EMAS VALIDATION

Environmental Statement *2023*

With Applied Data from 2022

EMAS
VERIFIED ENVIRONMENTAL MANAGEMENT

Kelheim Fibres

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Preface

A lot has changed since the introduction of the European Eco-Management and Audit Scheme (EMAS) within our company. We have worked hard to reduce our environmental impact and propel our sustainable development. Throughout this period, the concept of 'normalcy' demanded frequent reevaluation. Global challenges, whether arising from the COVID-19 pandemic or geopolitical events such as the situation in Ukraine, have subjected us to rigorous trials, assessing both our resilience and adaptability.

Recently, we have observed a reduction in production volumes and have navigated the end of Dolan GmbH at our facility. Consequently, we are compelled to explore innovative strategies to address the evolving dynamics at our joint site, with a specific focus in the areas of power plant and waste water treatment.

Our heat and electricity balance in particular, has undergone modifications. However, we have successfully conserved natural gas by acquiring additional electricity, thereby enhancing the overall efficiency of our power plant.

Introducing the newly established role of Site Service Commercial Manager marks a decisive step towards a proactive strategy for the optimal utilisation of our diverse resources. This approach not only includes our power plant and biology sectors, but also extends to our laboratories, canteen, premises, and our expertise across various areas. Furthermore, we are strategically engaging external partners to collaboratively capitalize on our full potential.

Despite the many changes and challenges, our unwavering commitment remains fixed on our ultimate objective: the constant enhancement of our environmental performance. While we take pride in our current accomplishments, we acknowledge that there is still a lot to do.

This environmental statement provides a clear and factual representation of our current standing and outlines the goals we have meticulously set for the forthcoming years. We trust that you will find value and satisfaction in reviewing this document.

Craig Barker,
CEO Kelheim Fibres GmbH

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About The Company–
Kelheim Fibres

2.1 Who We *Are*

Kelheim Fibres GmbH is one of the world's leading manufacturers of viscose specialty fibres. Despite being a smaller entity in the fibre industry with a production capacity of approximately 90,000 tons, the company distinguishes itself as a pioneering force in innovation across various future-focused domains.

Our fibres serve diverse applications, ranging from clothing and hygiene products to medical applications, as well as specialty papers, insulation, and filtration.

- **Approximately 500 employees, frequently comprising of individuals from second or third generations**
- **Firmly anchored in Kelheim since 1936**
- **Annual capacity of approx. 90,000 tonnes of viscose fibres**
- **Inhouse research and development since 1936**
- **Increased focus on open innovation and future-forward technologies**
- **Our commitment to Corporate Social Responsibility (CSR) demonstrated through the consolidation of all relevant resources within a newly established department**

Milestones

Partnership with **TextileGenesis™** for more transparency in the the textile chain

Cooperation with **Recycling Atelier Augsburg** for a closed-loop textile industry

New development, in collaboration with **Sandler & pelzGROUP**: Plastic-free women's hygiene products

New development, in collaboration with **Santoni**: Energy-efficient and waste-free production of menstrual underwear

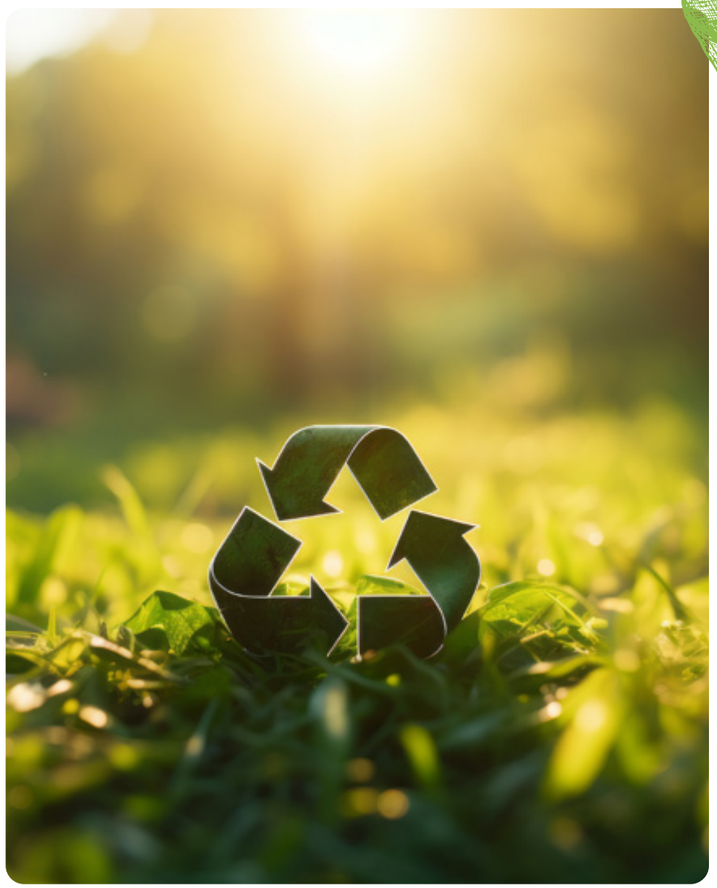
Cooperation with **MagnoLab** to promote innovation and sustainability in the textile industry

2.2 What We *Do*

Accelerating the Transformation of the *Circular Economy*

To enhance the overall sustainability profile of our entire value chain, our developmental initiatives prioritize three key aspects:

- Substitution of synthetic materials in disposable products
- Development of reusable products as an alternative to disposable products
- Increasing the proportion of alternative / recycled raw materials



Future-Forward *Solutions*

- **Leader in Tampon Fibres:** Our GALAXY® fibres are the leading solution in the global tampon industry delivering high absorbency, consistent performance while meeting the highest standards for purity and product safety.

- **Biodegradable AHPs:** (Absorbent hygiene products): Our femtec fibres are the perfect basis for absorbent hygiene products such as sanitary pads. They allow the production of skin-friendly and fully biodegradable AHPs that are comparable in performance with their synthetic alternatives.

- **Flushable Wet Wipes**: Our short-cut fibres enable the creation of soft and highly absorbent wet wipes. These can be easily disposed in the toilet preventing blockages in the sewage system or contributing to environmental pollution with microplastic.

- **Short-cut**: Our short-cut fibres provide speciality papers with the necessary durability for packaging applications, especially for sensitive goods. Short-cut fibres are free of synthetic materials, completely biodegradable, and hold FDA approval in accordance with CFR 21 for food contact. Additionally, they are endorsed by ISEGA for hot filtration purposes.

Our *Services*

- **AHP Competence Platform**: Our AHP competence centre provides an additional level of consultancy, process expertise, and service, particularly for solutions that require a higher level of knowledge. It serves as an excellent interface between manufacturers and brands. Moreover, we assist our customers in tackling new challenges and remain readily available to support their partners throughout the entire value chain.

- **Open Innovation**: At the heart of our innovation approach is the identification of customers' unmet needs and translating them into fibre solutions. In order to accomplish this, we focus on joint and open innovation and a close exchange with external partners. We continuously seek mutual inspiration, recognizing the vital role of synergies in guiding an idea from its initial concept to successful commercialisation.

- **Wetlaid Pilot Plant**: The in-house wetlaid pilot plant allows customers the opportunity to take on the initial steps of developing innovative papers. They can collaborate closely with our fibre experts to engineer new products, ensuring a seamless partnership throughout the entire process.

2.3 Our *Products*

- **Innovative viscose fibres** through flexible technology
- **Adjustment of fibre solutions** to specific application requirements
- **Incorporation of functional additives** into the fibre matrix
- **Modification of fibre cross-sections**
- **Adjustment of fibre dimensions**
- **Customer-oriented and customer-specific innovation**
- Share of **speciality fibres**: approx. 80%

Our Manufacturing *Process*

To manufacture our viscose fibres, the cellulose, utilized in the form of pulp, undergoes dissolution to create a honey-like, highly viscous liquid which gives the viscose process its name. This liquid is brought into a spin bath through a nozzle, facilitating the regeneration of dissolved cellulose into a fibre.

Throughout this intricate procedure, the fibre's characteristics, including shape, thickness, and length, can be tailored, and additives such as colour pigments can also be incorporated. Our fibres are offered in cut form (staple fibre) or as a continuous filament (uncut).

