. This closes the loop of sulfur compounds used in the viscose process. Both technologies, state-of-the-art CAP and WSA, are essential. Proper maintenance of these systems is key to avoiding any release of CS<sub>2</sub>, H<sub>2</sub>S, SO<sub>2</sub>, or SO<sub>3</sub>. With state-of-the-art CAP and WSA, and their proper maintenance, more than 90 percent of the CS<sub>2</sub> can be recovered safely and reused in the process.

Viscose production facilities without a WSA plant face the challenge of handling H<sub>2</sub>S emissions from the viscose process. In this case, H<sub>2</sub>S may be disposed of through energy generation boilers or by absorbing H<sub>2</sub>S in NaOH to form sodium hydrosulfide hydrate. Both these alternative H<sub>2</sub>S control measures have the disadvantage of lower recycling rates of sulfur chemicals compared to the WSA option. In addition, burning of H<sub>2</sub>S in energy generation boilers also results in higher SO<sub>2</sub> emissions, unless the SO<sub>2</sub> emissions are recovered as gypsum.

Another prerequisite of a safe viscose process is a plant design with sufficient capacity in equipment such as blowers to ensure safe extraction and transfer of CS<sub>2</sub> and H<sub>2</sub>S to the recovery equipment described above.

#### Info box 4/3

##### Changing Markets: Roadmap towards responsible viscose and modal fiber manufacturing

The Changing Markets Foundation was established to accelerate and scale up solutions to sustainability challenges by leveraging the power of markets. Working in partnership with NGOs, other foundations and research organizations, they create and support campaigns to shift market share away from unsustainable products and companies and towards environmentally and socially beneficial solutions.

In June 2017, the Changing Markets Foundation published the "Dirty Fashion Report" which raised the issue of environmental and human health impacts caused by the viscose industry. It presented evidence from the top three viscose producing countries in Asia, which showed that the fiber and fashion industry faces some serious issues in both the social and environmental aspects of sustainability.

Lenzing approached Changing Markets, welcoming the report and the greater public attention on the sustainability of viscose fibers. Lenzing is fully committed to addressing the issues raised by Changing Markets and has developed a roadmap for improvement. The efforts will focus on five key areas:

1. Closed-loop process for viscose manufacturing
2. Reducing emissions to air
3. Reducing emissions to water and solid waste
4. Responsible raw material sourcing
5. Initiatives for community wellbeing.

Lenzing aims to implement a voluntary and ambitious Lenzing Group standard for the production of viscose at all sites. This standard strives for compliance with the EU Ecolabel regulations by 2022.



## EU Ecolabel

The EU Ecolabel was established by the European Commission in 1992. It is an environmental quality label awarded to products and services that have less impact on the environment and on health throughout their entire life than comparable substitutable goods. 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 on a scientific basis and take into account the entire product life cycle. Regular revisions ensure that the criteria are adapted to new developments and that assessments remain current. EU Ecolabel criteria 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 to air or water and with regard to the handling of chemicals used. The Lenzing Group can provide viscose, modal and lyocell fibers with EU Ecolabel. [417-1]

## Info box 4/4

### Zero Discharge of Hazardous Chemicals

The Zero Discharge of Hazardous Chemicals (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. The ZDHC Program involves a collaboration of 23 signatory brands, 38 value chain affiliates, and 14 associates who work to support implementation of safer chemical management practices.

In the reporting year, the ZDHC Foundation decided to extend their scope to cover viscose manufacturing as well. Assessments will include standards for water and air emissions as well as chemicals. The Lenzing Group supports ZDHC and will contribute its expertise to develop a roadmap for driving improvement in the industry.

EU Ecolabel criteria table 4/13

EU Ecolabel criteria	Limit
<b>Man-made cellulose fibers criteria</b>	
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: Sulphur emission to air	30 g/kg
<b>Chemicals and processes criteria</b>	
Restricted substance	Spin finishes: 90% of the component substances readily biodegradable
Substitution of hazardous substances	Should satisfy restrictions concerning certain hazard classifications

## Air emissions

Lenzing Group sites producing viscose fiber, i.e., Lenzing (Austria), Nanjing (China), and Purwakarta (Indonesia), are equipped with several waste gas purification technologies, including Sulfosorbon® systems, CS<sub>2</sub> condensation, and catalytic combustion for minimizing atmospheric load. Moreover, at the Lenzing site (Austria), air with low concentrations of CS<sub>2</sub> from fiber production is used as combustion air for energy generation boilers. These systems assist in the recovery of sulfurous compounds, as well as in the substantial reduction of H<sub>2</sub>S and CS<sub>2</sub> emissions. This further reduces sulfur emissions. For further details on recovery systems, see the chemicals section.

Sulfur emissions, i.e., carbon disulfide (CS<sub>2</sub>) and hydrogen sulfide (H<sub>2</sub>S), originate from the viscose process and sulfur dioxide (SO<sub>2</sub>) emissions both from the process and from own energy production. Specific emissions to air were reduced over the reporting period.

Production of lyocell fibers generates no gaseous emissions due to the environmentally sound production process. [305-7]



#### Absolute emissions to air\* table 4/14

	2014	2015	2016	2017
Sulfur emissions (t) (CS <sub>2</sub> , H <sub>2</sub> S emissions expressed as sulfur)	33,620	29,511	30,488	26,807
SO <sub>2</sub> emissions (t)	3,872	4,004	4,480	3,649

\* Sulfur emissions were calculated using mass balance approach and SO<sub>2</sub> emissions are based on measurements. In this report, Sulfur emissions and SO<sub>2</sub> emissions reported from 2014-2016 have been updated with correct values. These changes have resulted in higher emissions than those disclosed in 2016 report. (Restatement) [102-48]

#### Specific emissions to air table 4/15

	2014	2015	2016	2017
Sulfur emissions (Index in percentage based on kg/t, 2014=100%)	100%	87%	90%	80%
SO <sub>2</sub> emissions (Index in percentage based on kg/t, 2014=100%)	100%	103%	115%	94%

#### Waste generated by the Lenzing Group table 4/16 [306-2]

in metric tons	2017
Total waste*	140,149
Hazardous waste	40,052
Recycling	2,419
Incineration	34,254
Landfill	3,219
Others*	160
Non-hazardous waste	100,097
Recycling	76,863
Incineration	9,621
Landfill	13,372
Others*	241

\* Classification of waste into hazardous and non-hazardous waste according to local regulations

\* Waste sent for further processing or storage whose treatment option will be known after a few months and is not available prior to publication of this report. In most cases, however, these wastes are processed and recycled.

#### Waste

Waste is an important issue for our society. World fiber consumption is increasing due to population growth. To cater for this demand, innovative approaches such as circular economy are required to address the limited resources. In the context of circular economy, waste has attracted renewed attention in different industries and especially in the textile value chains. Consequently, this aspect has been identified as material for Lenzing in terms of what we can contribute to the industry and society. The Lenzing Group's approach is to efficiently use and convert all raw materials into products, to prevent waste wherever possible, and to offer circular economy solutions to the textile value chains.

Within the EPEX Quality Consistency Program (QCP), Lenzing continuously improves process and raw material consistency, which leads to a reduction in waste. [103-2]

Limited consistency of definitions across countries and changes in legislation on definitions and mandatory waste management make it more difficult for direct comparison to be made with past data. In 2017, a process to provide harmonized waste statistics was initiated for the Lenzing Group. The first results of this approach are shown here for the year 2017, table 4/16. We are still further refining this harmonization process. Consequently, inconsistencies may occur until harmonization is complete. Progress has been made in the waste reporting compared to last year and final results of 2017 will be reported in next year's report after completing the harmonization process.

#### Info box 4/5

##### Best practice reporting

As there are many emission points along the viscose fiber production process, the Lenzing Group reports CS<sub>2</sub> and H<sub>2</sub>S emissions, expressed as sulfur emissions, based on mass balance calculations which reflect the reality much better than the single point measurements reported by some producers.

table 4/17

2017	Lenzing Austria	Nanjing, China	Purwakarta, Indonesia
CS <sub>2</sub> recovery and recycling rate	96.5%	96.3%	65%

At the production site in Indonesia (Purwakarta), Lenzing is striving to fulfill the current EU Ecolabel criteria by 2022. For details of EU Ecolabel criteria please refer to table 4/13. This roadmap will bring the CS<sub>2</sub> recovery rate of the Indonesian site into line with other viscose sites in the Lenzing Group.



Recyclable fractions of waste are separated and sent for recycling. Unrecyclable fractions are disposed of in accordance with local legislation. Wherever possible, Lenzing uses unrecyclable fractions to produce energy, for example in incinerators with energy recovery, as discussed in the energy section, page 61. Landfilling of non-hazardous waste is subject to strict national regulations. Hazardous waste is either treated or disposed of according to the applicable regulations. Lenzing uses licensed contractors to dispose of waste from the production sites. Audits are conducted for these service providers periodically. If non-compliance issues are found at any contractor, the contract is terminated. **[306-2]**

The largest amount of waste sent for treatment is fly ash which is either recycled as material for construction or disposed off in other industrial thermal processes. It is to be noted that many Lenzing Group sites have their own energy production and one site operates boilers that incinerate unrecyclable waste from local community with energy recovery. Due to these reasons, the Lenzing Group may have unproportionally larger amounts of more fly ash as a waste category than its peers in the industry.

The Lenzing Group proactively manages waste issues from its production but also waste from local communities. The Lenzing site in Austria disposes of municipal solid waste from local communities in Lenzing's waste incinerator (details see Info box 4/2). During this process, energy is recovered and used for production. The Lenzing Group's biorefineries convert wood into pulp and biochemicals, as discussed in the biorefinery section. Thus, the pulp plants prevent waste through higher resource utilization. Lenzing's innovative REFIBRA™ technology uses cotton scraps from the textile value chain along with wood pulp, thus reducing waste from textiles production. For further information, please refer to chapter 5 on innovation.

#### Info box 4/6

##### Water Footprint Network

The Water Footprint Network (WFN) is a non-profit organization with the mission "to provide science-based, practical solutions and strategic insights that empower companies, governments, individuals and small-scale producers to transform the way we use and share fresh water within earth's limits."

The Lenzing Group has contributed to two studies sponsored by the C&A Foundation, which were released in 2017.

Both studies highlight improvement potentials in viscose technology, and point out that there is a large difference between production facilities following latest technologies, and others.

"Viscose fiber production. An assessment of sustainability issues"<sup>1</sup>

The Viscose study analyses sustainability issues in the areas of air, water, ecosystems, climate change, and social fairness/communities. Main conclusions are that "the main viscose producers are already engaged in initiatives towards sustainable wood sourcing." The study's authors also emphasized that "industrial processing technologies and practices that improve the sustainability performance of viscose production are available and some producers are already applying them and investing in innovation for more sustainable production."

"Water footprint assessment of polyester and viscose"<sup>2</sup>

The water footprint study concludes that the water footprint of polyester is greatest, followed by cotton, and viscose is the lowest in this comparison. For polyester, "the largest contributions to the water footprint come from the industrial production phases (i.e., refineries, petrochemicals, and polyester fiber production) and water management practices applied during oil exploration. "Produced water" resulting from oil exploration is the largest by-product of this activity and contains toxic pollutants that are not always properly treated before disposal. Thus, the grey water footprint represents over 99 percent of the water footprint of polyester."

1) Water Footprint Network, 2017 a

2) Water Footprint Network, 2017 b



5



# Sustainable and products





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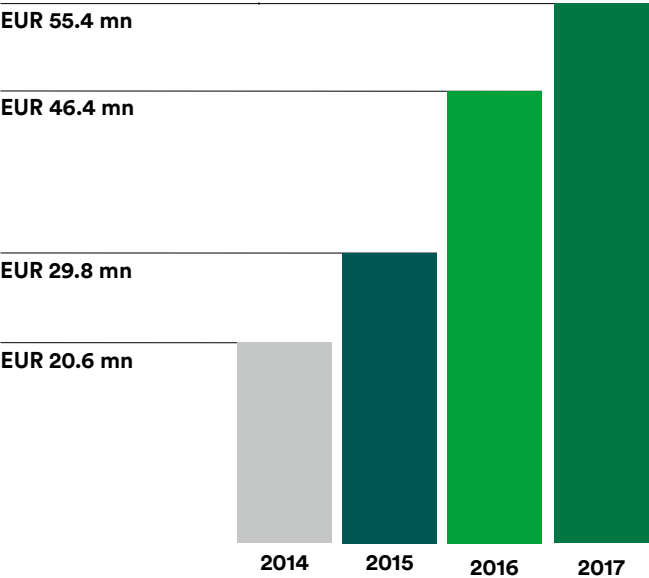
# Innovation for sustainable products

Innovation and sustainability are central to Lenzing’s sCore TEN strategy. Every new development – whether it be process- or product-related – is evaluated at the very beginning in terms of sustainability and environmental compatibility. If an idea or project does not comply with internal guidelines, it is not pursued any further. Sustainability is therefore a prerequisite and a condition for every new development at Lenzing.

In 2017, the Lenzing Group worked on several innovations where sustainability aspects are the main driving force. Innovations encompass several aspects and are handled collaboratively by different departments within the company. In addition, suppliers, customers and other relevant stakeholder groups, such as NGOs, were also involved, in order to achieve the best possible results for all interested parties.

A key hub and know-how center for such developments is the Global Research and Development (R&D) department at the company’s headquarters in Lenzing. In 2017, 192 employees (2016: 176) were working in the R&D department at the Lenzing site. The company’s investment in R&D amounted to EUR 55.4 million in 2017 (2016: EUR 46.4 million), calculated using the Frascati method (less received funding). This steep increase in both expenditure and staffing levels underpins the implementation of the sCore TEN corporate strategy. It represents a clear, long-term endorsement of Lenzing’s commitment to R&D as a key contributor to corporate success.

R&D expenditure, calculated using the Frascati method  
figure 5/1



As a result of this strategic alignment, Lenzing succeeded in launching a series of sustainable innovations in the 2017 financial year.

## Process innovations

Product innovation can frequently only be achieved through corresponding process innovation. Apart from process developments clearly focused on a particular product, as for example with TENCEL™ Lyocell fibers with REFIBRA™ technology or TENCEL™ Luxe with Eco Filament technology, there are other activities that target specific processes (or sub steps) in general. Here, too, sustainability aspects play an important role. Improving resource and energy efficiency as well as providing products and solutions to the value chain, which offer a better choice for customers, is a driving force and motivation for all of Lenzing’s process developments..

In the pulp field, Lenzing is working on further improving the material yield from the raw material wood in line with its biorefinery concept. Developments here are dealing with both established and potential new co-products. Another example in this area is the conversion of the pulp plant in Paskov aimed at replacing all fossil energy sources. Although pulp production is „energy self-sufficient“ overall and even supplies surplus energy, use of natural gas was previously required to support some of the process steps. This has now been replaced with biogas, so the site can be supplied completely with energy from sustainable sources.

Water stewardship is material for Lenzing and has been defined as a key focus area in Lenzing’s “Naturally positive” sustainability strategy.

In 2017, two water-related projects were undertaken in Lenzing’s R&D department:

- Improvement of water management in the lyocell process: The objective of this project is to save process water and, consequently, energy.
- Better understanding of the marine litter/microplastics issue: Lenzing collaborates with scientific institutes to obtain a comprehensive picture of this issue. The project includes additional specific investigations of the biodegradability of LENZING™ fibers under relevant conditions. The studies also address the issue of ecotoxicity, since the disintegration or decay of materials alone often does not provide a complete picture. Alongside the development of products, including associated degradability tests, communication of the results achieved is also an important part of this work. For further details, see page 78 “Biodegradable, compostable, flushable: LENZING™ fibers as a contribution to a circular model”.

The projects will be continued in 2018.

## Product innovations

### TENCEL™ Luxe filament

In the reporting year, Lenzing introduced TENCEL™ Luxe, the first branded lyocell filament (continuous yarn) based on the lyocell process to be produced by the Lenzing Group. The particularly high-quality filament yarns of the TENCEL™ Luxe brand offer exceptional aesthetics, performance and comfort. The target market is the luxury fashion segment. TENCEL™ Luxe allow fashion brands to redefine the subject of sustainability. The environmental impact of



this new filament is significantly lower than comparable bio-based premium filaments such as silk or viscose filament. Consequently, TENCEL™ Luxe stands for a previously unattainable combination of sustainability, performance and aesthetics.

TENCEL™ Luxe filament is currently being produced in a pilot plant at the Lenzing site. Construction and commissioning of this plant in 2017 represented a challenge for the departments involved, because two technologically sophisticated processes had to be combined: the lyocell process and filament production.