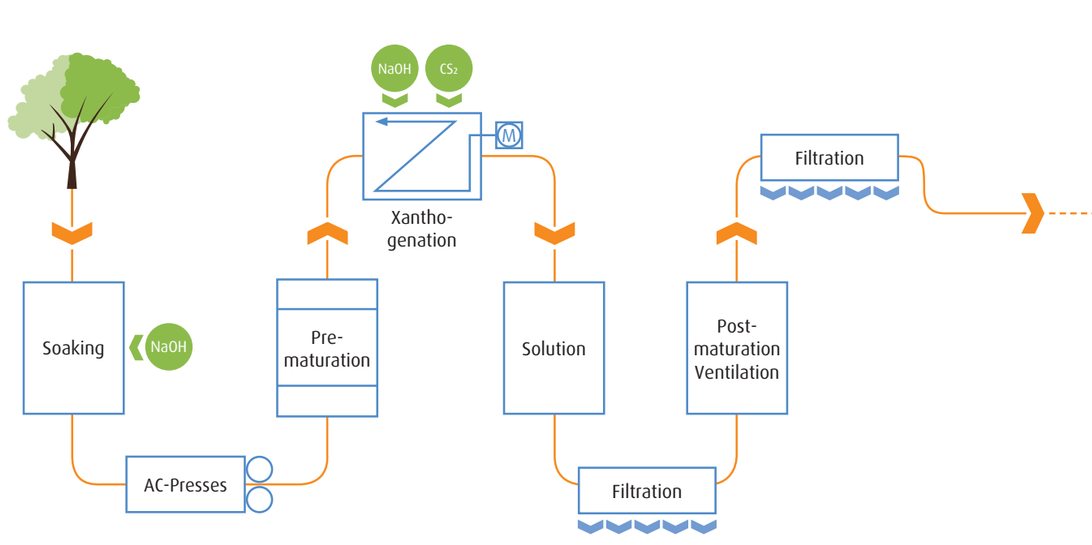
Applications

Feminine hygiene (e.g. tampons, single use), **textiles and nonwovens** (e.g. wipes, reusable hygiene products, feel-good textiles), **specialty papers and wipes** (e.g. beverage filtration, functional packaging, wet wipes), **technical products and special applications** (e.g. vacuum insulation panels)

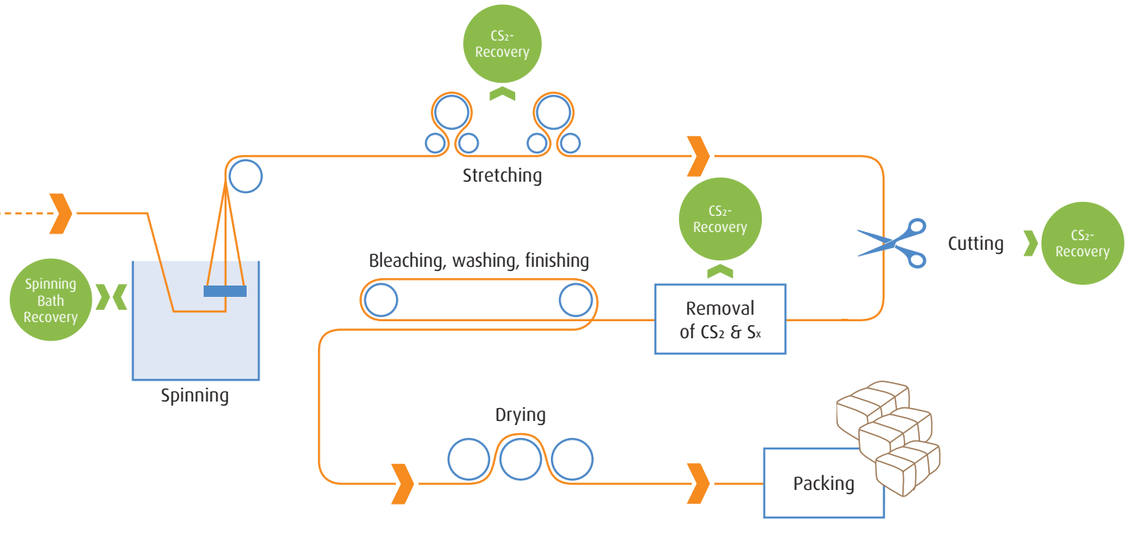
Byproducts

During the production of our viscose fibres, we also extract **sodium sulphate**. We produce **sulphuric acid** from our sulphur-containing emissions, supplemented by the purchase of liquid sulphur.

Sodium sulphate: 520 kg per ton of fibres produced.
Sulphuric acid: 750 kg per ton of fibres produced.



Production of viscose (spinning mass) from cellulose



Production of viscose fibres from the spinning mass

Figure 1

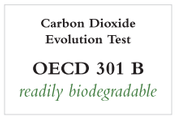
Viskose Fibres from Kelheim –
An Environmental Benefit

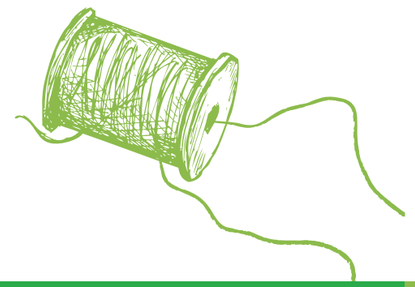
In the global viscose fibre market, we encounter various diverse certifications, labels, and questionnaires. As these predominantly rely on Key Performance Indicators (KPIs), they naturally represent assessments based on quantitative statements. However, environmental issues must also be assessed qualitatively in order to take on individual challenges and site-specific peculiarities into consideration. Therefore, we are actively developing a Kelheim-label designed to afford all stakeholders quick and easy-to-understand access to our environmental performance, placing it within a broader contextual framework.

Subject Area	Statement	Savings
Energy generation / CO_2	Our highly efficient power plant with combined heat and power generation enables us to achieve fuel utilization rates of up to 91%. This allows us to drastically reduce the consumption of primary energy sources compared to non-cogenerated power plants.	Around 74,000 t CO_2e / year
Water	Our facility is presently unaffected by water stress, and we anticipate that it will remain so in the future. Through multiple uses, we save water and protect our groundwater resources.	32% of groundwater is saved
Recovery plants	By generating energy in our sulphuric acid plant, we save on natural gas as a primary energy source and therefore emit less climate-damaging CO_2.	15,000 t CO_2e / year
Recovery plants	By using sulphuric acid in closed loops, we reduce the use of raw materials and CO_2 emissions in equal measure.	Around 1,250 t CO_2e / year
Recovery plants	Efficient CS_2 recovery enables us to save primary raw materials and avoid the transportation of hazardous goods.	Around 22,000 t CO_2e / year Additionally: Avoidance of approx. 153 railroad cars with hazardous goods
Waste	Thanks to our own incineration plant, we avoid unnecessary transportation of waste and can ensure processing to the highest safety standards.	
Waste water	Thanks to our own biological wastewater treatment, we can protect the municipal wastewater infrastructure and optimize the treatment of the wastewater produced.	10% higher cleaning performance than in conventional cleaning systems
End of product life	The certified biodegradability of our fibres enables sustainable solutions can be created and additional environmental pollution avoided. A prerequisite for this is appropriate further processing by our customers.	
Purchasing	We source more than 95% of our raw materials from Europe to prevent long transportation routes.	

Table 1

2.4 Certificates





2.5 Other On-Site *Facilities*

Our production facilities are undoubtedly the heart of our company and form the basis for the production of our high-quality viscose fibres. However, for the success of our company, collaboration among all departments is crucial, encompassing the following areas:

Production (257 employees): This area forms the core of Kelheim Fibres GmbH. It includes the viscose department, the dyeing plant, the spinning area, fibre packaging and the recovery plants.

Technology, Site, Infrastructure (140 employees): This department encompasses engineering technology (planning and maintenance), workshops, rail siding, warehousing, an in-house construction office, as well as energy (power plant) and environmental facilities (waste water treatment and residue combustion).

Laboratories and Development (32 employees): Our laboratories including six different working groups, the department for fibre and application development, and pilot plants. Both play an important role in quality assurance and the further development of our products.

CSR (Corporate Social Responsibility) (8 employees): This department includes the plant fire department, the safety department, the plant medical department as well as our environmental department and our Sustainability Manager.

Sales, Distribution, Quality Management, New Business Development and Marketing (29 employees): These departments work on sales, marketing, quality assurance and the development of new business areas.

Human Resources and Social Affairs (23 employees): This domain encompasses our Human Resources department, plant security, and the canteen, serving not only as a dining facility but also as a communal space for our employees.

Administration (33 employees): Administration includes plant management, finance, information and communication technology (ICT) and purchasing.

Training and Education: We take pride in maintaining a commendable training program, boasting a high ratio of 72 trainees under the guidance of two dedicated full-time trainers. This initiative provides many young individuals with a successful start to their careers.

Our diverse facilities at the site are crucial to the success of our company and play a key role in making Kelheim Fibres a leader in the industry. We are continuously committed to optimizing our processes and maximizing our contribution to sustainability.

Site Service: The closure of Dolan GmbH has resulted in a number of changes at the site. For example, we have integrated the dye plant, which was previously owned by Dolan GmbH that provided services for Kelheim Fibres, into our Production division. The most significant change, however, is the creation of the position of Site Service Commercial Manager. This position has been introduced to ensure that our many valuable site resources, from premises and energy to specialist equipment and the expertise of our employees, are used as efficiently and profitably as possible. The Site Service Commercial Manager works closely with external partners to realize our full potential while strengthening our contribution to sustainability and environmental protection.

3 Environment

Principle 07: Businesses should support a precautionary approach to environmental challenges.

Principle 08: Undertake initiatives to promote greater environmental responsibility.

Principle 09: Encourage the development and diffusion of environmentally friendly technologies.

*In our sustainability reporting, we adhere to the ten principles of the **UN Global Compact** and align with the 17 Sustainable Development Goals (SDGs) set forth by the United Nations. Through a comprehensive materiality analysis, we have identified three principles and nine SDGs that hold significance across our environmental value chain.*

Ensure availability and sustainable management of water and sanitation for all.

Ensure access to affordable, reliable, sustainable and modern energy for all.

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Ensure sustainable consumption and production patterns.

Take urgent action to combat climate change and its impacts.

Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably managed forests, combat desertification, and halt and reverse land degradation and biodiversity loss.

Strengthen means of implementation and revitalize the global partnership for sustainable development

We are proud of the creation of our new CSR-department in 2022. By centralising the CSR management, we have better oversights over all facets of the individual points of interest. Sustainability is not just a trend, for us it means taking responsibility.

Wolfgang Ott,
Director of Corporate Social Responsibility

We reflect on more than 85 years of company history. Despite significant changes in our product range over time, our enduring strengths have always been our commitment to environmentally friendly, sustainable solutions, and the production of high-quality products. As the emphasis on environmental protection has grown over the years, staying ahead of trends and continually reducing our impact on the environment is of utmost importance. This not only involves minimizing emissions but also addressing our contribution to climate change, impact on the local community, efficient resource use, and commitment to the circular economy.

In 2020, we achieved EMAS validation as the first viscose fibre producer worldwide. This certification marked a significant milestone in our environmental management system. The establishment of our CSR department in 2022 marked the next step in our sustainability roadmap.

In addition to the sustainability report, Kelheim Fibres plans to introduce its own environmental label to better present its environmental performance.

3.1 EMAS

The EU Eco-Management and Audit Scheme (EMAS) is a comprehensive environmental management system developed by the European Commission. This framework serves as a strategic tool for companies and organisations, facilitating the assessment, reporting, and enhancement of their environmental performance. Distinguished by its strict standards, EMAS aligns with the fundamental requisites of ISO 14001, setting more ambitious objectives. An integral component of EMAS compliance involves a public environmental statement with all publicized audited data. Pursuant to validation under EMAS, our overarching objective is to affirm and improve our environmental performance. EMAS is strategically engineered to encourage transparency across multiple levels, extending to our stakeholders, customers, employees, and the geographical sphere within which our operations unfold. Our corporate ethos underscores the alignment of sustainability and ecological initiatives with economic perspectives, which guides our conscientious efforts. EMAS seamlessly integrates into our overarching management system, encompassing quality standards (ISO 9001), energy management (ISO 50001), hygiene protocols (company standard), and compliance measures. The management representatives of each management system, as well as legally mandated representatives (such as the water protection officer), report directly to corporate management. In stark contrast to conventional top-down approaches, where employee involvement is often marginalized, we have integrated environmental awareness into our company's ethos by delegating responsibilities to our managers.

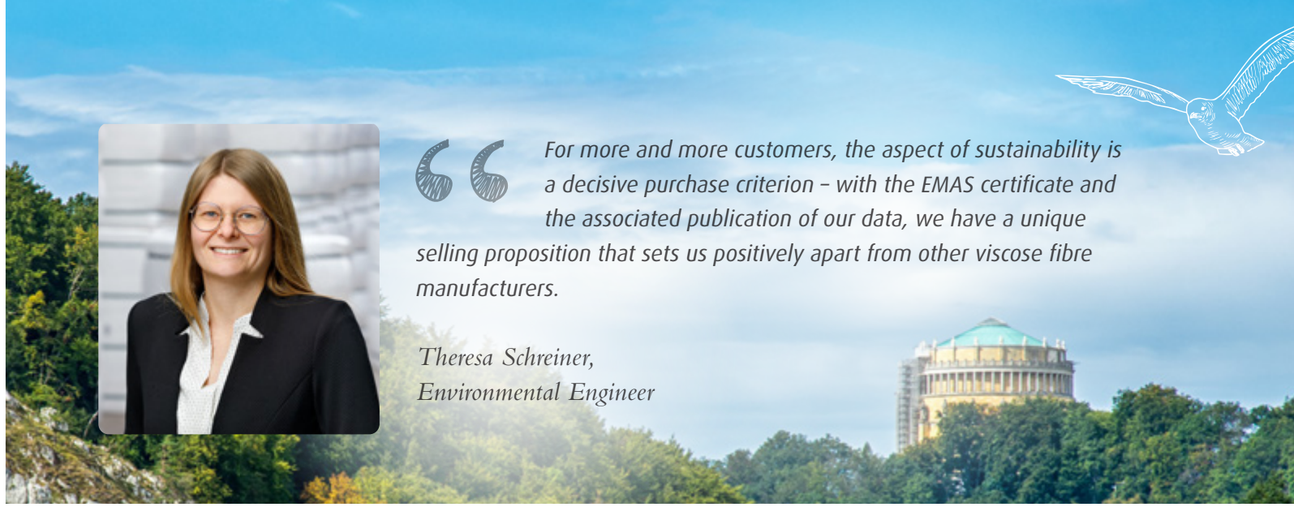
All employees undergo specific training related to EMAS. Defined processes regulate the interfaces between individual departments, with specific details governed by internal departmental instructions.

The regulations cover both normal operations and emergency situations. We regularly set goals to improve respective environmental performance, which we track and review as part of our continuous improvement process. Since 2020, we conduct annual environmental audits to assess compliance with regulations, the application of management systems, and progress toward achieving our improvement goals. The management also conducts an assessment as part of the annual management review.

We conscientiously acknowledge our societal, environmental, and regional responsibilities. Monitoring all regulations and documenting processes allows us to foster trust and security among our stakeholders. Adherence to established limits, compliance with environmental standards, and the use of cutting-edge technology, such as Best Available Technology Reference (BREF), underscore our commitment to continual improvement. Collaborative engagement with authorities is also pivotal to our operational philosophy.

While the proximity to employees' residences was advantageous when the company was founded, we acknowledge that an industrial company is not always viewed as an ideal residential neighbour. Nevertheless, we maintain a very good relationship with our neighbours and actively work to preserve that through open communication.

EMAS mandates external validation of our routine environmental statement by an accredited environmental expert, ensuring the inclusion of key performance indicators (KPIs) and the pursuit of our predefined objectives. This validation substantiates our commitment to transparency for all stakeholders with an interest in our environmental endeavours.



For more and more customers, the aspect of sustainability is a decisive purchase criterion – with the EMAS certificate and the associated publication of our data, we have a unique selling proposition that sets us positively apart from other viscose fibre manufacturers.

Theresa Schreiner,
Environmental Engineer

Organigramm

EMAS as well as all important (CSR-)functions are firmly anchored in our organisation.

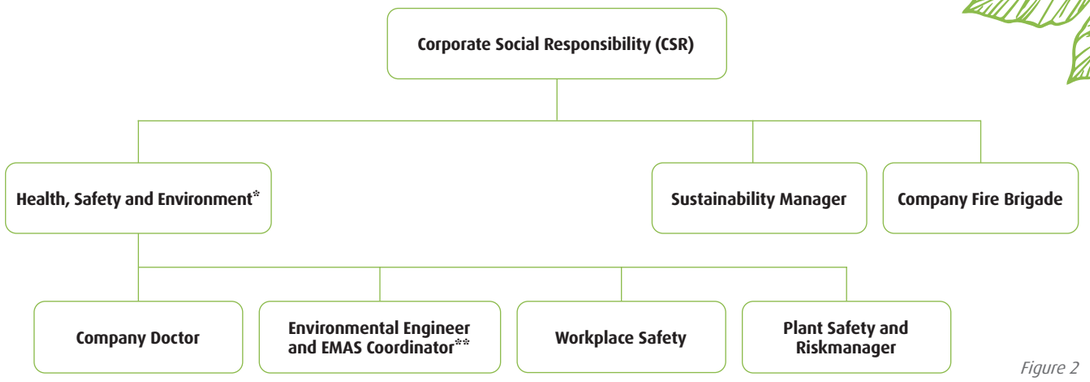


Figure 2

Emergency Response Plan

The company's alarm and emergency response plan according to §10 Annex 4 of the Hazardous Incident Ordinance is managed and updated by the environmental engineer and the incident response officer. The internal alarm and emergency response plan is designed to ensure smooth cooperation between internal and external emergency and rescue services in case of an emergency.

It aims to ensure that emergency measures take effect immediately and that the impact is minimised. As internal emergency response forces and facilities, it includes the company fire brigade, medical services, plant security, business and operations management, as well as the in-house alarm center (gate).

In a disaster scenario that cannot be managed by internal resources, external response forces are available from outside the plant for hazard control. The procedure is regulated through the alarm and emergency response plan.

*) The head of Health, Safety and Environment has the professional responsibility for the environmental facilities area and is also the Incident Response Officer of Kelheim Fibres GmbH.
**) The EMAS coordinator closely collaborates with the Head of CSR on all EMAS-related issues and monitors the continuous improvement process.