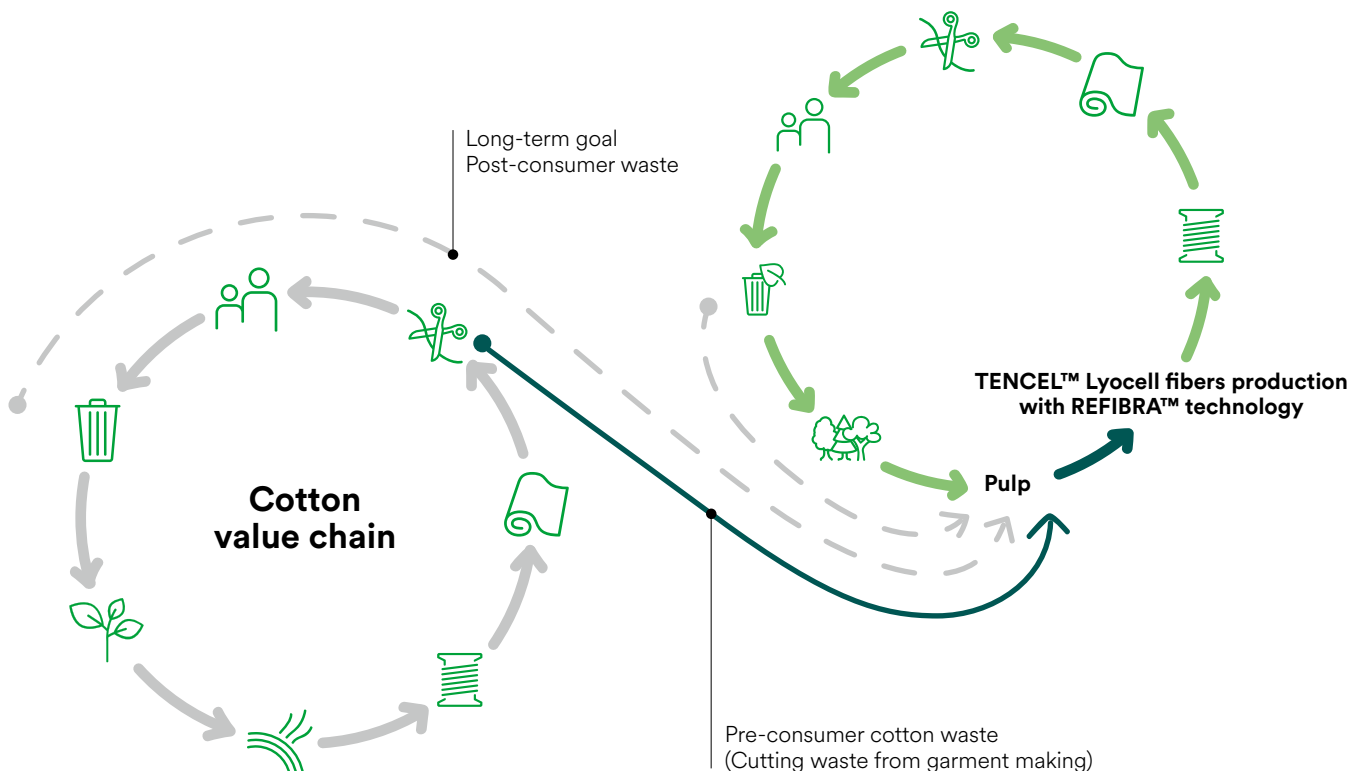
#### LENZING™ ECOVERO™ fibers

With the market launch of LENZING™ ECOVERO™ branded specialty viscose fibers in May 2017, Lenzing has further underlined its pioneering role in the field of sustainability. Compared to standard viscose fibers, these have an improved, very good ecological footprint based on three pillars:

- LENZING™ ECOVERO™ fibers are manufactured from sustainable wood and pulp originating from certified, controlled sources (compliant with the Lenzing Wood and Pulp Policy)
- LENZING™ ECOVERO™ fibers are certified with the EU Ecolabel
- LENZING™ ECOVERO™ fibers can also be identified in the final product

Compared to conventional viscose fibers, the production of LENZING™ ECOVERO™ fibers generates up to 50 percent lower emissions and water pollution. With these fibers, Lenzing can offer its customers, partners, and ecologically minded end consumers viscose fibers with a low environmental impact. The raw materials and fiber production process employed meet demanding sustainability standards, as verified by various certifications. Producers and consumers can turn to these fibers with a clear conscience and rest assured that they are using an ecologically compatible product.

#### REFIBRA™ technology – contribution to circular economy figure 5/2



#### TENCEL™ Lyocell fibers produced with REFIBRA™ technology – development of circular flow models

TENCEL™ Lyocell fibers with REFIBRA™ technology were presented for the first time in 2016 and launched successfully in 2017. The fibers are manufactured using the lyocell process, in which some pre-consumer waste (especially cotton offcuts from the textile industry) is used as a raw material. This not only makes Lenzing the world's first manufacturer to produce cellulose fibers partly using recycled cotton scraps as a raw material on a commercial scale, offering new possibilities for a circular economy.

Particularly in the development of circular flow models that enable economic growth without increasing the consumption of natural resources, close collaboration all along the value-creation chain is essential for Lenzing. Accordingly, cooperation was sought and continues to take place with various partners – from raw material producers to fashion companies – in the development of the REFIBRA™ technology. Various fashion brands – some globally active – and first home textile brands are developing collections with lyocell fibers produced with REFIBRA™ technology or offering products made of these fibers.

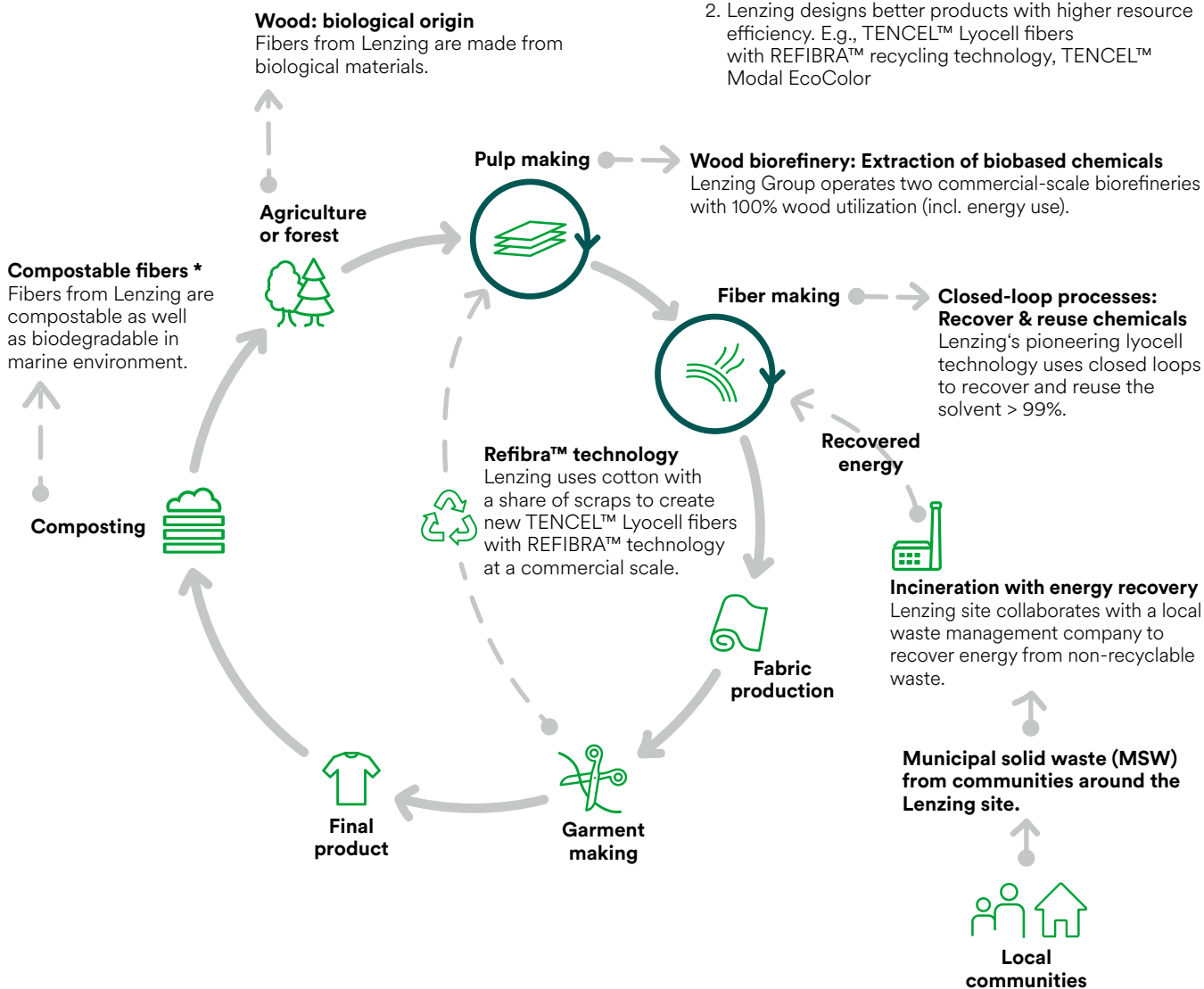
Lenzing itself is working both on further refinement of REFIBRA™ technology and on showcasing its ecological benefits. On the technological side, this not only involves optimizing the processes, but also expanding the raw material base. Furthermore, recycling options for discarded textiles (post-consumer waste) are being investigated. This development also involves mixed textiles made of different fiber types, making it very complex and challenging.



# Circular economy

The Lenzing Group exemplifies the circular economy model. The illustration describes the elements of circular economy and how Lenzing practices them.

## Circular economy – a systemic challenge figure 5/3



\* All standard fibers from Lenzing are compostable and biodegradable in marine and soil conditions. However, the compostability of textile and nonwoven products depends on the material composition (fiber blend) and processing in the value chain steps.



### Circular Fibres Initiative (Ellen MacArthur Foundation)

The Ellen MacArthur Foundation was established in 2010 with the aim of accelerating the transition to the circular economy. Since its creation the charity has emerged as a global thought leader, establishing the circular economy on the agenda of decision makers across business, government, and academia. The Foundation's work focuses on five interlinking areas: education, business and government, insights and analysis, systemic initiatives, and communication.

In November 2017, the Ellen MacArthur Foundation launched a new report in London, "A new textiles economy: Redesigning fashion's future".

The report concludes that the equivalent of one garbage truck of textiles is wasted every second, while less than one percent of clothing is recycled into new clothes. If nothing changes, the fashion industry will consume a quarter of the world's annual carbon budget by 2050. The report laid out a positive vision for a "new textiles economy", in which clothes are designed differently, worn longer, and recycled and reused much more often.

### Lenzing contributing as a core partner

Creating a new textiles economy sets a new level of ambition for the fashion industry, and will require an unprecedented scale and depth of collaboration. Industry leaders including core partners Lenzing, H&M, NIKE Inc., and C&A Foundation, endorse the new vision and report, to which they and over 40 influential fashion brands, leading businesses, NGOs, public bodies, and experts have contributed. McKinsey & Company has contributed research and analysis.

Lenzing contributes to this ambitious initiative by providing its industrial perspective and insights, including its vast experience in the textile industry and its pioneering TENCEL™ Lyocell fibers with REFIBRA™ technology, the first cellulose fibers partly using recycled cotton scraps as a raw material on a commercial scale.

*„Clothes are an everyday necessity, and for many an important expression of individuality. Yet the industry's current take-make-dispose model is the root cause of many environmental impacts and substantial economic value loss. Every second, the equivalent of one garbage truck of textiles is landfilled or burned. An estimated USD 500 billion value is lost every year due to clothing that's barely worn and rarely recycled. If nothing changes, by 2050 the fashion industry will use up a quarter of the world's carbon budget. As well as being wasteful, the industry is polluting: clothes release half a million tonnes of microfibres into the ocean every year, equivalent to more than 50 billion plastic bottles. Microfibres are likely impossible to clean up and can enter food chains."*

**Ellen MacArthur** Press Release, November 28, 2017



### Info box 5/1

#### Recycled Claim Standard

Lyocell fibers produced with REFIBRA™ technology are available with Recycled Claim Standard (RCS). The RCS is used as a chain of custody standard to track recycled raw materials through the supply chain. The Recycled Claim Standard verifies the presence and amount of recycled material in a final product. This is achieved through input and chain-of-custody verification by a third party. It enables transparent, consistent, comprehensive independent evaluation and verification of recycled material content claims for products.



# Sustainability benefits of LENZING™ fibers and filaments table 5/1

	All	Lyocell
<b>Botanic origin: wood and pulp sourcing</b>	<p>All wood and pulp suppliers must follow the stringent guidelines of the Lenzing Wood and Pulp Policy. Lenzing is committed to sourcing wood from non-controversial sources and strives to protect ancient and endangered forests as well as high conservation value areas.</p> <p>In Canopy's 2017 Hot Button Report, Lenzing achieved a high green shirt ranking (20.5 buttons) proving that there is a very low risk of sourcing wood from ancient and endangered forests when using LENZING™ fibers.</p> <p>More than 99 percent of Lenzing's pulp and underlying wood are certified by or controlled in accordance with FSC® and PEFC™ standards'.</p> <p>Wood is not only a renewable raw material it also contributes to a better carbon balance by capturing CO<sub>2</sub>, thus reducing climate change impacts. Forests also provide fresh water, oxygen, climate regulation, flood resilience, biodiversity and recreation. Sustainably managed semi-natural forests grow without the use of chemical fertilizers and artificial irrigation.</p>	<p>LENZING™ Lyocell fibers are derived from sustainable wood sources (e.g. eucalyptus, spruce, pine, birch and beech), harvested from certified and controlled sources following the stringent guidelines of the Lenzing Wood and Pulp Policy. They are available with chain of custody FSC® or PEFC™ certification upon request.</p> <p>LENZING™ Lyocell staple fibers have been certified as Biobased under the BioPreferred® Program of the U.S. Department of Agriculture, a governmental body.</p>
<b>Sustainable production</b>	<p>All fiber production sites operate according to a certified quality management, environmental management, and occupational health and safety system (ISO 9001, ISO 14001, OHSAS 18001).</p>	<p><b>Closed-loop process</b> LENZING™ Lyocell fibers (and other specialty lyocell fiber subtypes) are reputed for their environmentally responsible, closed-loop production 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 percent.</p> <p>The water footprint of LENZING™ Lyocell fibers is 1.7x lower than that of generic viscose fibers**.</p> <p>Lenzing's lyocell technology achieves a significant reduction in chemicals thanks to conversion of pulp to fiber in a closed-loop physical process.</p> <p>This economically viable manufacturing process received the European Award for the Environment from the European Commission in the category "Technology Award for Sustainable Development".</p> <p>LENZING™ Lyocell fibers have been certified as Biobased by the U.S. Department of Agriculture (USDA).</p> <p><b>Newly introduced specialty products</b> <b>TENCEL™ Lyocell fibers with REFIBRA™ technology</b> These fibers are produced using recycled cotton scraps and virgin wood pulp. They are available with Recycled Claim Standard.</p> <p><b>LENZING™ Lyocell filaments</b> Eco-botanic filaments are derived from the renewable resources wood at a commercial scale based on an environmentally sound closed-loop process.</p>
<b>Social responsibility: Human rights and labor relations</b>	<p>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 of all employees. Lenzing adheres to its Lenzing Global Code of Business Conduct.</p> <p>FSC® certification ensures that negative impacts on local populations are avoided. These certifications uphold indigenous peoples' rights of ownership and use of land and resources. People who work in certified forests and plantations benefit from fair labor rights.</p> <p>Labor rights are subject to local laws. At all Lenzing sites, employees benefit from fair wages due to collective bargaining, national protection of human rights and from the following Lenzing standards, which safeguard labor rights:</p> <p>Lenzing Global Code of Business Conduct (COBC), Lenzing Global Supplier Code of Conduct (SCOC), Policy on Human Rights and Labor Standards, Wood and Pulp Policy, Policy for Safety, Health and Environment (SHE), Sustainability Policy, Product Safety Policy, Quality Policy</p>	
<b>End of life</b>	<p>Derived from nature, all LENZING™ standard fiber types have been certified as biodegradable and compostable in industrial, home, soil, and marine conditions, so they can fully revert back to nature.</p>	



## Modal

## Viscose

LENZING™ Modal fibers are mainly manufactured from beech wood, sourced from sustainably managed semi-natural forests in Austria and neighboring countries. Beech wood forests are a natural and renewable source of raw material. A big share of the wood used at the Lenzing site comes from Austria, harvested from certified or controlled sources following the stringent guidelines of the Lenzing Wood and Pulp Policy. These fibers are also available with FSC® or PEFC™ certification upon request.

LENZING™ Modal fibers have been certified as Biobased under the BioPreferred® Program of the U.S. Department of Agriculture, a governmental body.

LENZING™ Viscose fibers are largely based on wood from eucalyptus, beech and spruce, however, it depends on the production site. LENZING™ Viscose fibers are available with chain of custody FSC® and PEFC™ certificate.

LENZING™ Viscose fibers have been certified as Biobased under the BioPreferred® Program of the U.S. Department of Agriculture, a governmental body.

### Eco Soft technology

LENZING™ Modal fibers are produced exclusively in Austria using Eco Soft technology, which gives textiles exquisite softness. The technology employs elemental chlorine-free bleaching (ECF) in an integrated pulp-to-fiber process that has high recovery rates of process ingredients and causes very low air emissions. It predominantly uses surplus renewable energy from the pulp mill making this fiber an environmentally responsible choice as proven by the EU Ecolabel.

### Eco Soft O2 technology

(can be offered as a specialty modal fiber with totally chlorine-free bleaching)

LENZING™ Modal fibers are produced using Eco Soft O2 technology, which gives textiles exquisite softness. The technology employs totally chlorine-free (TCF), oxygen-based bleaching in an integrated pulp-to-fiber process that has high recovery rates of process ingredients and causes very low air emissions. It predominantly uses surplus renewable energy from the pulp mill making this fiber an environmentally responsible choice as proven by the EU Ecolabel.

More than 80 percent share of bioenergy results in low fossil fuel use and a very low CO<sub>2</sub> footprint: Climate change impact is 88 percent lower for LENZING™ Modal than for generic modal\*\*\*.

The viscose process is a chemical-technological process. All individual stages are electronically monitored. Applied chemicals are recovered and reused. In addition valuable co-products like sodium sulfate are obtained and provided to other industries.

### Newly introduced specialty product

#### LENZING™ ECOVERO™ branded viscose fibers

- Sustainable wood and pulp from certified, controlled sources.
- Clean technology: certified with the EU Ecolabel  
Up to 50 percent lower emissions & water impact than generic viscose. According to Higg MSI\*\*\*\* tools, CO<sub>2</sub> emissions and fossil resource use are approximately half that of the industry average.
- Transparency: Fiber identification in the yarn, fabric and final product.

\* For R&D purposes, Lenzing reserves the right to use and investigate small amounts of raw material that is submitted to a due diligence procedure, which largely follows FSC® guidelines, but may not yet be fully certified.

\*\* 0.046 m<sup>3</sup>/kg fiber for TENCEL™ Lyocell vs. 0.1245 m<sup>3</sup>/kg fiber for generic viscose. Source: Higg MSI. These results were 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, the results show impacts from cradle to fiber production gate.

\*\*\* Climate change: 1.28 kg CO<sub>2</sub>eq/kg fiber for LENZING™ Modal fibers vs. 10.62 kg CO<sub>2</sub>eq/kg fiber for generic Modal. Source: Higg MSI. These results were 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, the results show impacts from cradle to fiber production gate.

\*\*\*\* These results were 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, the results show impacts from cradle to fiber production gate. ECOVERO™ branded viscose fibers' Higg MSI score was calculated based on LENZING™ fibers, which are already in the Higg MSI.



# Biodegradable, compostable, flushable: LENZING™ fibers as a contribution to a circular model

## End-of-use options for LENZING™ fiber applications

The various product groups manufactured from different types of LENZING™ fiber include clothing, home textiles, technical products, hygiene products, personal care products, etc.

The use phase for these products ends when the product lifetime is over. Several options exist for what happens at the end of product life:

- Products made from wood-based fibers can in principle be recycled and used again for fiber production in Lenzing, as shown by the example of TENCEL™ Lyocell fibers using REFIBRA™ technology for post-industrial cotton waste on a commercial scale. Recycling of other LENZING™ wood-based fibers has also been demonstrated at a pilot scale.
- If recycling is not possible, some textile and nonwoven applications can be composted if constituents are biodegradable. All the LENZING™ fibers are compostable, fulfilling the requirements for compostability in terms of biodegradability and eco-toxicity. However, to claim compostability for a final product, all constituents of the product need to fulfill relevant compostability criteria according to accepted standards.
- If composting is not an option, the final products can be incinerated with recovery of the embedded energy. Since the fibers consist of natural polymer, they are climate-neutral in terms of incineration, which means that only the amount of CO<sub>2</sub> that was stored in the plant is released. Either way, both composted materials and CO<sub>2</sub> provide input for plant growth, thereby closing the natural carbon cycle.
- The least desirable option is landfill, where wood-based fibers degrade slowly depending on conditions and do not liberate toxic chemicals.