3.2 Resource *Efficiency*

A sustainable production process involves the conservation of resources, the minimization of emissions and waste, and the application of energy-efficient practices in operational facilities. We achieve this through the operation of modern and technologically advanced recovery and processing plants. The recovery plants close the loop in our processes, ensuring a process-integrated approach. The following are examples of process-integrated plant operation:

- Carbon disulphide (CS_2) is recovered from exhaust streams either in an activated carbon adsorption plant or through direct condensation. This significantly reduces our demand for primary resources.
- Our waste streams with high concentrations of hydrogen sulphide (H_2S) and carbon disulphide (CS_2) are directed to the sulphuric acid plant for combustion. This enables the production of sulphuric acid and high-pressure steam for subsequent power generation and also contributes to the reduction of CO_2 emissions.
- Waste is disposed of in our combustion plant on-site and utilized for steam generation. This reduces the consumption of natural gas and results in a decrease in CO_2 emissions caused by the use of fossil fuels.
- Energy is recovered from hot media flows through the use of heat exchangers.
- The alkali used in our production process is filtered and, before disposal, repurposed for other uses within our process.

The definitions of BREF, specifications of ZDHC, and common v systems such as Nordic Swan and the EU Ecolabel serve as benchmarks for sustainability.

BREF

"Best Available Technology reference document" of the European Commission

ZDHC Roadmap to Zero

The ZDHC (Zero Discharge of Hazardous Chemicals) is a non-profit organisation that focuses on eliminating harmful substances from the textile value chain. The "Roadmap to Zero" is an initiative of this organisation aimed at reducing hazardous chemicals in the textile industry.

Resource Efficiency: CS_2 Consumption

Material	2020	2021	2022	Unit
CS_2	4,773.0	5,458.2	4,629.6	t
CS_2	0.0860	0.0868	0.0910	t/t fibre

Table 2

3.2.1 Raw *Materials*

The wood used for viscose production at our plant comes exclusively from certified, managed sources. Two types of wood are used: Plantation wood, in which the trees are reforested after harvesting, and wood from natural forests, which is no longer suitable for other uses, e.g. the furniture industry.

Through the exclusive use of wood with FSC™ and PEFC certification, we ensure that the wood is not obtained illegally or in violation of protection regulations for humans and nature.

By joining the Canopy initiative, Kelheim Fibres has also committed itself to the protection of ancient and endangered forest areas. This commitment is reflected in our policy on pulp purchasing. To achieve even greater sustainability in the use of raw materials, we are researching the use of recycled cellulose ("circular economy") as well as other sources of cellulose (e.g. orange peel or straw).

Raw Material

Material	2020	2021	2022	Unit
Cellulose	1,033	1,030	1,025	t / t fibre
NaOH	0.516	0.514	0.507	t / t fibre
H_2SO_4	0.753	0.761	0.747	t / t fibre

Table 3

3.2.2 Circular *Economy*

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Viscose fibres are a wood-based product with identical cellulose structure to the raw material wood pulp. An increasing number of end product manufacturers are committed to use only sustainable and plastic-free raw-materials. Furthermore, raw material availability, circular economy, and transparent supply chains are becoming more and more important topics in relation to production processes and communications efforts.
All of these objectives have been pursued at Kelheim Fibres for many years and remain the focal point of our ongoing efforts. The sustainability of our production processes is continuously improved by conserving resources, minimizing emissions and waste, and operating plants in an energy-efficient manner.
To take a step further in the direction of developing resource- and waste-reducing solutions, we collaborated with Renewcell, a sustaintech company based in Sweden. Together we will collaborate on developing commercial scale production of superior quality viscose fibres using Renewcell's 100% textile recycled material Circulose® and add the crucial missing link for a circular economy for textiles in Europe.

3.3 Energy

3.3.1 Energy *Sources*

To fulfill our commitment to successful, efficient, and sustainable business processes, a primary emphasis is placed on optimizing our energy requirements. Our conscientious utilization of energy resources is reflected with the following aspects:

- The effective generation and provision of energy.
- The economic use of energy and the best possible use of residual energy from the processes.
- The efficient use of energy by recycling and reusing process materials.
- Our continuous improvement process.

We operate a modern power plant powered by natural gas with low emission values. Strategically situated in close proximity to our production facility, this arrangement enables the utilization of steam created during power generation. This integrated approach contributes significantly to a remarkable increase in efficiency, surpassing 88%

Relative to the average emissions of German generation plants (442 g CO_2e / kWh in 2022 without upstream chain)[2], our gas-fired power plant emits only 15 g CO_2e / kWh. The operation of our power plant also entails responsibilities in connection with the European climate targets (in accordance with the Kyoto Protocol) and the German climate agreement (climate neutrality by 2045). Emissions trading plays an important role in achieving these targets. Fossil energy is not the future. In Germany, the industrial sector is responsible for 44% of total energy consumption in 2021. Compared to commercial (27%) and private (26%) consumption, the influence and impact of the industrial sector is significantly greater due to its size and energy demand.

Average Efficiency of Gas Flow Generation in Comparison[1]

	Energy Generation Efficiency
Kelheim Fibres (power and heat cogeneration)	> 88%
China 2016	48%
India 2016	40%
Germany 2016	48%
Australia 2016	36%

Table 4

Therefore, advancing the energy transition toward green solutions within the industrial sector holds great importance.

Our plan is to switch completely from natural gas to hydrogen by 2030. As an interim goal, we aim to establish a solar park near our production facility. While the capacity may not fully meet our energy demands, it will effectively mitigate peak electricity requirements.

Energy Consumption KPIs

Energy Consumption	2020	2021	2022	Unit
Power	86,376,490.0	102,056,327.0	90,946,319.0	kWh
Power	1,555.7	1,622.3	1,786.9	kWh / t fibre
Steam	411,489,848.0	558,425,298.0	510,275,990.0	kWh
Steam	7,411.4	8,876.8	10,025.9	kWh / t fibre
Fuel for vehicles	178,654.6	204,776.7	167,001.6	kWh
Fuel for vehicles	3.2	3.3	3.3	kWh / t fibre

Table 5

2023
Power from natural gas

2025
Solar park to mitigate energy demand peaks

2030
Power plant running entirely on hydrogen

German Energy Usage, Share of Usage Group[3]

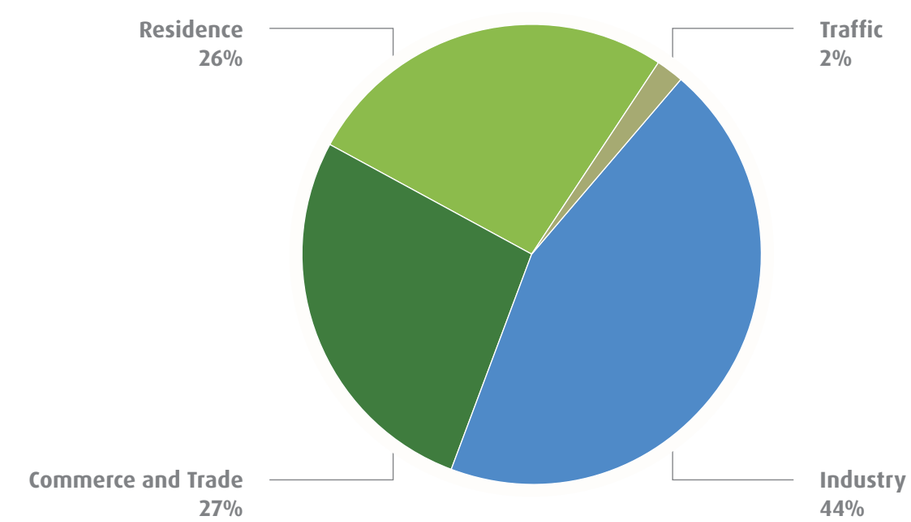


Figure 3

[1] https://guidehouse.com/-/media/www/site/downloads/energy/2018/intl-comparison-of-fossil-power-efficiency--co2-in.pdf
[2] https://www.umweltbundesamt.de/themen/klima-energie/energieversorgung/strom-waermeversorgung-in-zahlen#Strommix
[3] https://de.statista.com/statistik/daten/studie/236757/umfrage/stromverbrauch-nach-sektoren-in-deutschland/

3.3.2 Energy Generation *Efficiency and Recovery*

By operating recovery plants, we meet the requirement for both material and thermal utilization of waste gas streams. Waste generated on-site is thermally recycled within the plant. Our sulphuric acid plant significantly contributes to our energy production without emitting CO_2.

This helps us save considerable amounts of primary energy of fossil-based origin, actively contributing to greenhouse gas reduction. Our goal is to generate energy from renewable sources, which is a key target for the coming years. Other energy sources include a waste combustion plant with low-pressure steam generation and condensate streams being returned to the power plant.

3.4 Air Emissions *and CO_2*

The use and handling of substances containing sulphur are crucial in the production of viscose fibres.

Cellulose in the form of wood pulp is dissolved in caustic soda and carbon disulphide during the production process (xanthogenation) and forms a honey-like, highly viscous liquid, which gives the viscose process its name. This liquid is extruded into a coagulation bath through spinning jets, and the dissolved cellulose regenerates into a fibre. The process then passes through several steps, and carbon disulphide and hydrogen sulphide are removed from the fibres. The highly concentrated waste streams are then fed to a material recycling process, and the unharmful low concentration streams mainly enter the atmosphere via the 86-metre-high stack. Beyond that, only a few partial streams are emitted close to the ground via the roof of the spinning area.

As many parts of our plant are subject to emissions control legislation, important emission parameters are recorded online and the authorities have unlimited access to the recorded data. This enables authorities to conduct inspections and verify our plant emissions at any time. Additionally, the plant undergoes independent checks as part of annual inspections to further ensure compliance with regulations.

3.4.1 Specific *Emissions*

The waste gas streams with high concentrations are treated through two methods: either in the sulphuric acid plant, where sulphuric acid is produced through a combustion process, or in the carbon disulphide recovery plant, where carbon disulphide is adsorbed and bound to activated carbon.

Another form of carbon disulphide recovery is achieved through direct condensation, which is implemented in certain sections of our production line. The materials recovered in this way are then returned into the process. The use of these technologies has helped to reduce sulphur emissions from the plant by 45% in the last decade. As a result, Kelheim Fibres is able to meet the stringent limits set by the World Health Organisation (WHO) for environmentally significant sulphur emissions, surpassing the current regulatory levels in place.

Specific Air Emissions

Emissions	2020	2021	2022	Unit
Total dust	82.83	92.26	71.00	kg
Total dust	1.49	1.47	1.40	g/t fibre
SO_2	129,590	143,917	129,723	kg
SO_2	2.33	2.29	2.55	kg/t fibre
NO_x	55,590	65,977	53,586	kg
NO_x	1.00	1.05	1.05	kg/t fibre

Table 6

Development of Specific Sulphur Emissions to Air (kg sulphur / t fibre)

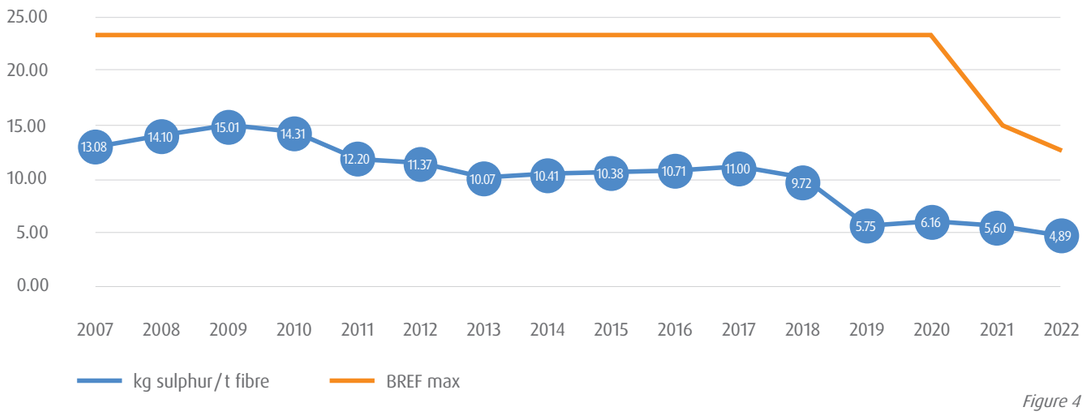


Figure 4

3.4.2 Greenhouse *Gases*

Prior to the reporting year 2020, our organisation employed an external assessor to calculate our carbon footprint. However, beginning with the data for the year 2021, a strategic decision was made to internally conduct the impact assessment, while adhering to the guidelines set forth by the Greenhouse Gas Protocol. This approach provides us with more valuable insights into impact categories, helps us to identify hotspots, and allows us to deliver individual data sets for interested stakeholders requiring variable scopes. To ensure full compliance with the established framework, a thorough validation of our entire calculation and base data was undergone in the year 2022 (pertaining to the 2021 data), executed by an independent third party CO_2 inventory specialist.

The GHG protocol divides a company's impact into three scopes:

- Scope 1 includes all direct emissions from our processes.
- Scope 2 contains indirect emissions such as external power supplies.
- Scope 3 emissions are the widest ranging, including upstream and downstream supply chain data.

In this report, we explain the base data and system boundaries of the calculations.

3.4.2.1 Basic *Data*

Following a fire that damaged large parts of our production facility in 2018, we are still in the process of rebuilding our production capacity. From 2020 to 2021, there was an increase in production output of 13.3%. In 2022, increasing raw material and energy costs forced us the raise the fibre prices leading to a 19.1% decrease in total production. This needs to be considered when analysing our emission values and intensities.

Emissions

Data point	2020	2021	2022	Unit
Total fibre output	55,521	62,908	50,896	t fibre
Sodium sulphate output	31,212	33,542	28,108	t
Change compared to previous year (based on fibre output)		**+ 13.3**	**- 19.1**	%
Scope 1 emissions	109,754	112,753	104,662	tCO_2e
Scope 2 emissions	130	71.8	2,355	tCO_2e
Scope 3 emissions	105,700	111,834	103,340	tCO_2e
Total emissions	215,584	224,660	210,357	tCO_2e
Emission per t fibre	3.88	3.57	4.13	tCO_2e/t fibre

Table 7

3.4.2.2 Scope 1

COMBUSTION FACILITY: Our continuous production process, demands a significant amount of energy and requires a constant and reliable energy supply. To ensure a stable production process, we run our own on-site cogeneration plant which utilises natural gas for producing steam and electricity. The power plant was modified in 2022, allowing us to use oil fuel as an alternative energy souce during potential natural gas shortages. Additionally, a large amount of the high-pressure steam feeding the turbine comes from the exothermic production process of our sulphuric acid plant. The low-pressure steam leaving the back pressure turbine is used as heating energy for the production facilities. In addition, our waste combustion facility also contributes to the heating steam supply. The total energy efficiency hinges on the balance of required electrical power and steam, influenced by outdoor temperatures, production output, and on-site conditions.

A second on-site production company also uses our power plant. Kelheim Fibres typically requires more electricity, while the other company needs more heat leading to a mostly balanced energy state. However, due to the other company's extended production shutdown in 2022, the steam and power consumption became imbalanced, leading to a significant surplus of steam. In response to the volatile energy market and temporarily high natural gas prices, we decided to purchase externally produced electricity to cover our needs, reduce our internal steam production, and avoid further product price increases. This also helped us keep the high energy production efficiency of our own power plant. Therefore, part of our 2022 Scope 1 emissions migrated to Scope 2.

Carbon Footprint: Scope 1 Emissions

Category	2020	2021	2022	Unit
Combustion facility	109,535	112,664	104,559	tCO_2e
Vehicles	47	48	45	tCO_2e
Diffuse emissions	172	41	58	tCO_2e
Sum	**109,754**	**112,753**	**104,662**	**tCO_2e**

Table 8

COMBUSTION VEHICLES: Since significant parts of our on-site logistics happen via rail with two shunting locomotives, the emissions from fuel used by these locomotives are also included.

COOLING AGENTS: A small part of our cooling systems require cooling agents to work properly which need to be refilled regularly. Since the refill period may not align with calendar years, the values cannot be readily compared on a year-on-year basis.

3.4.2.3 Scope 2

PURCHASED ELECTRICITY: As previously mentioned in Scope 1, specifically in relation to the combustion plant, we have procured externally sourced electricity to offset operational disruptions by another company situated on the premises. The said company relies on the electricity and heat from our Combined Heat and Power (CHP) plant. The comprehensive details of this arrangement are detailed here.

Carbon Footprint: Scope 2 Emissions

Category	2020	2021	2022	Unit
Purchased electricity	72	130	2,355	tCO_2e

Table 9

3.4.2.4 Scope 3

Carbon Footprint: Scope 3 Emissions

Category	2020	2021	2022	Unit
Purchased goods and services	69,388	76,564	63,737	tCO_2e
Fuel and energy related activities (not included in scope 1 or scope 2)	9,743	17,552	18,435	tCO_2e
Upstream transportation and distribution	8,963	5,415	5,784	tCO_2e
Waste generation in operations	9	77	857	tCO_2e
Business travel	—	23	86	tCO_2e
Employee commuting	641	663	704	tCO_2e
Downstream transportation and distribution	15,773	11,031	13,267	tCO_2e
Use of sold products	0	0	0	tCO_2e
End-of-life-treatment of sold products	1,184	511	471	tCO_2e
Scope 3 sum	105,700	111,834	103,340	tCO_2e

Table 10 [1]

PURCHASED GOODS AND SERVICES: Purchased goods and services covers all emissions by resources necessary for our production, following a cradle-to-gate approach. As we are currently lacking in-depth insights into the CO_2-performance of our supply chain, some base assumptions are necessary. We aim to improve data quality and to establish closer cooperation in this area with our suppliers in the coming years.

FUEL- AND ENERGY RELATED ACTIVITIES (NOT INCLUDED IN SCOPE 1 OR SCOPE 2): In contrast to Scope 1 and 2 emissions, we included indirect emissions caused by fuel consumption. This includes extraction, transport and processing of fuels.

UPSTREAM TRANSPORTATION AND DISTRIBUTION: This category covers all emissions caused by inbound transport from our suppliers to our site.