### The problem of plastic litter, particularly in the oceans

Plastics, materials from mainly synthetic polymers, are described as “the ubiquitous workhorse material of the modern economy”<sup>54</sup> due to their functional properties and cost position. Unfortunately, society has been slow to anticipate the need for dealing adequately with end-of-life plastics. After an often short period of use, 95 percent of material value are estimated to be lost to economy<sup>55</sup>. Recycling has only reached significant rates in certain regions and applications. The majority of plastics end up in landfill, and even an estimated 32 percent in the environment. Due to the non-biodegradable nature of most synthetic polymers, plastics litter accumulates when released to the environment. Packaging accounts for the highest share of plastic use (78 million tons in 2013<sup>56</sup>), but synthetic fibers for textile and nonwovens applications also account for a large amount to plastics production (62 million tons in 2016<sup>57</sup>) and following waste issues.

Sources and applications of polymers, including plastics and natural polymers, and their fate in the environment are shown in figure 5/4.

#### Info box 5/2

**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. Conditions must be defined to make the term relevant. Standardized test methods exist for most environments, describing the specific environment and the time allowed<sup>1</sup>.

**Compostability:** A special condition for biodegradability plus additional criteria, including limits for chemical content like heavy metals, and biological testing by assessment of plant growth. Home compost (uncontrolled conditions) and industrial compost (controlled conditions) are discriminated. There are different testing standards available with preference in different regions, one of the most used being standard EN 13432.

<sup>1)</sup> B. de Wilde 2013

One problem area which has only come into awareness in recent years concerns the issue of microplastics in the oceans. Society has used the ocean as a convenient place to dispose of unwanted materials and waste products for many centuries, either directly or indirectly via rivers. On a global perspective, little effort has been made to prevent plastics entering the marine environment. Consequently, a substantial volume of debris has been added to the ocean over the past 60 years, comprising a very wide range of sizes (meters to nanometers in diameter). It is truly a global problem. Estimates state that if current trends continue, by 2050 there will be more plastic litter than fish in the oceans<sup>58</sup>.

Microplastics, particles less than 5 mm in size, constitute a large part of the marine litter problem. These particles can be ingested by organisms in the sea and have the potential for negative effects in both physical and chemical pathways, such as blocking of food uptake, and enrichment of toxins, as well as entering the food chain all the way through to human consumption of fish. The fiber industry is well aware that microplastics from the fragmentation and weathering of textiles and nonwoven products can enter the oceans. During the use phase of textiles and due to washing processes, fiber fragments are released from garments and find their way into the oceans. The advantage of synthetic fibers such as polyester and nylon, their durability, then turns into a disadvantage and becomes a major threat to the marine environment.

<sup>54)</sup> EMAF 2017 a – New Plastics Economy, p.11

<sup>55)</sup> EMAF 2017 a, p. 11

<sup>56)</sup> EMAF 2017 a, p. 21

<sup>57)</sup> Sources: ICAC, CIRFS, TFY, FEB, Lenzing estimates

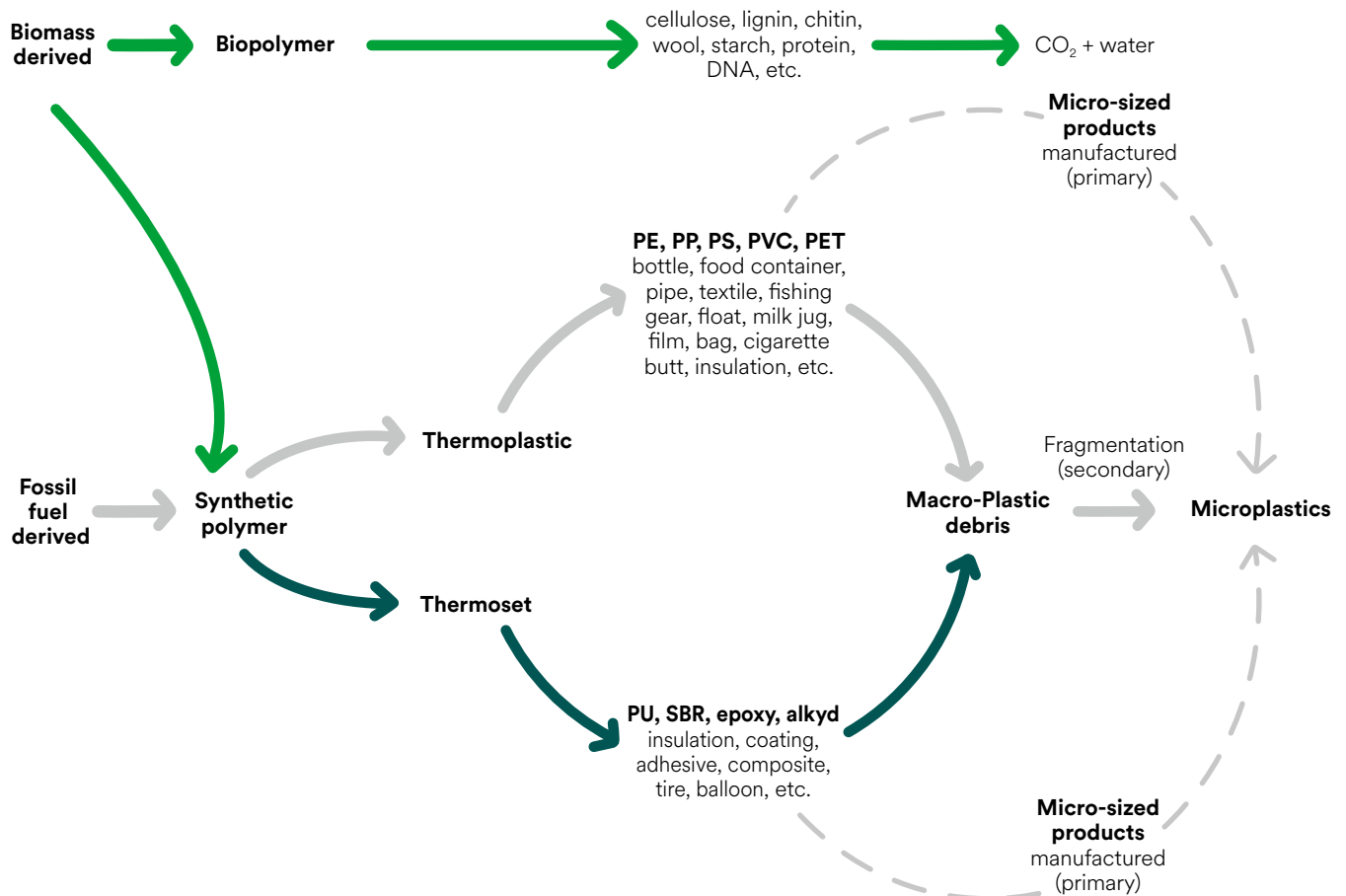
<sup>58)</sup> EMAF 2017a, p.22



## Production of the most common artificial (plastic) and natural polymers, and their fate in the environment.

Adapted from GESAMP 2015

figure 5/4



### A contribution to the solution – biodegradable fibers from Lenzing

It has been recognized in various reports that increased use of biodegradable fibers would contribute to reducing emissions of microplastics<sup>59,60,61</sup>. Government initiatives, such as the EU Plastics strategy, are addressing the issues of plastic consumption and pollution. They include options for substitution with renewable, bio-based, and biodegradable polymers<sup>62</sup>. Fibers and other materials made from pure cellulose fulfill this requirement. "If produced without using or retaining any substances of concern, cellulose-based fibers can be safely biodegraded."<sup>63</sup> The transition from plastics to biodegradable materials will need a change in waste management, new systems for collection and treatment will have to be installed in order to enable a circular flow with innovative (bio-) materials<sup>64</sup>.

important construction material in nature. As such, it has to be biodegradable in order to maintain the biological cycles. As cellulosic fibers derived from the basic raw material of wood, LENZING™ fibers form part of this natural material cycle.

Cellulose is the polymer from which all LENZING™ fibers are manufactured. It is the most common organic compound in nature and the main component of plant cell walls, making it the most

59) EMAF 2017 b, p. 69.

60) Research project "Textile mission" [http://bmbf-plastik.de/sites/default/files/2018-01/TextileMission\\_Praesentation\\_Auftaktveranstaltung\\_Veroeffentlichung.pdf](http://bmbf-plastik.de/sites/default/files/2018-01/TextileMission_Praesentation_Auftaktveranstaltung_Veroeffentlichung.pdf)

61) Henry 2018 <http://www.hioa.no/Om-HIOA/Senter-for-velferds-og-arbeidslivsforskning/SIFO/Publikasjoner-fra-SIFO/Microplastic-pollution-from-textiles-A-literature-review>

62) EU Plastics Strategy, 2018

63) EMAF 2017b, p. 120

64) EU Plastics Strategy 2018, EMAF 2017b



## Biodegradation in various environments

(modified from: EMAF, 2017, after B. de Wilde 2013)

figure 5/5

	Environment	Temperature conditions	Micro-organisms involved	Presence of Oxygen	LENZING™ fibers degrade	Reference
Speed of biodegradation ↑ ↓	Anaerobic digestion (thermophilic)		Bacteria and fungi	✗	✓	Internal testing
	Industrial composting			✓	✓	Vincotte
	Home composting			✓	✓	Vincotte
	Soil			✓	✓	Vincotte
	Fresh Water		Bacteria	✓	✓	Indirect(*)
	Marine Water		Diluted bacteria	✓	✓	Vinçotte

(\*) As biodegradation in marine water is more challenging than in freshwater, the degradation in freshwater can be concluded from marine water result.

It has been proven that LENZING™ fibers biodegrade relatively rapidly in all natural environments. Standard fibers from Lenzing for textile applications (viscose, modal, lyocell) and nonwoven applications (viscose, lyocell) have earned OK Compost certification from VINÇOTTE, now renamed as TÜV AUSTRIA BELGIUM NV.

Standard fibers from Lenzing for textile applications (viscose, modal, lyocell) and nonwoven applications (viscose, lyocell) were shown to be fully biodegradable in seawater conditions. Accordingly, they were awarded the prestigious OK biodegradable Marine logo by the VINÇOTTE certification body, now renamed as TÜV AUSTRIA BELGIUM NV. Table 5/2 shows the details and components of testing to obtain the certificate.

### Test components of the “OK biodegradable Marine” certificate table 5/2

Test	Norm/s	Testing requirement	Standard LENZING™ fibers
Marine Aerobic Biodegradation	ASTM DD6691 (2009)	90% of testing material must be biodegraded within 6 months in seawater under laboratory conditions.	✓
Marine Aerobic Disintegration	TS-OK-23 VINÇOTTE standard ASTM D7801 (2012)	90% of testing material must be disintegrated within 12 weeks (= 84 days) according the Vinçotte Standard and pass through a 2 mm sieve.	✓
Ecotoxicity: Aquatic invertebrate acute toxicity test with Daphnia magna	OPPTS 850.1010 (1996) OECD 202 (20049)	Less than 10% of an aquatic organism (Daphnia) should be affected when they are put in water containing the tested material in a 0.1% concentration.	✓
Chemical Characterization (heavy metals including cobalt and fluorine)	EN 13432 (2000) EN 13432, ISO 17088 and ISO 18606	Heavy metals content in ppm Zn ≤ 150 Cu ≤ 50 Ni ≤ 25 Cd ≤ 0.5 Pb ≤ 50 Hg ≤ 0.5 Cr ≤ 50 Mo ≤ 1 Se ≤ 0.75 As ≤ 5 Co ≤ 38 Fluorine ≤ 100	✓ Compliant with EN 13432



## Issues with published reports on the finding of viscose/rayon in the marine environment

Lenzing is aware of published studies that claim to have found viscose in marine samples (e.g., Woodall et al. 2014). These studies have been quoted in some reports and secondary publications with the conclusion that viscose and wood-based fibers are connected to the microplastics issue. The Lenzing Group takes this very seriously and is currently communicating with the research institutes involved. Furthermore, Lenzing is participating in a consultation by the European Commission on microplastics and undertaking research activities to clarify the facts.

A first study initiated by Lenzing revisited the analytical methods used to identify fibers in marine samples. Comnea-Stancu et al.<sup>65</sup> have tested the methods and found that use of Fourier transform infrared spectroscopy and matching with commercial spectra libraries can lead to ambiguous results, with a high likelihood of false identification of natural fibers as man-made (wood-based) fibers. The method is therefore only capable of identifying cellulosic fibers, but not discriminating the origin, whether natural such as cotton, or wood-based such as viscose.

Research is now focusing on the details and mechanisms of biodegradation of cellulosic fibers in various environments, and on the influence of further processing steps. Especially in textile dyeing and finishing, many types of chemical treatment are used, and some may have the potential to slow down biodegradation. This work is ongoing in collaboration with renowned institutes and multi-stakeholder research projects.

## Applications of LENZING™ fibers where biodegradability plays a role

### Flushable moist toilet tissues

Improper disposal of materials such as wipes and feminine hygiene products through the sewer system causes considerable damage every year. Pumping stations become blocked, and plastic parts in the wastewater cannot biodegrade. A comprehensive study by Water UK<sup>66</sup> shows that the majority of sewer blockage material recovered comprised non-flushable wipes that were not designed to be flushed and should not have been disposed of via the toilet.

By using the right fabric forming and binding technologies, wipes consisting of Lenzing's specialty lyocell short cut fibers enable both features: strong in use and disintegrating and biodegrading after they have been thrown away or flushed down into the toilet.

### LENZING™ for Packaging

The botanic packaging concept employing LENZING™ Modal fibers for fruit and vegetables is an innovative solution available for avoiding plastic. 100 percent LENZING™ Modal fibers are used to produce the knitted nets. Nets made of LENZING™ Modal fibers decompose within eight weeks and can be disposed of and decomposed quite easily with other organic waste. Accordingly, onions, potatoes, and beetroot are now being packaged in botanic nets and can currently be found on sale in Austria, Switzerland, and the UK.

## LENZING™ for Agriculture – botanic solutions for agriculture and aquaculture

Agriculture uses 6.5 million tons of plastic products per annum worldwide<sup>67</sup>. As a lot of the applications are used only for a short time, and in open places exposed to wind and weather, losses of plastic material as uncontrolled waste in the environment are a major issue. Due to their property profile, fibers made from the natural raw material wood are especially suitable for applications in agriculture and marine environments. For growing vegetables and fruit (support strings, ropes, nets, and nonwoven fabrics), LENZING™ for Agriculture fibers are an ecological alternative. A broad spectrum of applications is possible, including weed-control fabrics. A marine application has also been developed for aquaculture use in mussel nets made of LENZING™ for Agriculture fibers.

## Net-benefit products

Lenzing's net-benefit products offer positive impacts and benefits to environment, society, and value chain partners, which are significantly 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.

- LENZING™ Lyocell fibers are produced in a closed-loop production 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 percent.
- LENZING™ Modal Eco Color dope-dyed fibers provide efficient ecological advantages thanks to substitution of the resource-intensive conventional dyeing process. This yields substantial life-cycle savings in water and energy from cradle to finished fabric, e.g., up to 50 percent energy and water savings as well as a 60 percent smaller carbon footprint, resulting in a lower environmental impact compared to conventionally dyed fabrics.
- TENCEL™ Lyocell fibers with REFIBRA™ technology involve upcycling a substantial proportion of pre-consumer cotton scraps, e.g., from garment production, in addition to wood pulp, where the raw material is transformed to produce new virgin LENZING™ Lyocell fibers to make fabrics and garments. TENCEL™ Lyocell fibers with REFIBRA™ technology are identifiable in yarns, fabrics, and final garments due to the innovative special identification technology designed to confirm fiber origin. In turn, this improves supply chain transparency.
- LENZING™ ECOVERO™ viscose fibers generate up to 50 percent lower emissions and water impact compared to generic viscose. LENZING™ ECOVERO™ fibers can be robustly identified in the final product which improves supply chain transparency.
- TENCEL™ Luxe with Eco Filament technology are derived from the renewable resource wood at a commercial scale, with sustainability at its core, based on an environmentally sound closed-loop process. LENZING™ Lyocell fibers have better environmental performance than other cellulosic fibers, such as conventional cotton.

65) Comnea-Stancu 2016

66) Water UK: a membership organization representing the major water and wastewater services

67) Scarascia 2012



# LENZING™ product certifications

## 1) USDA Biobased

Standard fibers from Lenzing are USDA Certified Biobased products.

Biobased products are derived from renewable resources such as agricultural, marine, and forestry materials and provide an alternative to conventional products derived from petroleum.

The biodegradability of Lenzing's wood-based cellulose fibers has been confirmed by international standards and certified by international certification organization **VINÇOTTE**.

([www.vincotte.com](http://www.vincotte.com))

## 2) Compostable, home compostable

Standard fibers from Lenzing are fully compostable according to international standards and norms. The testing scheme includes tests for biodegradability (chemical breakdown), disintegration (physical breakdown), eco-toxicity, and harmful substances (e.g., heavy metals).

## 3) Biodegradable – in soil

Standard fibers from Lenzing are fully biodegradable in soil conditions. Testing measures the chemical break-down of a product according to international standards

## 4) Biodegradable – in seawater

Standard fibers from Lenzing are fully biodegradable in seawater conditions. Testing measures the chemical and physical break-down and ecotoxicity of a product according to international standards.

## 5) OEKO-TEX® Standard 100, Appendix 6

The appendix 6 catalog has been specifically developed for companies that are particularly focused on the Detox Campaign. It offers these companies assistance if they want to take this approach.

## 5) OEKO-TEX® Standard 100

is a worldwide consistent, independent testing and certification system for raw, semi-finished, and finished textile products at all processing levels. On the basis of its comprehensive and strict catalogue of measures, with several hundred regulated individual substances, the OEKO-TEX® Standard 100 takes account of:

- Important legal regulations
- Numerous harmful chemicals, even if they are not yet legally regulated.
- Requirements of Annexes XVII and XIV of the European Chemicals Regulation REACH as well as those of the ECHA SVHC Candidate List insofar as they are assessed by expert groups of the OEKO-TEX® Association to be relevant for fabrics, textiles, garments or accessories.

## 6) The FKT “Medically Tested – Tested for Toxins” label identifies textiles that do not release any chemicals that may irritate the skin or be harmful to health. This unique to the market combination of tests for harmful substances and for sensitive efficiency-based body compatibility provides double tested safety.

## 7) Food contact compliance

LENZING™ Lyocell (and Modal) standard fibers have been awarded an ISEGA certificate.

The ISEGA certification body evaluates products on the basis of food legislation or a range of standards which are reflected in the certification programs such as national standards and/or: European Framework Regulation (EC) No. 1935/2004, US-American CFR of the FDA, Title 21: Food and Drugs.

## 8) Responsible Forestry

Lenzing fibers are available with FSC® Mix Credit (C041246) or PEFC™ certification upon request.

## 9) EU Ecolabel

Produced with responsibility for the environment.

The EU Ecolabel is a label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their life-cycle: from raw material extraction, to production, distribution, and disposal.

All LENZING™ Viscose, LENZING™ Modal and LENZING™ Lyocell fibers are available with the EU Ecolabel.

## 10) Responsible Care

Responsible Care is the chemical manufacturing industry's environmental, health, safety, and security performance initiative. Lenzing headquarters has been certified according the Responsible Care standard for more than 20 years.

## 11) Management systems

All Lenzing fiber and pulp production sites operate according to a certified quality management, environmental management and occupational health and safety system (ISO 9001, ISO 14001, OHSAS 18001).

## -) Fairtrade

LENZING™ fibers are listed as responsible fibers under the Textile Standard of Fairtrade.

## 12) Recycled Claim Standard (RCS)

The RCS is used as a chain of custody standard to track recycled raw materials through the supply chain.



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## Product safety

Lenzing continues to utilize external third-party certifications to demonstrate the safety of its products in the appropriate area of use. OEKO-TEX® Standard 100, which certifies the safety of LENZING™ fibers for textile and nonwoven applications, is still Lenzing's main certification. Controls of raw materials and production processes ensure that fibers are compliant with relevant regulations, directives and standards. LENZING™ standard fibers are certified for food-contact applications according to European and US regulations.

In line with the increased interest of Lenzing's customers and the growing number of products (new and existing) being used in new applications, the team for Product Safety and Regulatory Affairs (PSRA) in Lenzing was strengthened in 2017. This response ensures that the company can keep abreast of changes to standards and regulations in most of the countries where Lenzing is present.

Lenzing regards this area as a very important part of the product offering to its customers. The increased resource means that the company continues to respond to the needs of its customers expertly in a timely fashion.

All LENZING™ fiber products are tested for a wide range of health and safety aspects to avoid potential effects on consumer health as far as this is possible within the limitations of a B2B company, such as a raw-material supplier. However, the responsibility for consumer health is a concern for companies that supply the final products to consumers. **[416-1]**

## Quality

In 2017 the Lenzing Group continued to improve the quality of products and services. This was achieved through closer collaboration with key customers in strategically important application areas. This approach is enabling better recognition of customer needs beyond aspects that had previously been included in product specifications. This understanding forms the basis for many improvement projects at all Lenzing sites to make products that better meet the purpose of our customers.

In addition, Lenzing has opened a new Application Innovation Center in Hong Kong. Here fabrics with different designs can be developed to demonstrate to customers the best use of LENZING™ fibers. This complements the Fiber Processing Unit in Lenzing, Austria, which has a greater focus on fiber to yarn and on the various dyeing processes for textile applications. A third Center of Excellence will be opened in 2018, further enhancing the company's customer focus and supporting use of its fibers along the supply chain.

Heartbeat for Quality – an initiative to improve quality – was launched in March 2017 and matches Lenzing's strategic quality activities with its vision:

- To be a market leader in terms of best product consistency, application performance, and service.
- To live and breathe quality and understand and adapt to the needs of its customers.
- To use internal systems to drive manufacturing processes to achieve sustainable improvements.

By the end of 2017, Lenzing had aligned its production facilities with roadmaps for quality programs in many areas. Lenzing benchmarks its product performance and capability against its competitors, which allows the company to identify where even greater work is needed.

This coordinated approach with the full backing of the Lenzing business has enabled progress in three key areas – elimination of spinning faults, elimination of contamination, and development of more secure packaging. This has only been possible with the commitment of the whole business. The quality culture in the Lenzing Group is being further developed, and it is hoped that the effect of improvements to date, which are already being appreciated by customers, can be further enhanced in 2018.

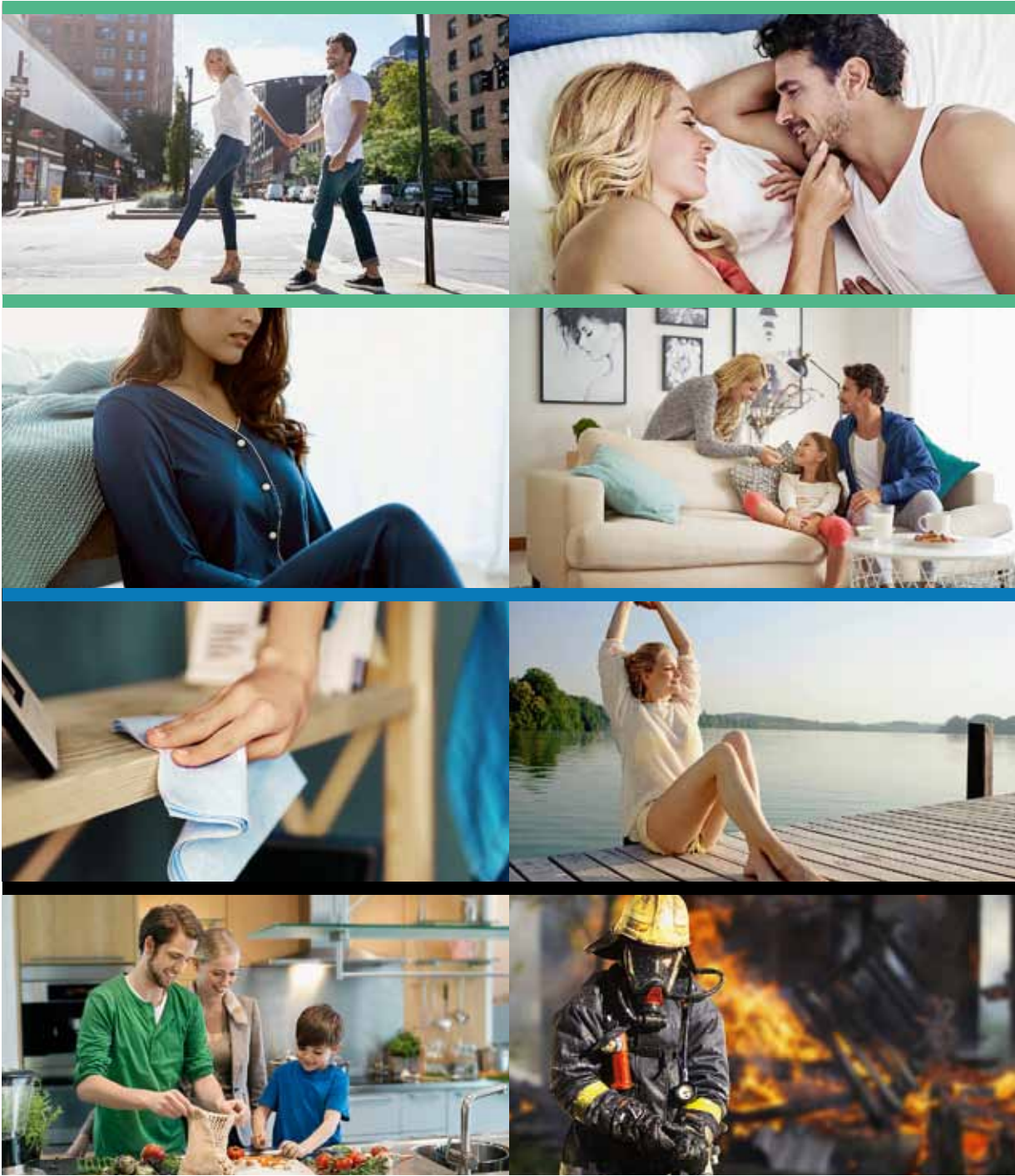
The Quality Management System at Lenzing is aligned with the ISO 9001 standard, and all Lenzing production locations bear this certification. Accordingly, there is a global approach to quality management, where each operating site adapts the global strategy to the product portfolio and corresponding customer requirements.



# LENZING™ fibers in use

**You can dress yourself from head to toe with LENZING™ fibers. Our wardrobe is full of them. LENZING™ fibers are present everywhere, whether in underwear, T-shirts, vests for every-day use or in more exquisite garments to be worn in the evenings.**

With respect to sports activities, people encounter fibers from Lenzing in fast-drying, breathable, odorless T-shirts, fleece jackets, trousers for climbing, running or walking or for yoga as well as in the accompanying sports shoes. In the bathroom fibers from Lenzing can be found in towels and bath towels. They are soft and at the same time absorbent and easy-care. People use hygienic and wet wipes to cleanse their skin. Swabs and pads are available, and there are baby diapers for the little ones. And even the most delicate feminine hygiene products contain LENZING™ fibers.



- Textile applications
- Nonwoven applications
- Industrial applications

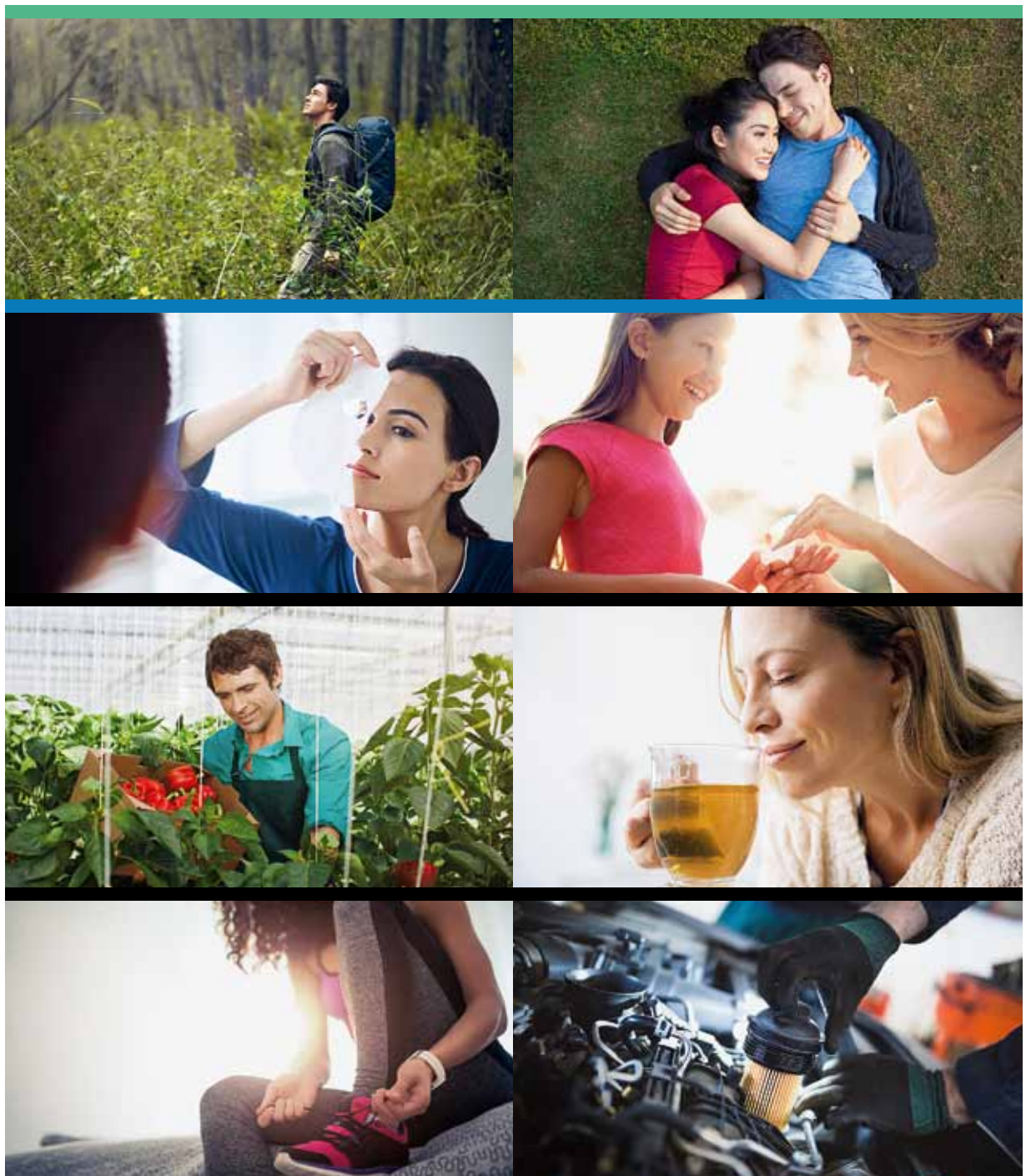


In the household people use wipes made from LENZING™ fibers, and hold sustainable, biodegradable fibers from Lenzing in their hands when they carry home fruit or vegetables in a net. Acetic acid and soda derived as biorefinery products of Lenzing's pulp production also reappear in retail consumer goods.

In the medical sector, LENZING™ fibers are used for hygiene and wound care. Fibers for protective clothing offer protection from burns, heat stress, and heat stroke caused by flash fires, electric arcs, and other thermal hazards.

When people go to bed at night, they make themselves comfortable in pajamas and on mattresses made with LENZING™ fibers, and cover themselves with bed linens containing Lenzing products.

LENZING™ fibers are found in many areas of life. In the future Lenzing will intensify its efforts to make the end consumers aware that they can also make their own personal contribution to sustainability and environmental protection through their daily shopping decisions.

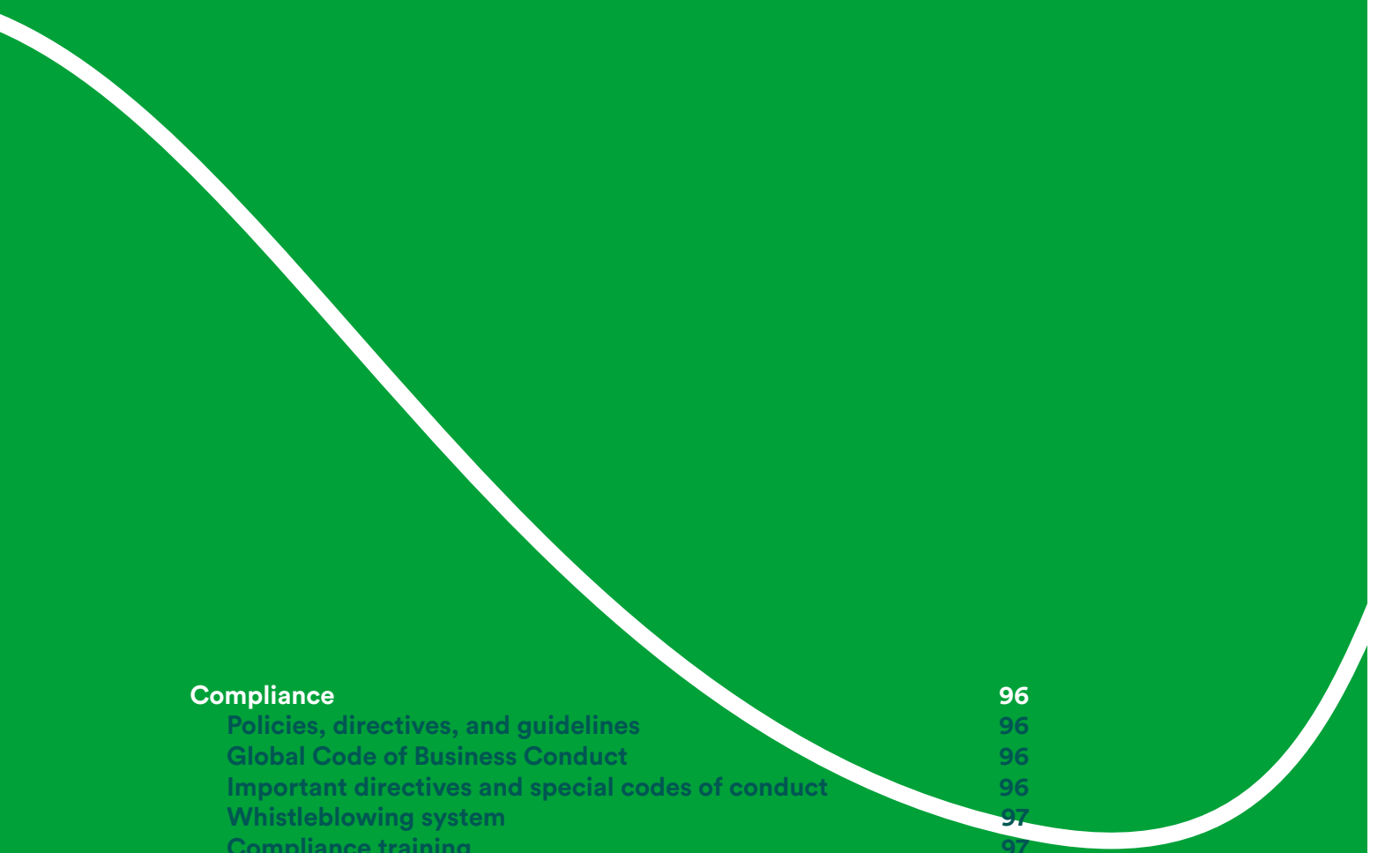




# Responsibility for people

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# Staff development

Motivated employees who are eager to learn are the driving force in a company. Lenzing not only takes responsibility for the professional development and further education of its employees, but also for their wellbeing, and helps them to remain healthy.

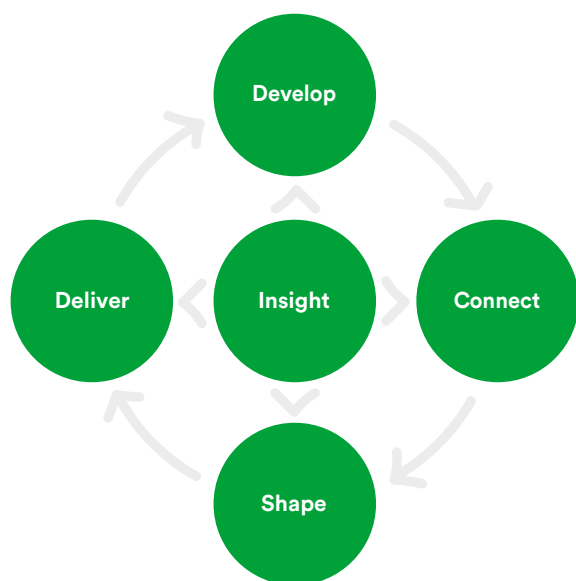
The Lenzing Group supports the training and further education of its employees, and offers „on-the-job“ challenges to promote their personal and professional development.