WASTE GENERATION IN OPERATIONS: Here, we differentiate between four different types of waste of which three are accounted for in this category:

- Waste for external recycling
- Waste for external disposal
- Scrap
- Waste to our combustion plant (assigned to Scope 1 as we generate energy with our own waste)

BUSINESS TRAVEL: This covers all our emissions from car, train and plane business travels.

EMPLOYEE COMMUTE: Our employees' daily commute is an important data point. During the pandemic, we have enabled mobile working for employees whose presence on-site is not required (primarily administrative tasks).

DOWNSTREAM TRANSPORTATION AND DISTRIBUTION: This category covers all emissions caused by outbound transport from our site to the clients' facilities.

USE OF SOLD PRODUCTS / END-OF-LIFE-TREATMENT OF SOLD PRODUCTS: We are manufacturers of a wide range of specialty fibres which are used for multiple purposes in very different fields of application all around the world. As this is a topic of particular interest, we are currently working on generating a better database with deeper insights into the emissions from downstream processing. The current assumption for end-of-life-treatment corresponds to the global average of residual waste disposal.

[1] Capital assets can no longer be reprocessed at the location and would result in the annual values being distorted if depreciation models were used. They are therefore not taken into account.

3.5 Water

Within our operational procedures, water serves a primary role in the cooling process before being responsibly reintegrated back into the Danube River near our plant. When water is needed in the process flow, we aim to maximize its reuse, thus contributing to resource conservation.

3.5.1 Water *Quantity*

Annual Water Use

Following use, the treated water undergoes purification within vertically integrated bioreactors designed to meet the most rigorous standards in purification performance. Kelheim Fibres stands as a pioneer in adopting this cutting-edge and distinctive vertical bioreactor technology. Boasting an impressive decomposition rate of 96%, our vertical bioreactors surpass the capabilities of conventional wastewater treatment plants, typically achieving around 90%. Our purification capacity aligns with that of a sewage treatment plant catering to a city with 160,000 inhabitants. Rigorous internal and external monitoring networks ensure adherence to legal limits.

Water	2020	2021	2022	Unit
Well water	14,014,095	14,710,176	13,823,260	m^3
Well water	252	234	272	m^3/t fibre
Danube water	6,784,080	7,311,867	6,743,943	m^3
Danube water	122	116	133	m^3/t fibre
Municipal water (not used in production)	16,181	16,980	17,770	m^3

Table 11

3.5.2 Water *Quality*

Substances commonly identified as pollutants serve as essential nutrients for the microorganisms within our treatment plants. These microorganisms convert organic residues into harmless substances, yielding primarily carbon dioxide, water, and nitrogen as byproducts. Executed within our advanced vertical bioreactors, this natural process unfolds under meticulously optimized conditions.

Precision in process control is achieved through sophisticated measurement technology. An Alphameter regulates the air supply to the purification systems based on anticipated plant loading, ensuring a consistent microorganism supply while maintaining energy efficiency. The wastewater produced is reintegrated into the Danube, with strict adherence to emission limits overseen by local water management authorities. Our operations also adhere to the Self-Monitoring Ordinance, involving regular sampling and analysis to promptly respond to any fluctuations in values.

3.6 Chemicals

3.6.1 REACH

Our responsibility as a manufacturer also means that our products do not pose a risk during manufacturing or during subsequent use. This is covered by the REACH regulations. Only approved raw materials may be used, and the conditions of use are specified in chemical safety reports. Threshold values are also set for substances that must not be exceeded in the finished products. The implementation of REACH follows a holistic approach and complements measures relating to operational and sustainable environmental protection.

3.6.2 ZDHC

The non-profit organisation ZDHC, boasting over 160 global contributors, is committed to the eradication of harmful substances from the textile value chain. The ZDHC guidelines establish standardized criteria for assessing key indicators, including wastewater, air emissions, and other process-related parameters, specifically for producers of Man-made Cellulosic Fibres (MMCF). Independently monitored and openly published, the measured data ensures transparency and accountability. Our participation with ZDHC grants us access to a repository of best practices in chemical management, fostering collaboration and knowledge exchange among industry peers. Through this collaborative approach, facilitated by ZDHC, we anticipate expediting the industry's transition toward greater responsibility.

3.7 Waste

Waste generated on-site undergoes professional disposal procedures, facilitated by an internal residue combustion plant. Originally constructed in 1974 and subsequently modernized in 2001 and 2002, our plant adheres to the highest safety and emissions technology standards.

Operated in accordance with the 17th BImSchV, the residue combustion plant relies on natural gas for combustion processes and utilizes the thermal energy from waste, including high value components. Approximately 4 tons of 16-bar steam per hour are produced through these combustion processes, contributing to the plant's low-pressure steam network for thermal applications.

3.7.1 Non-Hazardous and Hazardous *Waste*

Non-Hazardous Waste by Category

Waste Management	2020	2021	2022	Unit
Total waste	5,984	6,072	6,243.4	t
Total waste	107.8	96.5	122.7	kg/t fibre
Process waste for recycling	117.0	112.0	112.0	t
Process waste for recycling	2.1	1.8	1.8	kg/t fibre
Process waste for disposal	2,062	2,274	206.5	t
Process waste for disposal	37.1	36.148	4.1	kg/t fibre
Other waste	3,805.0	3,687.0	4,309.1	t
Other waste	68.5	58.6	84.7	kg/t fibre

Table 12

Hazardous Waste by Category

Waste Management	2020	2021	2022	Unit
Total waste	1,201	707	1,195	t
Total waste	21.6	11.2	23.5	kg/t fibre
Process waste for recycling	35	32	18,0	t
Process waste for recycling	0.6	0.5	0.4	kg/t fibre
Process waste for disposal	113	82	78.4	t
Process waste for disposal	2.0	1.3	1.5	kg/t fibre
Other waste	1,053	593	1,098.7	t
Other waste	19.0	9.4	21.6	kg/t fibre

Table 13

As we operate a state of the art facility with an experienced team, we are able to safely treat CS_2 contaminated waste on our site. Any hazardous waste that cannot be reused in the process is disposed of strictly in accordance with current regulations.

Our Main Process Waste

Processed Waste	2020	2021	2022	Unit
Alkali cellulose	112.43	81.36	74.54	t
Alkali cellulose	2.0	1.3	1.5	kg/t fibre
Acid cable	1,378.73	1,509.91	1,154.74	t
Acid cable	24.8	24.0	22.7	kg/t fibre
Fibre waste	371.35	381.06	276.17	t
Fibre waste	6.7	6.1	5.4	kg/t fibre

Table 14

3.8 Neighbourhood *Impacts*

Hydrogen sulphide is naturally emitted during our plant's production processes and it's odour may occasionally be discerned by the surrounding population in Kelheim. The crucial determinants are the concentration and volumes of released hydrogen sulphide. Kelheim Fibres has undertaken efforts to substantially reduce sulphur emissions, exemplified by a modernisation program spanning the last decade, resulting in a noteworthy reduction of over 50% in the quantities of hydrogen sulphide released in the air.

As the population in Kelheim grows, the residential zones increasingly continues to encroach upon industrial sites—a trend exacerbated by the current housing shortage. In response, we have dedicated substantial financial resources over the past decade, to an ambitious noise reduction program. Tangible manifestations of this initiative include noise protection halls situated west of the plant, the muffled stack of the CS_2 recovery plant, and the newely renovated 86-meter-high stack.

Following the 2018 fire, additional measures were integrated into the reconstruction efforts to mitigate noise impact from the spinning area. This comprehensive set of initiatives has resulted in a notable reduction of at least 6 dB(A) in noise impact at relevant immission points.

3.9 Biodegradability

According to the provisions of the EU Directive "Single-Use Plastic" (SUPD), our viscose fibres are not chemically modified and are therefore not considered as plastic. One of the most important properties of the fibres in this context is their biodegradability.

Regarding biodegradability, the question arises as to what exactly is meant by it and how it is demonstrated. Scientifically, a product is considered biodegradable only if microorganisms can break down the material into its elemental components such as carbon, oxygen, hydrogen, and minerals.

Compostability is generally inseparable from the understanding of biodegradability. Compostability is confirmed and demonstrated according to DIN EN 13432. However, in reality, compostability only covers part of the full definition of biodegradability. How do substances behave, for example, in an aqueous environment? Plastic pollution in oceans is one of the central environmental problems that society has yet to erradicate. Various testing methods provide answers to the question of the environmental impact of a substance on the marine environment.

Biodegradability Certificates: Overview

Method	Description
OECD 301 B	Evidence of quick biodegradability in 28 days
DIN EN ISO 14851 resp. ISO 14852	Oxygen demand in closed respirometer with sludge inoculum
DIN EN ISO 17756	Oxygen demand and / or CO_2 evolution with soil inoculum
DIN EN ISO 18830	Oxygen demand in closed respirometer with sea sediment inoculum
OECD 301 F	Calculation of oxygen demand to measure aerobic degradation

Table 15

PART OF THE SOLUTION: VISCOSE FIBRES FROM KELHEIM

What is the big benefit of viscose fibres compared to oil-based fibres?
COMPOSTABILITY: Viscose fibres are compostable according to DIN EN 13432.