Despite the company's firm roots in Europe, an international corporate culture has evolved in the Lenzing Group thanks to continuous dialog between its sites in Asia, Europe, and the USA. Cultural diversity and respect for others constitute an integral part of everyday working life. The management team actively supports the progressive internationalization of the workforce at all levels. At the same time, Lenzing is still a practice-oriented company that is characterized by flexibility and a high service level and within which a friendly, familial atmosphere has been preserved.

## From people – for people: The Lenzing Group's leadership model

Lenzing's corporate culture is characterized by the values of respect, diversity, and collaboration with speed in accordance with the Group's sCore TEN strategy. An important key for sustainable corporate success is the basic principle of „from people – for people“, which is reflected in the Lenzing Group's leadership model. Guidelines for how work, communication, assessment, recruitment, and planning take place in the team at Lenzing are defined in this model. In addition, the leadership model describes principles for how the Lenzing Group operates and does business, as well as the criteria for designing company training programs.

**Leadership Model**  
figure 6/1



## Growing workforce

The Lenzing Group's workforce is growing continuously, and the Group's activities are becoming increasingly international. At the end of 2017, the Lenzing Group employed 6,315<sup>68</sup> people in eleven countries, representing an increase of 4.5 percent compared to 2016 (6,043 employees). The number of contractors rose from 432 to 520 in 2017. The proportion of full-time posts in the Lenzing Group amounted to 83 percent (thereof 12 percent women and 88 percent men). Consequently, the proportion of part-time posts amounted to 17 percent (thereof 21 percent women and 79 percent men<sup>69</sup>). The Lenzing Group employed 173 apprentices, with 93 percent of them working at Lenzing's sites in Austria and 7 percent in the United Kingdom. [102-8]

## Diversity

Respect, diversity, and inclusion are fundamental pillars of the sCore TEN corporate strategy and integral, indispensable elements of the Lenzing Group corporate culture. They are taken into consideration in the staffing of positions in Supervisory and Management boards. For the proposals for filling supervisory board mandates and when nominating management board members, attention is paid to achieving a technical and diversity-related balance, because this contributes substantially to the professionalism and effectiveness of the work of the supervisory and executive boards. Apart from technical and personal qualifications, such aspects as age structure, origin, gender, training, and background experience are considered in this context. A diversity concept in written form was resolved on 19 February, 2018.

In the Lenzing Group's Policy on Human Rights and Labor Standards, Lenzing commits itself to respect and support fundamental labor principles including the protection from discrimination, harassment and inhumane treatment. This includes protection from 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, discrimination in working conditions, marital status and others.

The Lenzing Group's corporate culture aims to promote tolerance and respect for others and their respective cultural background. However, as employees are mainly recruited locally, the proportion of employees with a nationality other than that of the respective Lenzing subsidiary is 2.9 percent. The proportion of female employees is growing slightly every year, namely from 12.3 percent in 2015 to 13 percent in 2016, and 13.5 percent in 2017. Although

<sup>68</sup> Employees (excluding apprentices, and contractors) in Austria, the Czech Republic, United Kingdom, USA, China, Indonesia, India, Thailand, Turkey, Korea and Singapore

<sup>69</sup> Due to the transition to a 5-shift system, these employees (=90% employment level) are treated as part-time employees.



the average proportion of female employees has continuously increased in the last few years, the low proportion of women in the company is attributable to the fact that working in shifts is sometimes associated with serious physical exertion.

The proportion of over-50s in the workforce has grown slightly in recent years from 20.4 percent in 2015 to 21 percent in 2016, and 22.3 percent in 2017. The labor turnover rate (i.e., the number of people leaving the company) fell further last year. While the turnover rate stood at 12.1 percent<sup>70</sup> in 2015, it fell sharply to 5.8 percent in 2016<sup>71</sup>. In 2017, the rate fell further to 4.2 percent. **[102-8, 401-1, 405-1]**

#### Diversity: Information by country, 2017 table 6/1

(headcount, proportion of women, proportion of over-50s, labor turnover rate)

	Headcounts	Female in %	Age > 50 in %	Turnover in %
Group	6,315	13.5	22.3	4.2
Austria	2,998	17.0	27.2	4.4
Indonesia	1,749	3.5	11.2	2.1
China	707	15.1	3.4	8.3
Czech Republic	389	17.7	50.9	2.8
USA	203	16.3	39.9	5.4
Great Britain	167	13.2	48.5	4.8
Other	102	49.0	13.7	11.8

## Employees with disabilities

The Lenzing Group employed 97 people with disabilities in 2017 (2016: 102). Most of these were employed in Austria (83), followed by the Czech Republic (11), Indonesia (2), and the USA (1). While no formal recording of numbers of employees with disabilities is conducted at the site in Grimsby (United Kingdom), no employees with disabilities were registered at the Nanjing facility. **[405-1]**

No complaints, cases of discrimination, or human rights abuses were reported in 2017. **[406-1]**

Lenzing complies with the local standards in all countries. 81.3 percent<sup>72</sup> (2016: 45.9 percent) of the Lenzing Group's global workforce are included in collective agreements. The proportion of employees to whom notice periods governed by labor law or collective agreement apply in the event of restructuring measures amounts to 80.6 percent. **[102-41]**

## Works council

The management of the Lenzing Group is committed to a transparent information policy towards the employees' official representatives. There are local works councils at the facilities in Lenzing, Heiligenkreuz and Paskov. In accordance with the Austrian Labor Constitution Act, representatives of the Lenzing AG works council 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 factions and interest groups are active at the sites in Paskov, Purwakarta, Nanjing, Grimsby, and Mobile. **[403-1]**

Consequently, 100 percent of the total workforce is represented by local unions or works councils. No strikes took place at any Lenzing production facility (Grimsby, Paskov, Purwakarta, Nanjing, Mobile, Lenzing, or Heiligenkreuz) in 2017. **[407-1]**

## Lifelong learning and training

Highly qualified and motivated employees constitute the basis for sustainable corporate success. Consequently, the Lenzing Group attaches great importance to the continuous training and further education of all team members – from apprentices to skilled workers through to managers. Lenzing fosters the potential and skills of its employees with a wide range of personnel development measures and tailor-made training programs. Total expenditure on lifelong learning and personnel development increased once again from EUR 3.3 million in 2016 to 4.7 million in 2017.

To meet its future requirements for young skilled workers, Lenzing is also training apprentices itself. In 2017, a total of 173 apprentices were being trained, 161 of them in Austria and 12 in the United Kingdom. One focus of further education and training activities in 2017 were international programs organized by Global Human Resources (HR). These included the „Springboard“ global junior leadership program, the „Lenzing Lyocell Talents“ development program aimed at engineers, and the mentoring program for young

70) The high turnover rate in 2015 can be attributed to the excelLENZ cost saving program and various divestments.

71) This figure has been corrected and deviates from the figure in the 2016 report (7.1%). **[102-48]**

72) In 2017 PT. South Pacific Viscose and Lenzing Biocel Paskov a.s. concluded collective bargaining agreements.



#### Info box 6/1

##### Mentoring program

In order to support young talents purposefully in their development, Lenzing launched a global mentoring program in 2017. Almost 60 experienced employees received training in two stages to become mentors for the purpose of passing on their experience to mentees and supporting them in challenging situations. The mentors in turn benefit from the ideas and know-how of the young generation. In this way, different skills and abilities are intertwined and the Lenzing culture refined with a focus on respect and diversity.

##### Breakfast with EC

Since 2016, the „Breakfast with EC“ initiative has been offering employees the opportunity to address their concerns to the Executive Committee (EC) and to discuss questions concerning the sCore TEN strategy in a relaxed atmosphere. In 2017, 80 team members at the Lenzing facility took advantage of this opportunity, and a total of ten „breakfast meetings“ were held.

##### Management programs

The „Deliver with Power“ pilot project launched in 2016 aims to improve presentation techniques. 154 employees took part in Austria, and it was rolled out in the Czech Republic, Asia, and the USA in 2017. The second management program, „Collaboration with Speed“, was initiated in Austria in the fall of 2017. This program to promote efficient collaboration consists of five modules: intercultural collaboration, managing international teams, digital tools, communication in virtual teams, and leadership parkour.

##### Commercial Academy

As part of the global „Commercial Academy“ training program, a total of 18 training sessions were held in Europe, America, and Asia in 2017, where almost 140 employees from the commercial field were able to enhance their technical expertise, legal knowledge, and negotiation techniques. Further Commercial Academy training sessions will be held in all regions in 2018.

##### Global Fiber Academy

The „Global Fiber Academy“, which was founded in 2004 with the objective of improving interdisciplinary knowledge of fibers and understanding of the value chain throughout the Group, was continued in the reporting year.

[404-2]

talent launched in 2017, in which successful colleagues support young employees. See Info box left.

The Lenzing Training Center (BZL) founded in Austria in 1998 offers numerous training and further education programs not only for the Lenzing Group, but also for other companies. The main focus of these programs is apprentice training and personnel development.

The „VIEW Team“ online survey tool was developed during the reporting year at the Lenzing Training Center. VIEW Team visualizes strengths and bottlenecks from the team member perspective. Development opportunities are identified and the effectiveness of change measures is ensured. In this way, team members participate in the continuous optimization of collaboration.

Furthermore, the Lenzing Group attaches particular importance to annual performance reviews, where joint targets and development plans are agreed between employees and their line managers. These are intended to provide both parties with the opportunity – away from the daily routine – to reflect upon and evaluate their current situation and to define future goals and initiatives for successful further development of the collaboration. Apart from the definition of operational targets, as well as their subsequent evaluation, the performance reviews also aim to promote and improve the culture of communication in the company. [404-2]

## Health

The Lenzing Group's health management system („House of Health“) is based on the concept of salutogenesis<sup>73</sup>. This concept is tailored to the respective health and social systems of the countries where Lenzing operates and provides a conceptional framework for targeted investments in health care. To promote the health of employees even more strongly than before, the new position of Health Care Manager was created in the Global HR department in 2017. Apart from coordinating the company physicians, the Health Care Manager initiates various activities in the „House of Health“ field.

### Health management at Lenzing production facilities

Lenzing provides employees at all locations with an in-house primary care system that compensates for deficits in the health systems of the respective countries. Table 7/7 on page 111 (annex) provides a brief overview of the Lenzing Group's healthcare services.

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

<sup>73</sup>) The concept was developed by Israeli-American sociology professor Aaron Antonovsky († July 7, 1994). In contrast to pathogenesis, salutogenesis focuses on the question of what keeps people healthy, rather than the question of what makes them ill.



hospital in the vicinity of Lenzing's Indonesian PT. South Pacific Viscose fiber facility.

The large fiber production plants in Lenzing and Purwakarta also have their own outpatient clinics with appropriately trained medical staff for quick, competent treatment of acute conditions.

In terms of emergency medical care, Lenzing goes beyond the offering of basic first aid services with at least ten regularly trained first responders per 100 employees. Emergency physicians and paramedics at the production sites, who are familiar with operational hazards, ensure high-quality medical assistance for injured or acutely ill persons.

In addition, the emergency rescue service at the Lenzing site is operated in cooperation with and under the auspices of the Austrian Red Cross. In case of emergency, the emergency physicians and paramedics of the local health care center (IBG Gesundheitszentrum Lenzing) cooperate closely with the company's own fire brigade. A similar model with local partners is implemented in Purwakarta. At these two locations, Lenzing can also call on modern, company ambulances that ensure prompt further treatment at specialized medical facilities.

#### **Info box 6/2**

##### **Mobile (USA): iHealthy programm**

Employees at the facility in Mobile (USA) continued to be offered health checks in the 2017 reporting year. This represented a continuation of the now well-established iHealthy wellness program managed by an external healthcare service provider.

#### **Info box 6/3**

##### **Lenzing (Austria)**

Employees at the Lenzing facility benefit from a comprehensive program to promote health and well-being in the workplace. The issue of healthy eating was a particular focus of the program in 2017.

At the kick-off event in Lenzing, internationally renowned chef and nutrition expert Sarah Wiener spoke about enjoyment and a health-conscious diet. Some of her vegetarian dishes can now be found on the menu plans of the Lenzing company restaurant.

In addition, cooperation with local food suppliers was intensified in 2017. The company restaurant makes increasing use of organic foods and only offers MSC-certified fish. The key topic of „healthy eating“ also encompasses monthly expert commentaries regarding controversial nutrition issues, various presentations, and a health check, including dietary advice, which is easily accessible to all team members.

#### **Info box 6/4**

##### **Purwakarta (Indonesia): Healthcare services for the community**

For several decades now, all employees at the site (and their family members) have been offered a comprehensive primary medical care service. The company operates two hospitals – one on the company premises and one in the city of Purwakarta, where most employees live. On average, 500 patients a week are treated at these two modern, well-equipped hospitals. In total, the facilities provide 6,000 people with healthcare services.

The medical services include treatment of acute and chronic illnesses and the dispensing of medications. The hospital in the city offers additional services, such as simple laboratory diagnostics and primary dental care. The hospital on the company premises is also used as an emergency department. Emergency cases can be given initial treatment here. Moreover, quick and competent initial treatment of work-related accidents is ensured by a large number of trained first-aiders. All healthcare facilities and services are managed and monitored by a highly qualified Indonesian physician employed by the company.

To increase the health awareness of employees, Lenzing relies increasingly on preventive medicine in Purwakarta. For example, preventive medical programs addressing such topics as a healthy lifestyle, dental hygiene, and changing one's diet by reducing salt, sugar, and cholesterol were offered at the company hospitals in 2017. In addition, a voluntary blood donation program was initiated in cooperation with the Red Cross organization in 2017, which met with great approval on site.

## **Safety**

### **Lenzing Group philosophy for safety, health, and the environment (SHE)**

The protection of employees and protection of the environment are a fundamental prerequisite of corporate activity for Lenzing and are therefore firmly anchored in the corporate values of the Lenzing Group.

- Activities are carried out in a way to protect people and the environment based on the belief that every incident, injury and occupational illness is preventable.
- Lenzing protects the environment by minimizing emissions and waste and by improving resource efficiency.



- In order to continuously improve SHE performance, objectives and targets are set and controlled and the safety culture, standards and systems are continuously developed and maintained.
- The Lenzing Group complies with all applicable legislation and regulations in the countries of their operation and goes beyond compliance to relevant industry standards.
- All employees are trained and involved in hazard identification, risk assessment and control.
- All employees are empowered to stop any task or activity if it cannot be carried out in a safe manner.

#### **„Heartbeat for Safety“: Cultural change in full swing**

The medium-term „Heartbeat for Safety“ concept launched in 2016 continued to be implemented consistently in 2017.

The group-wide „Heartbeat for Lenzing“ conference held in June 2017 made a decisive call for driving cultural change towards increased safety awareness. The motto of the three-day conference was „Every day a little better than the day before“. At this event, around 120 team members from all locations received training from Lenzing management board representatives, internal and external experts, and customers concerning the issues of safety and quality in the context of sustainable conduct. The conference was a milestone in reinforcing and accelerating the employees' change in consciousness regarding more „joined-up“ thinking and action in these areas.

In its specific implementation of the new safety strategy, the Lenzing Group focused on the following points in 2017:

#### **„Safety Walks And Talks“**

Since the launch of this group-wide training and discussion format in 2016, 749 Lenzing managers have been trained how to hold successful talks on the subject of safety in 45 training sessions. By the end of 2017, a total of 5,612 „Safety Walks And Talks“ were conducted.

#### **SHE compliance / external auditing**

A program to audit all Lenzing locations was launched in the 2017 reporting year. The aim here is to check whether all local legal regulations and all requirements for company operations are being fulfilled, and whether the Lenzing Group's internal guidelines are being adhered to. In each case, independent local experts familiar with local circumstances and the respective language are called upon for the audit. Any findings are documented and processed accordingly.

#### **Life-saving rules**

Another main focus in 2017 was standardization of the Group's existing regulations for preventing fatal accidents as a consequence of hazardous activities. Examples of such activities include activation of machines and systems, opening of pipes, and potentially dangerous working at heights. The new regulations have been summarized in a dedicated folder, and employees throughout the Group have been given a better understanding of them in training sessions.

#### **Integration of team members in the „SHEARS“ platform**

Seamless reporting and documentation of all relevant events (accidents, near-accidents, observations) are essential for an efficient safety management system. As part of the continuous improvement process for safety standards, it is therefore particularly

important to integrate employees on site into the „SHEARS“ standard reporting system, and to ensure an appropriate level of risk awareness. A standardized, computer-based reporting system was implemented throughout the Group in 2017. The aim here is to increase the impressive number of 17,700 reports (2017) even further in coming years.

In the reporting year an intensive motivation program under the motto of „STARK“<sup>74</sup> was also implemented at the lyocell production facility in Lenzing. The objective was to obtain as many reports as possible in order to implement as many improvements as possible in the subsequent analysis. To boost motivation levels, a lottery was organized and numerous prizes were awarded to employees for their observations and reports.

#### **Safety committees**

To reduce risks to the greatest possible extent, health and safety committees have been established at every production site. These meet on a regular basis to define common objectives, strategies, and specific programs. The committees are composed of both employees' and management representatives. **[403-1]**

#### **Potentially hazardous areas**

In order to ensure uniformly high standards for handling potentially hazardous materials throughout the Group, the necessary processes are being harmonized. A corresponding project is being initiated in 2018 and will be implemented in phases over the next few years. The aim is safe and appropriate use of hazardous materials, substances, and chemicals in accordance with uniform regulations.

Employees are exposed to potential health and safety risks in the following areas of the Lenzing Group:

- Production and logistics
- Research and development
- Business travel (especially by car)
- Areas where chemicals are employed
- Increased construction work during the course of expansion projects

#### **Injuries and work-related accidents of employees and supervised workers**

The 2017 injury rate (accidents involving less than one day's absence from work) remained constant at all Lenzing locations as compared to the previous year. In light of the extensive investment activities at Lenzing production facilities and the resulting increased risk of injury and much higher numbers of personnel on Lenzing construction sites, this can be regarded as a success.

Overall in the Group, the average rate of 25.3 injuries per 1,000 employees in 2017 was much the same as the 2016 level of 24.1 injuries. Compared to the previous years (6.2), the „1000-person rate“ (number of work-related accidents involving more than one day lost per 1,000 employees) remained at the same level in 2017 (5.6). At the lyocell locations in Grimsby (United Kingdom), Mobile (USA), and Lenzing (Austria), there were no work-related accidents with days lost. **[403-2]**

74) Acronym for „Sicherheitsbeobachtungen in der T1-Anlage Registrieren und Korrekturmaßnahmen setzen“ [registration of safety observations in the T1-plant and implementation of corrective measures]



## Work-related fatalities

No fatal injuries were registered in the Group in the reporting year.  
[403-2]

### Lenzing Group: number of injury cases table 6/2

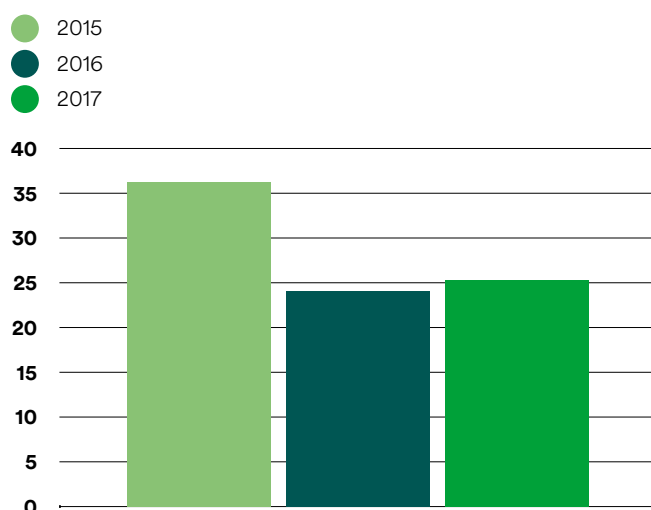
	2015	2016	2017
Group	224*	157*	172

\* The figures have been corrected and divert from the figures in last year's report (251 for 2015, 180 for 2016)

The accident figures for 2016 and 2017 do not include „Minor Injury No Treatment“ (MINT) cases, such as mosquito bites, whilst the figures for 2015 do include them. This change in reporting was made to obtain a better picture of the number of accidents actually requiring treatment [102-48]

### Lenzing Group: injury rate of employees and supervised workers (per 1,000 employees)

figure 6/2

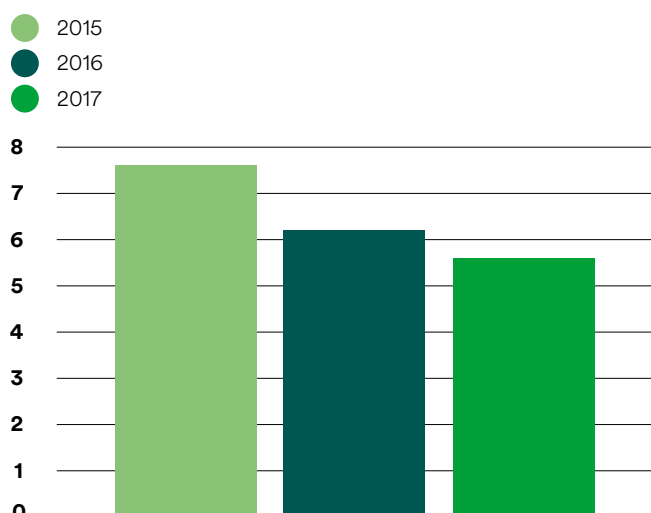


### Lenzing Group: lost workday cases (LWCs) table 6/3

	2015	2016	2017
Group	47	40	38

### Lenzing Group: lost workday cases (LWC) Rate of employees & supervised workers (per 1,000 employees)

figure 6/3



## Info box 6/5



### Why do safety walks and talks matter?

Heiko Arnold, Chief Technical Officer, Lenzing Group: "A company's Safety, Health and Environment (SHE) performance depends crucially on the engagement of all employees regarding the common goal of an injury free, healthy, and environmentally compliant workplace. While accidents seem to be inevitable to some, others believe all accidents can be prevented. Needless to say, in companies with excellent safety performance, more people tend to follow the belief that all incidents are preventable. But how do these companies achieve that crucial change in mindset?

It becomes possible in a company where employees feel responsible not only for their own safety, but also for the safety of everybody working in and for the company. This state is typically called the "interdependent" state of a safety culture. This state builds on organizational pride, caring for each other, and fostering safety-conformant behavior throughout the organization. All this only can be achieved in a sustainable way if the management engages in just the same way. Safety Walks And Talks, or SWAT for short, provide the opportunity for management to get up close and personal on that matter, to listen to what the employees have to say, and to observe how things are on the shop floor. This not only provides an opportunity to contribute to improvements and show personal commitment, it also shows people on the shop floor that their concerns are being heard and the topic is being taken seriously.

At Lenzing, we commit to the goal of an incident free work environment where the whole organization engages in achieving this goal. That's why the Safety Walks And Talks are such a crucial element in our daily work. They connect all employees across all hierarchical levels in the context of this common goal. Following this principle, we have already achieved significant success in transforming the safety behavior of our employees at the Lenzing Group and we will not stop ensuring that continuous improvement also applies in the area of Safety, Health and Environment."



# Corporate citizenship

Both locally and internationally, the Lenzing Group takes its social responsibility as a corporate citizen seriously and makes a major contribution to strengthen the economy in the regions where it operates. This was confirmed yet again in 2017 by a study into the socio-economic and regional economic importance of the Lenzing Group, conducted by the Johannes Kepler University (Linz, Austria) and Gesellschaft für Angewandte Wirtschaftsforschung<sup>75</sup> (Innsbruck, Austria). The study concluded that the business operations of the Group have measurable socioeconomic effects that extend far beyond purely economic aspects.

Overall, the study came to the conclusion that the Lenzing Group creates or secures 20,291 jobs worldwide. Every job within the Lenzing Group creates or secures more than two additional jobs in another branch of the economy. Furthermore, the public sector benefits in the form of tax revenues and social security contributions. **[203-2]**

The study also investigated how many jobs in the region were created indirectly as a result of the company's activities. The number of jobs secured indirectly significantly exceeds the number of staff directly employed by the company.

Socio-economic influence of the Lenzing Group in 2017:

## Austria

### • Upper Austria

At its site in Lenzing, the Lenzing Group operates a pulp and fiber production facility with 2,386 employees. The Group's head office and central research and development activities are also located in Lenzing. As a consequence of the economic activities at the Lenzing site, 6,507 jobs were secured in the federal state of Upper Austria in 2017. Disposable income in the region rose by EUR 412.3 million. Thanks to Lenzing's activities, the gross domestic product of Upper Austria increased by EUR 825.4 million. Approximately 70 percent of the total value added is attributable to the manufacturing industry and the rest to other sectors (commerce, service sector, construction, trade and infrastructure).

### • Burgenland

At the production facility in Heiligenkreuz, lyocell fibers are manufactured. Thanks to Lenzing's activities, the gross domestic product of the federal state of Burgenland increased by EUR 101.3 million and the disposable income by EUR 51.3 million. In 2017, the production facility in Heiligenkreuz secured more than 934 jobs in the region.

## Czech Republic

Lenzing operates a pulp plant in Paskov. Its contribution to the Czech Republic's gross domestic product amounted to EUR 201.6 million, while disposable income rose by EUR 89.8 million. Overall, in 2017 the pulp plant in Paskov secured 3,630 jobs.

## United Kingdom

At the production facility in Grimsby, lyocell fibers are manufactured. Lenzing's contribution to the United Kingdom's gross domestic product amounted to EUR 55.3 million, while disposable

income increased by EUR 27.6 million. 436 jobs were secured by the activities of the production facility in Grimsby.

## Indonesia

The plant in Purwakarta ranks among the world's largest viscose fiber plants. Lenzing's contribution to Indonesia's gross domestic product amounted to EUR 303.3 million, while disposable income increased by EUR 135.1 million. In 2017, the facility was responsible for 5,462 jobs. The facility is one of the most important employers in the Purwakarta region, where it also finances infrastructure and healthcare facilities, as well as numerous social projects.

## China

The Lenzing plant in Nanjing mainly produces viscose fibers for the Chinese market. The factory's contribution to China's gross domestic product amounted to EUR 153.1 million, while disposable income increased by EUR 68.1 million. Overall, 2,756 jobs were secured by the plant's activities in 2017.

## USA

In Mobile, Lenzing manufactures Lyocell fibers destined for the American nonwoven market and for exporting abroad. The Mobile site's contribution to the USA's gross domestic product amounted to EUR 71.8 million, while disposable income increased by EUR 35.9 million. Overall, 566 jobs were secured. The plant is currently being expanded, whereby additional positive effects on value creation and employment can be expected.

## Maintaining relationships with local residents

Lenzing attaches great importance to good relationships with its neighbors. Production-related circumstances, such as noise emissions, unpleasant odors, and environmental pollution, can nevertheless result in disputes with local residents.

Such complaints were registered at the sites in Lenzing, Purwakarta, and Nanjing in 2017. Appropriate measures were implemented to deal with them. As of December 31, 2017, there were no pending legal disputes relating to conflicts between local residents and Lenzing companies/subsidiaries. **[413-2, 103-1, 103-2, 103-3]**

One example of the company's efforts to be a good neighbor is the Lenzing site's longstanding cooperation with farmers and forest owners located around the plant. At annual meetings, the Lenzing Management Board discusses current projects that could affect the company's neighbors with representatives of the farmers and forest owners. These close relationships were also actively cultivated in 2017.

<sup>75</sup>) Schneider et al. 2017



## Social projects and environmental initiatives

One of Lenzing's objectives is to sustainably improve the living conditions of as many people in the world as possible. For this reason, Lenzing has been supporting numerous social projects and environmental initiatives for many years on a decentralized basis. These projects include a longstanding micro-credit program in Purwakarta (Indonesia), sponsoring of various sports and social events, support for educational initiatives, as well as charitable projects at all locations. Taking account of local requirements, the management teams at Lenzing sites decide which projects and initiatives to support. Within the scope of its corporate citizen activities, Lenzing also supports numerous environmental projects, focusing on specific local needs.

### **Paskov (Czech Republic): Renewable resource wood**

The facility in Paskov makes an important contribution to sustainable development in the Moravia region, with a focus on training programs and environmental projects. The company is one of the co-founders of the „Wood for Life Foundation“ which advocates respectful treatment of the renewable resource wood.

As part of the „Visit a forest with a forester“ project, children have the opportunity to try their hand at sivicultural activities, such as planting a small tree. On the other hand, the „Wooden building of the year“ competition reveals how attractive buildings can be when created from wood. During the reporting year, social, cultural, and sports activities were supported within the scope of partnership agreements with several surrounding communities, including the restoration of municipal buildings and facilities. In the field of education, the company supported the projects of two local universities, a school cooperation project, and the national competition for young chemists.

### **Purwakarta (Indonesia): Protection of the mangrove forests**

Numerous environmental initiatives were supported at the production facility in Indonesia. The focus here is on specific local needs. For example, the company nurtures the biodiversity of the region with a project for conserving and replanting mangrove forests. In cooperation with the „Indonesian Mangrove Restoration Foundation“, a total of 2,000 young mangroves have been planted.

Mangroves represent an important resource pool for the population. As a breeding ground for many crustaceans and fish, the coastal forests secure the food supply for the population and provide people with fruit. The project led to a change in thinking in the region. The population is becoming increasingly aware of the negative consequences of deforestation in contrast to the major economic and ecological benefits of the mangrove forests. The Indonesian site also supports the neighboring communities in their efforts to become energy self-sufficient, both with biogas tanks and in the utilization of biomass waste for energy production. In the „Eco Village“ project that SPV supports the aim is to raise awareness in the areas of waste separation, recycling, biomass utilization, and increasing water reserves in the ground.

### **Nanjing (China): A heart for orphans**

The company has been standing up for orphaned children for many years now at its production facility in China. The „LNF Charity Drive“ program provides affected children and young people from rural areas with financial support and donations in kind. Completely in line with Lenzing's corporate culture, the employees also demon-

strated how much they care in 2017, with donations of new writing utensils, such as pens, pencils, rulers, and notebooks, as well as second-hand clothing to underprivileged orphaned children.

### **Mobile (USA): Support for children and families in need**

The facility in Mobile primarily supports children and families in need. For example, the company provided sponsorship via the local chamber of commerce for the „Summer Youth Program“ attended by more than 100 disadvantaged young people in 2017, who benefited from a very practically oriented training program. The company and its employees also made donations in 2017 to the non-profit „United Way“ organization, which provides people with a path out of poverty and supports such institutions as the St Mary's Home for Children.

### **Lenzing (Austria): Support for people with intellectual disabilities**

The Lenzing site takes a proactive approach to its social responsibility and implements selected projects over the long term. One such example is its sponsorship of the international Special Olympics sports movement for people with intellectual disabilities. Special Olympics offer training and competition opportunities in 32 different Olympic sport disciplines for more than 4.2 million athletes worldwide. Lenzing has been supporting this sports movement in Austria – in line with its corporate values of respect, diversity, and inclusion – since 2015. Lenzing is one of the sponsors of the National Summer Games to be held in Upper Austria in June 2018, assuming, among others, the costs for the production of 5,000 mascots for the athletes.

Another example is the company's 15-year collaboration with the Lebenshilfe Oberösterreich (Upper Austrian counseling) association, which cares for around 1,700 people with intellectual disabilities. The background to the joint project at the Regau workshop is that the Lenzing Group places very high demands on the quality and cleanliness of fibers produced. Not least because fibers for nonwoven applications are used for hygiene applications. The fibers are continuously subjected to a manual quality inspection at the workshop in Regau. Four specially trained employees check the fibers in rooms furnished specifically for this purpose. The insights gained help the Lenzing Group to better identify causes of contamination and demonstrate potential for further improvement. Thanks to the extremely precise work of the Lebenshilfe employees, a representative overview of the type and frequency of different types of contamination of nonwoven fibers has been gained over the years. **[404-2]**



# Compliance

Integrity, conformity with regulations, and ethical conduct are essential components of the Lenzing Group's corporate culture. In order to meet this requirement and also comply optimally with the strict legal requirements for listed public companies, Lenzing has established a group-wide compliance management system (CMS). Particular importance is attached to the role-model effect of management and the independent conduct of all team members.

The Legal, IP & Compliance department is responsible for all legal and compliance issues throughout the Lenzing Group. The exception are matters with legal implications in the areas of human resources and safety, health and environment. The department reports directly to the Chief Executive Officer (CEO). One important task lies in the further development of the CMS for processes that control compliance with legal and company-internal regulations and guidelines.

The Legal, IP & Compliance team is responsible for the following tasks:

- Continuously recording compliance-relevant risks
- Setting standards for minimizing these risks
- Developing compliance-relevant guidelines and verifying adherence to them
- Staff training
- Providing assistance with compliance issues
- Reporting regularly to the executive board, supervisory board, or audit committee

All of the Lenzing Group's compliance-relevant documents are categorized systematically and organized hierarchically. The document pyramid encompasses the entire framework of Lenzing Group internal regulations and defines a separate approval process for each document category.

## Policies, Directives, and Guidelines figure 6/4



## Policies, directives, and guidelines [102-16]

- Policies are declarations of intent on the part of the Lenzing Group, which define the standards of behavior for all employees. They include the Global Code of Business Conduct as a guiding principle, the Supplier Code of Business Conduct, the Policy on Human Rights and Labor Standards, the Policy for Safety, Health and Environment, the Sustainability Policy, the Quality Policy, the Policy for Wood and Pulp.
- Directives define codes of conduct, which are binding for all employees. Important directives include the Antitrust Directive, the Anti-Bribery and Corruption Directive, the Whistle-Blower Directive, and the Issuers' Compliance Directive.
- Guidelines mainly contain procedural instructions directed at the work processes, such as the safe handling of chemicals.

## Global Code of Business Conduct

To prevent potential misconduct, the Lenzing Group has defined clear rules for legally compliant and upright, moral conduct, which are binding for all team members. The revised Global Code of Business Conduct (CoBC), which applies throughout the Group, entered into force on January 1, 2017 and constitutes a sound basis for the development of trustful relationships between the Lenzing Group and its stakeholders. It also takes account of one of the guiding principles of the sCore TEN corporate strategy, namely that the manner of doing business is just as important as the business itself. Over 400 employees attended training sessions in 2017 in order to gain a better understanding of the new Global Code of Business Conduct. All team members have been encouraged to report violations and suspected breaches of the code of conduct as soon as possible.

The CoBC is a framework for legal and ethical standards, within the scope of which all Lenzing Group team members operate. It defines the core values and practices for the manner in which the Lenzing Group does its business. The CoBC is binding for all team members worldwide. The contents of the CoBC are based on various Lenzing Group policies and directives, with which they are also interlinked. It is subdivided into three parts, namely Social & Cultural Responsibility (people), Environmental Compatibility & Ecological Sustainability (planet), and Economic & Financial Responsibility (profit).

Further information can be found at [http://www.lenzing.com/fileadmin/template/pdf/konzern/lenzing\\_gruppe/code\\_of\\_conduct.pdf](http://www.lenzing.com/fileadmin/template/pdf/konzern/lenzing_gruppe/code_of_conduct.pdf)

## Important directives and special codes of conduct

### Anti-Bribery and Corruption Directive

The Lenzing Group operates a zero-tolerance policy towards all forms of bribery and corruption. Lenzing is committed to a culture of honesty, openness, and fair dealings with customers, service providers, suppliers, and competitors.



The Anti-Bribery and Corruption Directive (ABC Directive) describes the behavioral requirements for meeting this obligation. It allows managers, employees, and third parties that perform services for the Lenzing Group or on behalf of the Lenzing Group to identify potential problems and to be completely clear about how to proceed in critical cases.

#### **Antitrust Directive**

The Lenzing Group unreservedly recognizes the principles of free and fair competition and is committed to compliance with all the relevant legal antitrust requirements. A high level of commitment is also expected from Lenzing's business partners. In all circumstances, the Lenzing Group distances itself from anti-competitive and unfair practices on the part of its customers, suppliers, representatives, dealers, and competitors.

The Antitrust Directive provides a detailed overview of the most important antitrust issues, in order to assist Lenzing Group employees in identifying, preventing, and reporting potential anti-competitive conduct.

The experience gained by team members in dealings with the ABC and Antitrust Directives enacted in 2015 were used to revise them in 2017. For example, the monetary thresholds for accepting gifts and invitations were adjusted.

#### **IP Protection Directive**

The Directive for the Protection of Confidential and Strictly Confidential Information rolled out in late fall 2016 was evaluated by an external consultant as part of an audit in July 2017. The revised directive is scheduled for completion and group-wide roll-out in the second quarter of 2018.

Around 200 employees at the Lenzing site were trained in the existing Directive for the Protection of Confidential and Strictly Confidential Information in 2017.

#### **Global Supplier Code of Conduct**

The Global Supplier Code of Conduct outlines Lenzing's expectations for supplier conduct with regard to health and safety at work, labor and human rights, environmental protection, ethics, and management practices. See chapter 3, page 38, for details.