DEGRADATION BEHAVIOR IN THE SEA

The following figure provides an overview over the biodegradation time required for viscose fibres compared to oil-based materials.

Average Degradation Time of Products*

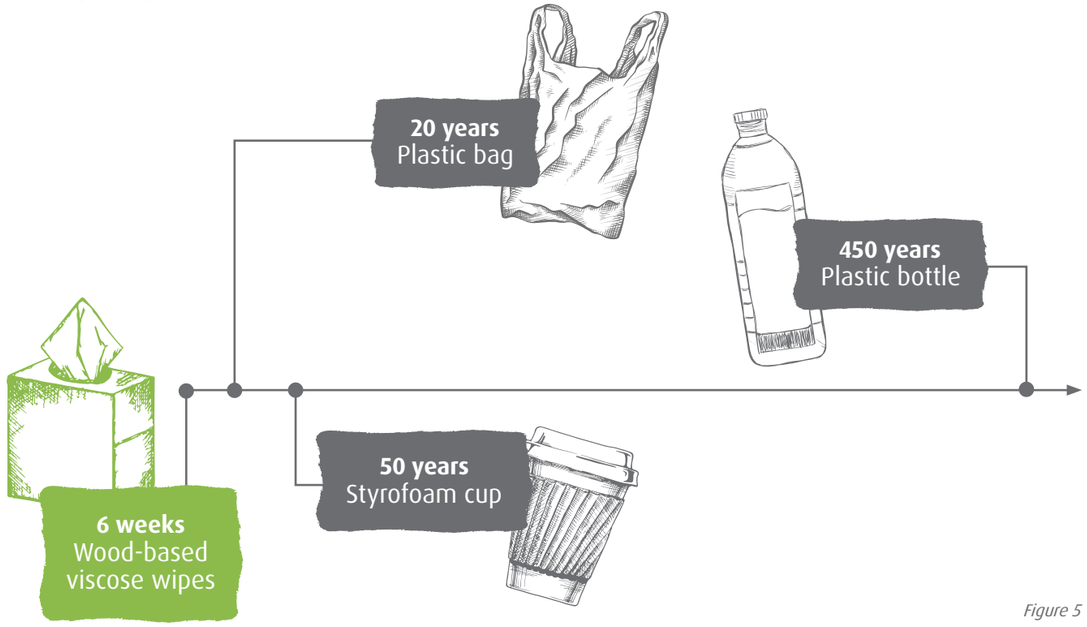


Figure 5

*source: statista_de/Nabu

The Biodegradation Process of GALAXY® Fibres Compared to Cellulose

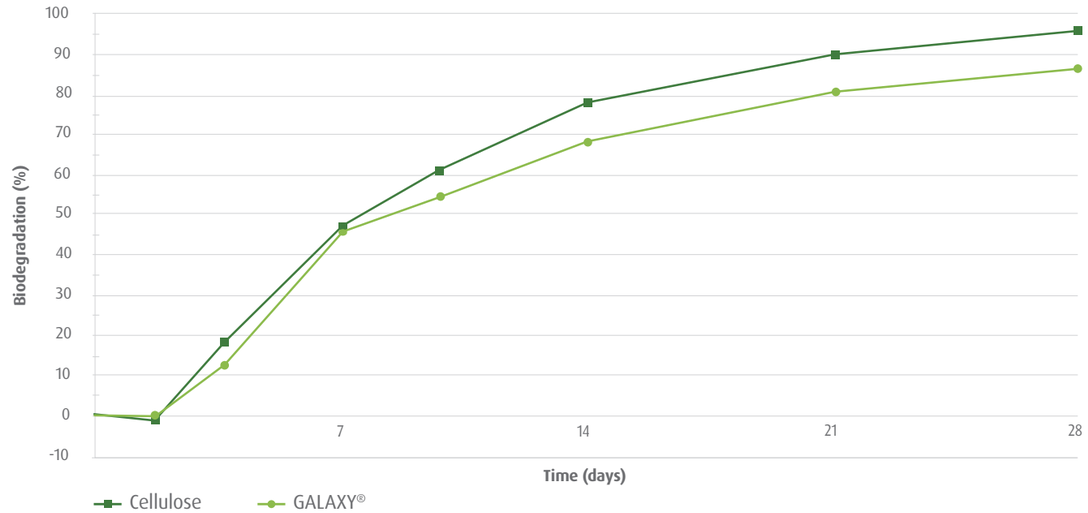
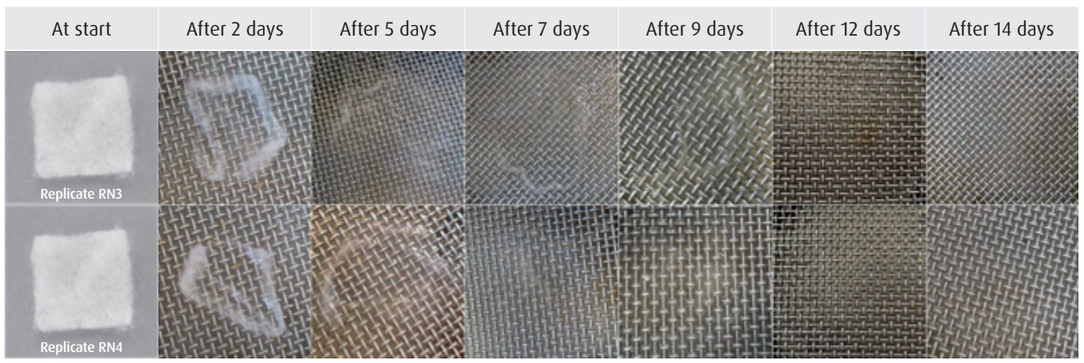


Figure 6

How well the wood-based viscose fibres really degrade can be seen when tested alongside the naturally occurring polymer cellulose. In the figure above, you can see the biodegradation times for natural cellulose compared to our GALAXY® fibre.

Viscose fibres thus fully meet the requirements of OECD 301 B, according to which a degradation performance of at least 60% must be achieved after 28 days.

Biodegradability of GALAXY® Fibres



Visual presentation of the test fibre GALAXY® during 14 days of incubation.

Figure 7

4

Our Actions
Have an Impact

The introduction of EMAS symbolizes our commitment to document and continuously improve our environmental performance. EMAS is directed at our owners, customers, employees, and our local community. All stakeholders benefit at various levels from EMAS. Our common goal is to unite sustainable and ecological practices with economic perspectives as we stay on the path of continuous improvement at all levels.

Owners

Our owners are strategic investors in a forward-thinking company. To align with their expectations, we are compelled to confront the contemporary challenges and present resolutions for both current and prospective issues. Our commitment lies in the development of environmentally conscious products that not only serve their designated purposes but also proactively contribute to the preservation of our planet, ensuring enduring success in the long run.

Clients

Our fibres allow our clients across diverse sectors, including hygiene, textiles, packaging, and technology, to craft environmentally sustainable end products. We offer bespoke and innovative fibre solutions that provide substantive value, exemplified by fully biodegradable products exhibiting superior technical performance compared to conventional petroleum-based alternatives. Clients can place their trust in us, benefitting from our meticulous storage of production parameters and raw material lots for each fibre bale, ensuring transparency and safety for consumers, clients, and our organisation.

Employees

For over 85 years, we have been at the forefront of viscose fibre production in Kelheim, Germany. Many of our team members represent the second and third generations, fostering a profound connection and cultivating a welcoming and familial atmosphere within our company. With over a third of our workforce boasting more than two decades of dedicated service, we take pride in our remarkably low turnover rate, recognizing that the knowledge and commitment of our employees stand as our most prized assets. We actively encourage employee engagement in decision-making processes and collaborating on shared objectives with worker representatives. We provide competitive wages, outstanding social benefits, and optimal conditions for both personal and professional growth. Our suggestion system facilitates the active and rewarding participation of our employees in our ongoing pursuit of continuous improvement.

Moreover, we are committed to shaping the future and enhancing educational prospects for young individuals in the region. Currently, with 72 apprentices under our wing, our apprenticeship rate stands at an impressive 12%, significantly surpassing both regional and national benchmarks.

Neighbours, Region, Society

Aligned with our core values, we uphold a steadfast commitment to our responsibility towards society, the environment, and the regions in which we operate. Our strict adherence to all regulations and meticulous documentation of processes ensure a secure foundation for all stakeholders. We consistently meet prescribed limits, adhere to environmental standards, and adhere to the most stringent requirements of cutting-edge technology. Central to our operations is the establishment of effective collaboration with authorities.

While the historical advantage of having employees in close proximity to the company's location has evolved, the presence of an industrial enterprise may not always be embraced as a welcome neighbour in a contemporary residential setting. Nonetheless, we are dedicated to sustaining a positive relationship with our neighbours and proactively work towards its continuation. This commitment is underpinned by open communication, a principle we rigorously uphold.