#### **Issuer Compliance Directive**

Lenzing AG shares are listed on the Prime Market and the ATX of the Vienna Stock Exchange. Furthermore, a Lenzing AG corporate bond is traded on the Vienna Stock Exchange. Consequently, Lenzing AG is obligated to organize its business management in accordance with the EU Market Abuse Directive and the Issuer Compliance Regulation of the Austrian Financial Market Authority. These directives regulate the handling of inside information in capital-market-oriented companies to prevent improper use. Lenzing AG has implemented all of the directives' structures and measures, including appointment of a Compliance Officer, establishment of confidentiality areas, and the definition of blocking periods, during which it is forbidden for certain groups of people to trade Lenzing securities. [102-16]

The internal Issuer Compliance Directive was revised and published in February 2017.

## **Whistleblowing system**

The Whistleblowing Directive was published in Lenzing's key working languages in August 2017, and the „Tell us“ whistleblowing system was activated at the same time. Since then, violations and concerns with regard to unethical, unlawful, or other conduct detrimental to the company's integrity can be reported directly using the system. The audit committee is informed twice a year of the reports received. In 2017, a total of two reports were registered via the whistleblowing system. Both reports were processed systematically. This resulted in one investigation, which was concluded within the financial year. There were no cases of corruption on the part of Lenzing Group employees in 2017. [102-17, 205-3]

## **Compliance training**

The Global Code of Conduct revised in the 2017 financial year applies to all Lenzing Group team members. An international training program was developed in 2016 to ensure that all Lenzing Group employees are familiar with the code of conduct, understand it, and consciously put it into practice in their everyday working life. Implementation of this training program began in 2017. By 2019, every Lenzing Group team member should have completed a CoBC training session.

3,317 employees at all Lenzing sites received the Anti Bribery and Corruption Policy by e-mail (53.3 percent).

In 2017, various training sessions on the subject of combating corruption, with a total of more than 400 attendees (including all Management Board members), were conducted at Lenzing locations around the world. [205-2]

408 employees at all Lenzing sites received face-to-face training on anti-corruption (6.6 percent).

## **Enforcement**

The Compliance Officer submits a report to the audit committee of the supervisory board twice a year. A separate compliance report is published in the Annual Report in the „Corporate governance“ section. During the course of implementing the CoBC, guidelines have also been issued for handling sensitive Lenzing Group data (e. g., „protection of confidential and strictly confidential information“). Depending on the scope and relevance of this data, a decision-making committee defines different confidentiality levels. As of a certain confidentiality level, data is transferred exclusively via a secure computer system, which is only accessible to a restricted and carefully monitored user group. A document control guideline that defines uniform processing rules for all team members was revised and published in June 2017. As regards potential corruption offenses or breaches of antitrust law, no official measures were undertaken or legal claims made against the Lenzing Group in 2017. The process audit conducted in 2017 with regard to corruption yielded no significant risks.

Lenzing made no political donations. No significant fines or non-monetary sanctions were imposed as a result of legal infringements or breaches of regulations in 2017.

[206-1, 307-1, 415-1, 416-2, 419-1]





Chief Commercial Officer Robert van de Kerkhof (CCO), Chief Executive Officer Stefan Doboczky (CEO), Chief Technical Officer Heiko Arnold (CTO) and Chief Financial Officer Thomas Obendrauf (CFO)



Lenzing Aktiengesellschaft  
Lenzing, March 6, 2018

The Management Board

**Stefan Doboczky**  
Chief Executive Officer

**Robert van de Kerkhof**  
Chief Commercial Officer

**Thomas Obendrauf**  
Chief Financial Officer

**Heiko Arnold**  
Chief Technical Officer



7

# Annex



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General standard information table 7/1

GRI Standards - Disclosure Number	Disclosure title	Reference to chapter	page nr.	Explanations and omissions
<b>Organizational profile</b>				
102-1	Name of the organization	Lenzing Group: Brief Portrait	12	
102-2	Activities, brands, products, and services	Lenzing Group: Brief Portrait; Overview of Fiber Technologies	12, 57	
102-3	Location of headquarters	Lenzing Group: Brief Portrait	12	
102-4	Location of operations	Locations of the Lenzing Group	10	
102-5	Ownership and legal form	Lenzing Group: Brief Portrait	13	
102-6	Markets served	Locations of the Lenzing Group, Value Chain	10, 14	
102-7	Scale of the organization	Lenzing Group: Brief Portrait	12	
102-8	Information on employees and other workers	Staff development; Diversity	88, 89	Temporary contracts are only concluded on an exceptional basis and account for less than 1 percent of the contracts in the Lenzing Group (employees and apprentices). New hires usually are provided with contracts limited to a probation period which are changed into permanent contracts after this trial period has expired.
102-9	Supply chain	Value Chain	14	
102-10	Significant changes to the organization and its supply chain	Letter from the CEO	7	
102-11	Precautionary Principle or approach	Strategy	24	
102-12	External initiatives	Stakeholder Dialog	35	
102-13	Membership of associations	Stakeholder Dialog	32, 35	
<b>Strategy</b>				
102-14	Statement from senior decision-maker	Letter from the CEO	7	
102-15	Key impacts, risks, and opportunities	Strategy, Risk management	22, 30	
<b>Ethics and integrity</b>				
102-16	Values, principles, standards, and norms of behavior	Compliance	96, 97	
102-17	Mechanisms for advice and concerns about ethics	Compliance	97	
<b>Governance</b>				
102-18	Governance structure	Sustainability governance	30	
<b>Stakeholder engagement</b>				
102-40	List of stakeholder groups	Stakeholder Dialog	31, 35	
102-41	Collective bargaining agreements	Diversity	89	
102-42	Identifying and selecting stakeholders	Stakeholder Dialog	31, 35	
102-43	Approach to stakeholder engagement	Stakeholder Dialog	31, 35	
102-44	Key topics and concerns raised	Materiality Analysis	21	



**Reporting practice**

102-45	Entities included in the consolidated financial statements	About this report	6
102-46	Defining report content and topic Boundaries	About this report	6
102-47	List of material topics	Materiality Analysis	21
102-48	Restatements of information	About this report; Resources and emissions; Diversity; Safety	6, 65, 68, 89, 93
102-49	Changes in reporting	About this report	6
102-50	Report period	About this report	6
102-51	Date of most recent report	About this report	6
102-52	Reporting cycle	About this report	6
102-53	Contact point for questions regarding the report	About this report	6
102-54	Claims of reporting in accordance with the GRI Standards	About this report	6
102-55	GRI content index	Annex	102
102-56	External assurance	Annex	114



## Specific standard disclosures table 7/2

### Category: Economy

GRI Standards - Disclosure Number	Disclosure title	Reference to chapter	page nr.	Explanations and omissions
<b>Economic performance</b>				
103-1 103-2 103-3	Management Approach Disclosure	Lenzing Group - Brief portrait; Managing Sustainability	12, 13, 30	
201-2	Financial implications and other risks and opportunities due to climate change	Risk management	29	The risk report compiled by Risk Management contains a detailed quantitative assessment of all risks and opportunities identified in the Lenzing Group, together with the necessary mitigation measures. Due to confidentiality, the quantitative assessment of the risks cannot be revealed.
<b>Indirect economic impacts</b>				
103-1 103-2 103-3	Management Approach Disclosure	Responsibility for people	94	
203-2	Significant indirect economic impacts	Corporate Citizenship	94	
<b>Procurement practices</b>				
103-1 103-2 103-3	Management Approach Disclosure	Sustainable procurement management	38	
204-1	Proportion of spending on local suppliers	Wood and Pulp; Chemical Sourcing	48, 50	
<b>Anti-corruption</b>				
103-1 103-2 103-3	Management Approach Disclosure	Compliance	96	
205-2	Communication and training on anti-corruption policies and procedures	Compliance	97	A definition of employee category according to GRI is in process.
205-3	Confirmed incidents of corruption and actions taken	Compliance	97	
<b>Anti-competitive behavior</b>				
103-1 103-2 103-3	Management Approach Disclosure	Compliance	96	
206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	Compliance	97	
<b>Sustainable innovations</b>				
103-1 103-2 103-3	Management Approach Disclosure	Strategy; Sustainable Innovation & Products	24, 70 - 85	



**Category: Environmental**

Specific standard disclosures	List of specific standard disclosure regarding each identified essential aspect and DMA	Reference to the page	page nr.	Explanations and omissions
<b>Materials</b>				
103-1 103-2 103-3	Management Approach Disclosure	Sustainable procurement management; Wood and Pulp; Chemical Sourcing	38, 39, 50	
301-1	Materials used by weight or volume	Wood and Pulp; Biorefinery	42, 55	Due to confidentiality reasons a quantitative description of chemical use is not part of the reporting
<b>Energy</b>				
103-1 103-2 103-3	Management Approach Disclosure	Resources and emissions	60, 61	
302-1	Energy consumption within the organization	Resources and emissions	62	
302-3	Energy intensity	Resources and emissions	62	
<b>Water</b>				
103-1 103-2 103-3	Management Approach Disclosure	Resources and emissions	60, 64	
303-1	Water withdrawal by source	Resources and emissions	64	
<b>Biodiversity</b>				
103-1 103-2 103-3	Management Approach Disclosure	Wood and pulp	40, 45	
304-2	Significant impacts of activities, products, and services on biodiversity	Wood and pulp	40, 45	
<b>Emissions</b>				
103-1 103-2 103-3	Management Approach Disclosure	Resources and emissions	60	
305-1	Direct (Scope 1) GHG emissions	Resources and emissions	62	
305-2	Energy indirect (Scope 2) GHG emissions	Resources and emissions	62	
305-4	GHG emissions intensity	Resources and emissions	62	
305-7	Nitrogen oxides (NO <sub>x</sub> ), sulfur oxides (SO <sub>x</sub> ), and other significant air emissions	Resources and emissions	67, 68	
<b>Effluents and waste</b>				
103-1 103-2 103-3	Management Approach Disclosure	Resources and emissions	64, 68	
306-1	Water discharge by quality and destination	Resources and emissions	64, 65	
306-2	Waste by type and disposal method	Resources and emissions	68, 69	
<b>Environmental Compliance</b>				
103-1 103-2 103-3	Management Approach Disclosure	Compliance	96	
307-1	Non-compliance with environmental laws and regulations	Compliance	97	There was no non-compliance with environmental laws and regulations in the reported period.



## Supplier environmental assessment

103-1 103-2 103-3	Management Approach Disclosure	Wood and pulp; Logistics in the supply chain	42, 51	
308-1	New suppliers that were screened using environmental criteria	Wood and pulp	43, 51	
308-2	Negative environmental impacts in the supply chain and actions taken	Logistics in the supply chain	51	

## Category: Social

Specific standard disclosures	List of specific standard disclosure regarding each identified essential aspect and DMA	Reference to the page	page nr.	Explanations and omissions
<b>Employment</b>				
103-1 103-2 103-3	Management Approach Disclosure	Staff development	88, 89, 90	
401-1	New employee hires and employee turnover	Diversity	89	No differentiated reporting of indicators according to gender since data is currently not available on group level. Will be reported in 2018.

## Occupational health and safety

103-1 103-2 103-3	Management Approach Disclosure	Health; Safety	90, 91, 92	
403-1	Workers representation in formal joint management-worker health and safety committees	Safety	89, 92	
403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	Safety	92, 93	

## Training and education

103-1 103-2 103-3	Management Approach Disclosure	Lifelong Learning and Training	89, 90	
404-2	Programs for upgrading employee skills and transition assistance programs	Lifelong Learning and Training; Corporate citizenship	90, 95	

## Diversity and equal opportunity

103-1 103-2 103-3	Management Approach Disclosure	Diversity	88	
405-1	Diversity of governance bodies and employees	Diversity	89	

## Non-discrimination

103-1 103-2 103-3	Management Approach Disclosure	Diversity	88	
406-1	Non-discrimination: Incidents of discrimination and corrective actions taken	Diversity	89	

## Local communities

103-1 103-2 103-3	Management Approach Disclosure	Stakeholder Dialog; Corporate Citizenship	33, 94	
413-2	Operations with significant actual and potential negative impacts on local communities	Corporate Citizenship	94	

## Public policy

103-1 103-2 103-3	Management Approach Disclosure	Compliance	96	
415-1	Political contributions	Compliance	97	



## Customer health and safety

103-1 103-2 103-3	Management Approach Disclosure	Product safety	83	
416-1	Assessment of the health and safety impacts of product and service categories	Product safety	83	
416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	Product safety		There were no incidents of non-compliance concerning the health and safety impacts of products and services in the reporting period.

## Marketing and labeling

103-1 103-2 103-3	Management Approach Disclosure	LENZING™ product certifications	82	
417-2	Incidents of non-compliance concerning product and service information and labeling	LENZING™ product certifications		There were no incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling in the reporting period.

## Socioeconomic compliance

103-1 103-2 103-3	Management Approach Disclosure	Compliance	96	
419-1	Non-compliance with laws and regulations in the social and economic area	Compliance	97	

## Material GRI topics for the Lenzing Group sustainability report table 7/3

Lenzing sustainability issue	Place in the value chain			GRI topic
	Supplier	Own production	Customer/Use/Disposal	
Wood sourcing	x	x		MATERIALS, MARKETING AND LABELING, PROCUREMENT PRACTICES, SUPPLIER ENVIRONMENTAL ASSESSMENT
Sustainable innovations	x	x	x	no correlation with GRI
Energy Use	x	x	(x)	ENERGY
Air Emissions	(x)	x		EMISSIONS
Climate Change	x	x	(x)	EMISSIONS, ECONOMIC PERFORMANCE
Water use and pollution	x	x	x	WATER, EFFLUENTS AND WASTE
Chemicals/toxicity		x	x	MATERIALS, MARKETING AND LABELING, CUSTOMER HEALTH AND SAFETY
Product responsibility		x	x	CUSTOMER HEALTH AND SAFETY, MARKETING AND LABELING
Sustainable materials (LCA)	x	x	x	MATERIALS
Waste and circular economy	x	x	x	EFFLUENTS AND WASTE, MATERIALS
Although the topic 'compliance' has not been specifically identified as a highly significant material topics, the Lenzing organization has decided to report on it according to GRI Standards (option core).				
Compliance		x	x	ANTI-CORRUPTION, ENVIRONMENTAL COMPLIANCE, PUBLIC POLICY, ANTI-COMPETITIVE BEHAVIOR, SOCIOECONOMIC COMPLIANCE

GRI topics refer exclusively to 2016 GRI Standards.



# NaDiVeG\* compliance table table 7/4

Issue	Concept description	Risks for external stakeholders and environment
<b>Respect for human rights</b>	<ul style="list-style-type: none"> <li>• Policy on human rights and labor standards</li> <li>• Code of Conduct</li> <li>• FSC® certification</li> <li>• sCore TEN (Culture Focus)</li> <li>• Sustainability Policy</li> </ul>	<ul style="list-style-type: none"> <li>• Legal and compliance risk</li> <li>• Risks of non-compliance with human rights might affect employees of suppliers – especially in forestry</li> </ul>
<b>Combating of corruption and bribery</b>	<ul style="list-style-type: none"> <li>• Code of Conduct</li> <li>• Whistleblowing Directive</li> </ul>	<ul style="list-style-type: none"> <li>• Legal and compliance risk</li> <li>• Supply chain risk for Lenzing customers</li> <li>• Risks concerning corruption and bribery may affect the societies of countries where Lenzing operates in a negative way</li> </ul>
<b>Diversity</b>	<ul style="list-style-type: none"> <li>• sCore TEN (Culture focus)</li> <li>• Corporate Governance Report (Diversity concept)</li> <li>• Policy on human rights and labor standards</li> <li>• Code of Conduct</li> </ul>	<ul style="list-style-type: none"> <li>• Discrimination of gender, cultural background, age and further diversity aspects</li> </ul>
<b>Social (employees)</b>	<ul style="list-style-type: none"> <li>• sCore TEN (values, culture focus, leadership model)</li> <li>• Sustainability Strategy</li> <li>• Sustainability Policy</li> <li>• Works council / trade union at all sites</li> <li>• Policy for Safety, Health and Environment</li> <li>• Life-long learning program</li> <li>• Whistleblowing Directive</li> </ul>	<ul style="list-style-type: none"> <li>• Safety and health risks for employees and other persons working for Lenzing</li> </ul>
<b>Social (society)</b>	<ul style="list-style-type: none"> <li>• Compliance with applicable laws</li> <li>• Sustainability Strategy (Focus area community wellbeing)</li> <li>• Sustainability Policy</li> <li>• Whistleblowing Directive</li> </ul>	<ul style="list-style-type: none"> <li>• Health and safety risks for local communities</li> <li>• Environmental risks</li> <li>• Supply chain risks for Lenzing's downstream customers</li> </ul>
<b>Environment</b>	<ul style="list-style-type: none"> <li>• Sustainability Strategy</li> <li>• Sustainability Policy</li> <li>• Policy for Safety, Health and Environment</li> <li>• Wood &amp; Pulp Sourcing Policy</li> <li>• Group Sustainability Targets</li> <li>• ISO management systems</li> <li>• Enterprise Excellence (EPEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Risks of negative effects on the ecological systems of forests of suppliers and water bodies</li> <li>• Risks of high contribution to climate change through own emissions</li> </ul>
<b>Any other issues</b>		

\*Nachhaltigkeits- und Diversitätsverbesserungsgesetz (Austrian Sustainability and Diversity Improvement Act)



Risks for Lenzing	Due diligence/measures for handling the risks	Results
<ul style="list-style-type: none"> <li>• Legal and compliance risk</li> <li>• Fines</li> <li>• Lawsuits</li> <li>• Reputation loss</li> </ul>	<ul style="list-style-type: none"> <li>• Whistleblowing System</li> <li>• Works council</li> <li>• Supplier assessment to mitigate supply chain risks</li> </ul>	<ul style="list-style-type: none"> <li>• 100% of the total workforce is represented by local unions or works councils. No strikes at any Lenzing production facility in 2017.</li> </ul> <p>› Chapt. 6 and chapt. 3</p>
<ul style="list-style-type: none"> <li>• Legal and compliance risk</li> <li>• Business damage</li> <li>• Reputation loss</li> </ul>	<ul style="list-style-type: none"> <li>• Whistleblowing System</li> <li>• Compliance trainings</li> <li>• Enforcement</li> <li>• Reporting to the audit committee of the supervisory board twice a year.</li> <li>• Supplier assessment to mitigate supply chain risks</li> </ul>	<ul style="list-style-type: none"> <li>• No cases of corruption</li> <li>• No significant fines or non-monetary sanctions were imposed as a result of legal infringements or breaches of regulations in 2017</li> </ul> <p>› Chapter 6</p>
<ul style="list-style-type: none"> <li>• Compliance risk</li> <li>• Reputation loss</li> </ul>	<ul style="list-style-type: none"> <li>• Grievance mechanism through works council</li> </ul>	<p>› Chapter 6 (gender, age, employed people with disabilities)</p>
<ul style="list-style-type: none"> <li>• Reputation loss</li> <li>• Negative impact on employer branding</li> <li>• Difficult recruitment</li> <li>• High employee turnover</li> <li>• Loss of know-how and lack of competence</li> <li>• Lawsuits</li> </ul>	<ul style="list-style-type: none"> <li>• Whistleblowing System</li> <li>• Heartbeat for Safety Heartbeat for Health</li> <li>• Life saving rules</li> <li>• SHEARS platform</li> <li>• Safety trainings</li> <li>• Health infrastructure at all site</li> <li>• Specific regional events for employees</li> <li>• Work Councils/ Trade Unions</li> <li>• Total expenditure on lifelong learning and personnel development increased more than 40%</li> </ul>	<ul style="list-style-type: none"> <li>• Decreasing turnover rate</li> <li>• Lost workday cases: Slight improvement over the last two years</li> <li>• Injury rate remained constant at all Lenzing locations as compared to the previous year</li> </ul> <p>› Chapter 6</p> <p>› Annex</p>
<ul style="list-style-type: none"> <li>• Reputation loss</li> <li>• Lawsuits</li> <li>• Business damage</li> </ul>	<ul style="list-style-type: none"> <li>• Whistleblowing System</li> <li>• Community activities at production sites</li> </ul>	<ul style="list-style-type: none"> <li>• No significant fines or non-monetary sanctions were imposed as a result of legal infringements or breaches of regulations in 2017</li> <li>• Dirty Fashion Report</li> </ul> <p>› Chapter 6</p> <p>› Annex</p> <p>› KPIs report cover</p>
<ul style="list-style-type: none"> <li>• Reputation loss</li> <li>• Lawsuits</li> <li>• Business damage</li> <li>• Regulatory risks (increased costs for CO<sub>2</sub>-emissions, stronger regulations concerning environmental laws)</li> </ul>	<p>Targets:</p> <ul style="list-style-type: none"> <li>• 50% improvement of specific sulfur emissions by 2022</li> <li>• 20 % improvement of specific water emissions by 2022</li> <li>• Afforestation project starting in 2018</li> <li>• FEM 3.0</li> <li>• Supplier assessment to mitigate supply chain risks</li> <li>• Lenzing Enterprise Excellence Program for continuous improvement (EPEX),</li> <li>• Applying voluntary benchmarks, such as the EU Ecolabel</li> </ul>	<p>ISO certificates 14001, 9001, OHSAS 18000</p> <p>Ranking in Canopy Hot Button Report, a benchmarking done by an NGO</p> <p>EcoVadis Gold Status</p> <p>SAC Higg MSI: better scores for Lenzing's products compared to industry average (e.g. TENCEL™ Lyocell, see page 58)</p> <p>› Chapter 3</p> <p>› Chapter 4</p>



# Additional Lenzing AG data according to NaDiVeG requirements

Additional Lenzing Aktiengesellschaft data according to NaDiVeG requirements (§243b UGB)

## Lenzing AG safety

Lenzing AG safety table 7/5

	2015	2016	2017
Lenzing AG: number of injury cases	72	74	67
Lenzing AG: injury rate of employees and supervised workers (per 1,000 employees)	32.3	30.1	25.3
Lenzing AG: lost workday cases (LWCs)	23	17	22
Lenzing AG: lost workday cases (LWCs) Rate of employees & supervised workers (per 1,000 employees)	10.3	6.9	8.3

### Work-related fatalities

No fatal injuries were registered in Lenzing AG in the reporting year.

## Lenzing AG workforce

Lenzing Aktiengesellschaft: Human Resource Indicators

Headcounts as of 31.12.; employees only (no apprentices, no contractors)

Lenzing AG workforce table 7/6

	2015	2016	2017
Total headcounts as of 31.12.	2,207	2,339	2,533
Proportion of women	17.2%	18.1%	18.3%
Proportion of age >50	27.3%	27.7%	27.3%
Proportion of non-Austrians	4.2%	4.6%	5.3%
Apprentices	121	121	113
Contractors	167	204	231
Proportion of employees with full-time contract	86%	90%	63%
Thereof female	10%	12%	16%
Thereof male	90%	88%	84%
Proportion of employees with part-time contract*	14%	10%	37%
Thereof female	60%	73%	22%
Thereof male	40%	27%	78%
Proportion of employees for whom collective bargaining agreements exist	100%	100%	100%
Employees with disabilities	78	70	72
Turnover rate	4.4%	4.6%	4.1%

\* Due to the transition to a 5-shift-system, these employees (=90% employment level) are also treated as part-time employees.

As regards potential corruption offenses or breaches of antitrust law, no official measures were undertaken or legal claims made against the Lenzing Aktiengesellschaft in 2017.

Figures concerning environmental matters will not be reported separately for competitive reasons and since these matters are managed and measured group-wide. The omission of this information does not prevent a fair and balanced understanding of its development, performance, position and impact of its activity.



# Additional information to chapters

## Chapter 6

### Lenzing Group: health infrastructure

Lenzing Group: health infrastructure table 7/7

	Lenzing	Purwakarta	Nanjing	Paskov	Heiligenkreuz	Mobile	Grimsby
<b>Outpatient clinic</b>	One fully equipped outpatient clinic on site	Two clinics (one on site, one off site)					
<b>In-house emergency care</b>	Emergency care and first aid services	Emergency care and first aid services	Emergency care and first aid services	Emergency care and first aid services	Emergency care and first aid services	Emergency care and first aid services	Emergency care and first aid services
<b>Diagnosis &amp; therapy</b>	Health days with general preventive medical check-up  Work specific checkup	Annual general preventive medical checkup with individual therapy plan	Annual general and work specific preventive medical checkup	Regular medical checks	Health days with general preventive medical check-up	iHealthy Wellness Program with general preventive medical checkup  Occupational health medical surveillance	Free physio-therapy  Rehabilitation advice from external health provider
<b>Medical care for family members</b>		Family members of all employees receive medical care				Medical insurance offered to families of employees	
<b>Preventive medicine</b>	Program for spinal health  Smoking cessation courses  Fitness and relaxation courses  Influenza vaccination program  Counseling by an occupational psychologist  Ergonomics counseling	Various programs to increase health awareness	Health screening program in partnership with an external provider	Financial support for medical treatments, if employees attend health and educational classes	Health promotion program with sport coaching  Influenza vaccination program  Assessment of psychological stress factors and removal thereof	iHealthy Wellness Program Employee assistance program (EAP)  Flu vaccination program  Annual Biometric screening	Health screening program in partnership with an external provider  Employee Assistance Program (EAP) to help with psychosocial problems  Individual offerings for fitness and healthy diet  Free eye tests



## CSR projects Indonesia

CSR projects Indonesia table 7/8

Program	Target	Scope
<b>Health</b>		
Free medical service for all Desa Cicadas* villagers in cooperation with Local Health Clinic	To help villagers access medical service within an affordable distance	Since 2006, Desa Cicadas  Every month, approximately 2,100 villagers utilize this medical service
Provide nutritious foods for children in Posyandu (government program to support children's health)	To improve the awareness of children's health	Since 2008, Desa Cicadas  Increased numbers of visitors (parents with their children) to Posyandu
Donations for a child from a poor family with leukemia	To help people in need	Since 2016, Desa Cicadas  Support from SPV for medical treatment
Support medical service for all Ciroyom inhabitants in cooperation with the local community official	To help people in need access a proper medical service	Whenever required by people in need, Desa Cicadas  People can access proper medical service for serious diseases
Support government program for rubella and measles vaccination in cooperation with local state clinic	To control the spread of both diseases and to transition from measles vaccine to a measles-rubella vaccine in Indonesia's routine immunization schedule	2017, Desa Cicadas  Numbers of participants are significant
<b>Education</b>		
Scholarship for senior high school students from poor families by paying monthly tuition fees	To improve the education level at least up to high school grade	Since 1998, Desa Cicadas  More people graduating from senior high school, 38 student beneficiaries in private schools.
Support for early childhood education (monthly fee for teachers)	To support the education process at the kindergarten	Since 2009, Desa Cicadas  Ensures quality of kindergarten education
Support for graduation events in elementary schools	Being a good corporate citizen	Since 2009, Desa Cicadas  5 schools with up to 200 students,
University scholarship	To improve the still low education level of local population	Since 2010, Desa Cicadas  Monthly support for 12 students from senior high school; number of beneficiaries increasing every year
<b>Social and Cultural</b>		
Rice distribution for people's basic needs (orphans, elderly, clergy) in cooperation with women's activists	To help people in need	Every month since 1998, Desa Cicadas  People can satisfy their basic food needs; approx. 600 people benefit every month
Rice distribution for all Kampung Ciroyom families	To help people in need	Every other month since 2010  People can satisfy their basic food needs; 450 families benefit.
Courtesy food parcel presented to every family on Idul Fitri Day (Islamic festival of Eid)	To build good relationships	Since 1990, Desa Cicadas, partly Desa Cilangkap, Desa Cikaobandung and Desa Hegarmanah  Good relationships achieved between SPV and local community; 2,200 families benefit
Supporting activities of a local charity association that helps women	Being a good corporate citizen	Monthly since 2006, Desa Cicadas & Kecamatan Babakancikao
Support for religious activities and national events	Being a good corporate citizen	Since 2006, Desa Cicadas, kecamatan Babakancikao, Purwakarta
Support for community car	To deliver sick people to hospital or for other urgent need	Since 2016, Desa Cicadas  People have access to a community car for transport
Refurbishment of public facilities	To help refurbish public facilities (roads, bridges, mosques, drainage, sports facilities, and schools)	Since 1985, Desa Cicadas, Kecamatan Babakancikao, Purwakarta
<b>Micro Credit</b>		
Provision of zero-interest soft loans to small-scale businesses in cooperation with women's activists	To help small businesses	Since 2008, Desa Cicadas  138 small businesses were being supported; they now have the possibility to grow.

\*Neighboring village of PT. South Pacific Viscose



## Clean Environment

Biogas project	To reduce emissions, to process cattle waste, and to generate alternative energy for households	2017, Kecamatan Pasawahan and Wanayasa, Purwakarta 9 biogas units for 23 families
Provision of garbage bins	To support clean environment	Since 2008, Desa Cicadas, Purwakarta
Mangrove planting in cooperation with NGO	To maintain biodiversity and to prevent coastal erosion along Merunda coast, Jakarta	2016, Merunda coast, Jakarta
Hydroponic plantation	To reduce emissions with vegetable plantation and obtain healthier vegetables	2017, at SPV site Vegetables can be consumed by the local community and employees



# Independent Assurance Report on the Combined Consolidated Non-financial Report 2017

We have performed an independent assurance engagement in connection with the combined consolidated non-financial report 2017 (the “NFI-report”) of

Lenzing AG,  
 (“the Company”).

## 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 and publishes the NFI-report under the title “Sustainability Report 2017 Lenzing Group”.

The responsibility of the legal representatives of the company includes the selection and application of reasonable methods for sustainability reporting as well as the use of assumptions and estimates for individual sustainability disclosures that are reasonable under the circumstances. Furthermore, the responsibility includes the design, implementation and maintenance of systems and processes relevant for the preparation of the sustainability reporting in a way that is free of – intended or unintended – material misstatements.

## Auditors’ Responsibility

Our responsibility is to state whether, based on our procedures performed, anything 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) 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 Austrian Standards for independent assurance engagements (KFS/PG 13) and in accordance 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 is substantially less in scope than an independent assurance engagement with the purpose of expressing a conclusion with reasonable assurance, thus providing reduced assurance.

The procedures selected depend on the auditor’s judgment and included the following procedures, in particular:

- Inquiries of personnel on corporate level, which are responsible for the materiality analysis, in order to gain an understanding of the processes for determining material sustainability topics and respective reporting boundaries of the Company;
- Risk assessment, including a media analysis on relevant information concerning the sustainability performance of the Company in the reporting period;
- Evaluation of the design and implementation of the systems and processes for the collection, processing and control of the disclosures on environmental, social and employees matters, respect for human rights and anti-corruption and bribery, including the consolidation of the data;
- Inquiries of personnel on corporate level responsible for providing and consolidating and for carrying out internal control procedures concerning the disclosures on 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;
- Visit of production sites at Lenzing (Austria) to gain an understanding of the value creation processes in the wood-based fiber production.
- Inquiries of personnel of the production site at Grimsby (United Kingdom) by videoconference to assess local data collection and reporting processes and the reliability of the reported data.
- Analytical evaluation of the data and trend explanations of quantitative disclosures, submitted by all sites for consolidation at corporate level;
- Evaluation of the consistency of the for the Company applicable requirements of the Austrian Sustainability and Diversity Improvement Act (§§ 243b and 267a UGB) and the GRI Standards (Option “Core”) with disclosures and indicators in the report;
- Evaluation of the overall presentation of the disclosures;



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 review future-related disclosures and statements from external information sources and expert opinions.

This assurance report is issued based on the assurance agreement concluded with the Company. Our responsibility and liability towards the Company and any third party is subject to paragraph 8 of the General Conditions of Contract for the Public Accounting Professions. The respective latest version of the AAB is accessible at <http://www.kpmg.at/aab>.

### **Conclusion**

Based on the procedures performed, 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) and the sustainability reporting guidelines of the Global Reporting Initiative (GRI Standards, Option “Core”) in all material respects.

Linz, March 6, 2018



KPMG Austria GmbH  
Wirtschaftsprüfungs- und Steuerberatungsgesellschaft

### **Gabriele Lehner**

Austrian Chartered Accountant



# Glossary

**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.

**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<sub>2</sub>) 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.

**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 products and bioenergy.

**Canopy Planet Society** The Canopy Planet Society is a Canadian nonprofit organization that focuses on the conservation and protection of ancient and endangered forests.

**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.

**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, the 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<sub>2</sub> emission per unit of a product) over time. Products can be e.g. (primary) energy, gross domestic product, or any units produced by a company.

**Dissolving 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

**Ecosystem services** The benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other nonmaterial benefits.

**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.

**EDANA– European Disposables and Nonwovens Association** The international association serving the nonwovens and related industries, with European focus and global influence. It reflects the changing dynamics of the nonwovens industry, mainly focusing on harmonization of global technical standards.

**Environmental, social and governance standards (ESG)** 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.

**Eutrophication** A process of pollution that occurs when a lake or stream becomes over-rich in plant nutrient; as a consequence it becomes overgrown in algae and other aquatic plants.



**FAO – Food and Agricultural Organization of the United Nations** The Food and Agriculture Organization of the United Nations (FAO) is a specialised agency of the United Nations that leads international efforts to defeat hunger. It is based in Rome.

**Finishing agents** Soap-like substances added in the final washing cycle. Finishing agents are used in the production of lyocell, viscose and modal fibers.

**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.

**Global Reporting Initiative (GRI)** 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.

**Greenhouse gas (GHG) emissions** Emissions of gases which contribute to global warming by absorbing infrared radiation, thereby heating the atmosphere. The main contributors are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O).

**Growing stock** Volume over bark of all living trees more than (e.g. 10) cm in diameter at breast height.

**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 Index** The Higg Index is the core driver of the Sustainable Apparel Coalition (SAC), an association of leading companies in the textile and chemical industry, non-profit organizations as well as research and educational experts aiming to create a more sustainable international textile industry. This suite of self-assessment tools empowers brands, retailers and facilities of all sizes, at every stage in their sustainability journey, to measure their environmental and social and labor impacts and identify areas for improvement. The Higg index provides a holistic overview of the sustainability performance of a product or company – a big-picture perspective that is essential for progress to be made.

**Industrial wood** Is round wood which is not processed into sawwood or plywood, but mechanically disintegrated (e.g. into wood containing paper, or chipboard) or chemically digested (e.g. pulp).

**Integration** All stages of fiber production are concentrated at one and the same site, from wood, the raw material, to pulp and fiber production.

**ISO 14001** An international standard for the certification of environmental management systems.

**ISO 9001** An international standard for the certification of quality management systems.

**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.

**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 fiber. The generic fiber name is lyocell, the branded products from Lenzing are marketed as TENCEL™ and VEOCEL™ fibers.

**Magnesium bisulfite process** This is an acidic, single-step process for recovering cellulose from wood while at the same time separating out lignin and hemicellulose.

**Microcredit program** Microcredits are small loans of between one and several thousand euros to small businesses, mainly in developing countries. Apart from micro-insurance and micro-savings, they are an important micro-finance service. The loans are usually provided by specialist financial service providers and non-governmental organizations, mostly to promote development.

**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 the brand name TENCEL™ Modal.

**MSI** Materials Sustainability Index . The quantitative part of the Higg Index, scoring materials according to their environmental impacts in the categories global warming, eutrophication, water scarcity, and abiotic resource depletion (fossil fuels), and according to chemistry applied.

**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

**OHSAS 18001** Occupational Health and Safety Assessment Series (OHSAS) is a certification system for management systems pertaining to work safety.

**PEFC™** The Program 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.



**Roundwood** Is unprocessed raw wood, which can be processed into various products (plywood, saw-wood, paper, particle board, pulp), depending on quality and size.

**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?”

**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.

**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

**Sustainable Apparel Coalition (SAC)** 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.

**TCF** Totally chlorine free (bleaching process)

**Textile Exchange (TE)** Founded in 2002, Textile Exchange 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.

**USDA** The U.S. Department of Agriculture (USDA) is made up of 29 agencies and offices with nearly 100,000 employees who serve the American people at more than 4,500 locations across the country and abroad. USDA provides leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on public policy, the best available science, and effective management.

**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.

**VINÇOTTE** Belgian certification company VINÇOTTE tests and certifies products which are biodegradable in various environments, and/or suitable for industrial compostability and for proper disposal in a garden composter.

**Viscose fibers** Regenerated cellulose fibers produced from raw materials of plant origin (e.g., wood) using the viscose process.

**Wood-based cellulose fiber** A fiber industrially produced from raw materials of plant origin (e.g. wood), known in the industry as man-made cellulose fiber.

**World Apparel Lifecycle Database (WALDB)** The WALDB will make it easier for apparel and footwear brands to identify environmental hotspots along their full value chain, to quantify the benefits of improvement and reduction measures, and to benchmark individual footprints compared with industry averages.

**World Economic Forum (WEF)** The World Economic Forum (WEF) is a foundation based in Cologny in the Swiss canton of Geneva, which is primarily known for its annual meeting of the same name that takes place annually in Davos in the canton of Grisons.

**Xanthate** A precursor or an intermediate product in viscose production

**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.



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