Materiality Analysis

To better understand the needs and expectations of our stakeholders, we conducted a comprehensive materiality analysis. In this process, we defined a set of 34 indicators that were compared with various reputable sources, including sustainability reports from other producers of viscose fibres, applicable laws, the ten principles of the United Nations, inquiries from external stakeholders, and certification requirements. This thorough assessment aimed to ensure that no significant issues were overlooked.

The selected indicators were then distributed in separate questionnaires to internal and external stakeholders. The external questionnaire was made publicly available on social media platforms and our website to ensure that all stakeholders had the opportunity to participate. In total, we received responses from 36 internal and 66 external stakeholders. The results are presented in Figure 7 below.

Materiality Analysis

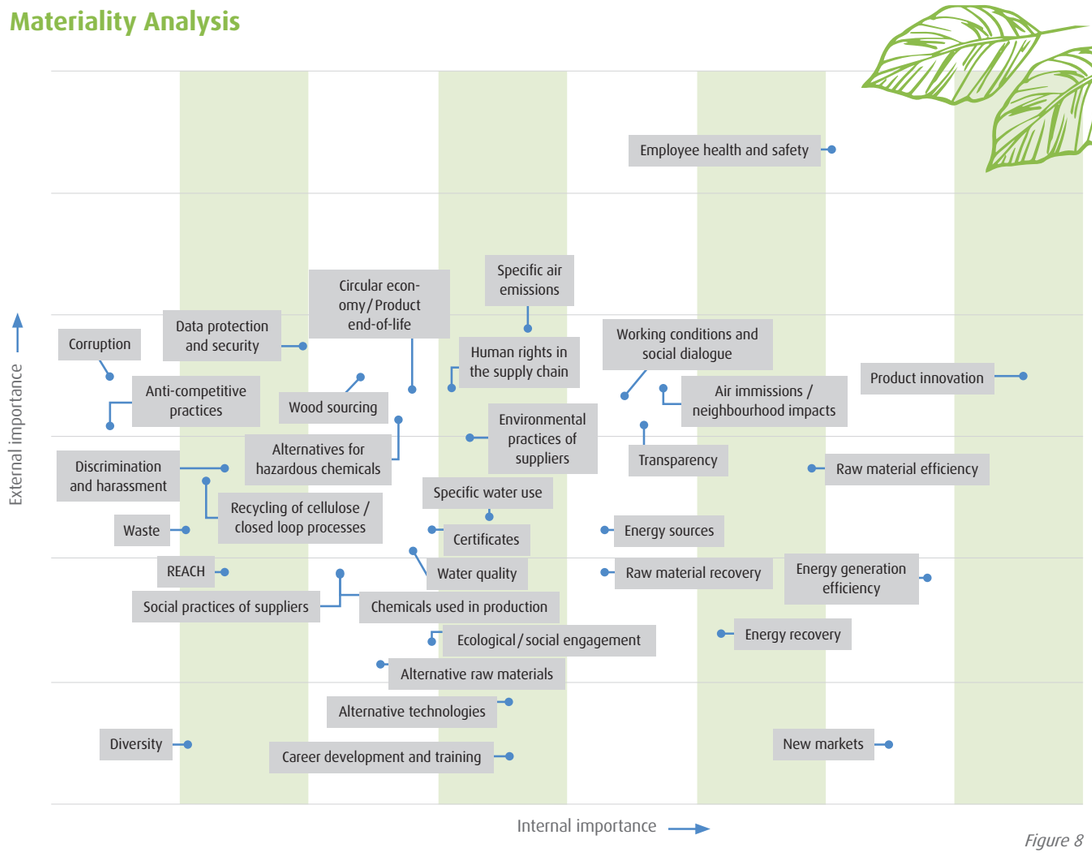


Figure 8

5
Our
Management System

The EMAS Environmental Management System has been instituted across the entirety of Kelheim Fibres GmbH. Our company is dedicated to the development, production, and distribution of specialized viscose fibres, in addition to the manufacturing and distribution of sodium sulphate and sulphuric acid. Our sole operational location is situated in Kelheim, Germany.

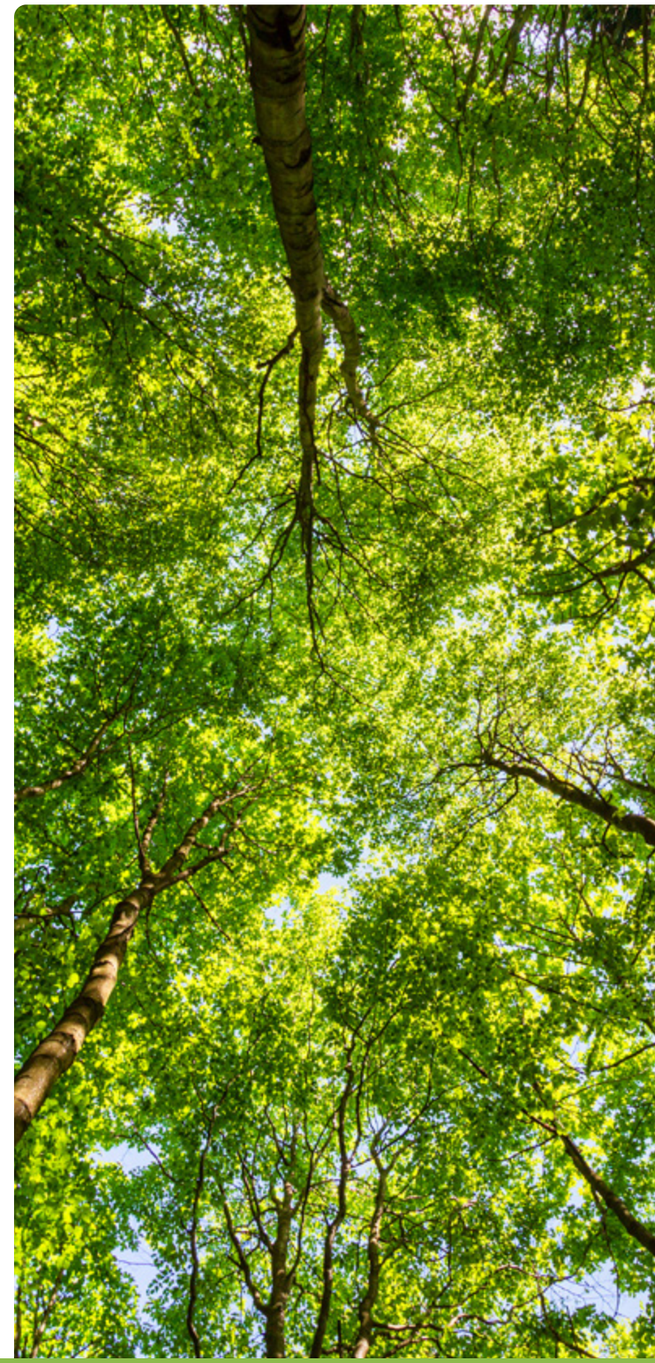
EMAS forms an integral part of our comprehensive management system, encompassing quality (ISO 9001), energy (ISO 50001), hygiene (company standard), and compliance (holistic and cross-aspect). The management representatives for each system, along with legally mandated appointees (such as the water protection officer), directly report to the executive management.

The integration of environmentally conscious practices is meticulously ensured through the mandatory delegation of responsibilities to our leadership team. Furthermore, all employees undergo EMAS training.

Our processes meticulously govern the interfaces between individual departments, with precise details outlined in the corresponding internal operating instructions for each department. These regulations cover both routine operations and emergency situations.

We consistently establish goals for enhancing environmental performance and diligently monitor and review them within the framework of our continuous improvement process. In our annual internal audits, referred to as environmental operational audits, we assess compliance with regulations, the implementation of the management system, and our targeted improvements. The executive management conducts an annual management review as an integral part of this process.

The basis of our actions, including those in the environmental sphere, rests upon our robust business policy.



6
Legal
Framework

EMAS epitomizes an unwavering commitment to the continuous enhancement of environmental performance. This iterative process is rooted in a well-established environmental management system, stemming from a robust legal compliance framework. Rigorous legal compliance entails the systematic consolidation of all pertinent legal domains into a meticulously maintained and regularly updated legal register. Internally, we meticulously oversee regulatory adherence through the initiatives by designated officers responsible for key areas such as waste management, water protection, and emissions control, complemented by our internal audit processes.

Furthermore, our commitment to compliance is externally affirmed through the scrutiny of regulatory annual inspections, encompassing:

- IE monitoring (Industrial Emissions Directive).
- Inspection of the residual combustion plant.
- Annual discussion on wastewater management for the operation of the biological wastewater treatment plant.
- Fire protection inspection.

The combination of internal and official monitoring indicates legal compliance of the plant operation. The legal framework governing our production facilities and associated upstream and downstream installations is determined by these facilities. The following list outlines the key regulatory frameworks:

Viscose Fibre Production

- Approval of the plant according to § 4 of the Federal Immission Control Act (BImSchG) in conjunction with Appendix I of the 4th Federal Immission Control Ordinance (4. BImSchV) No. 4.1.8
- Limitation of emissions from this plant according to the Technical Instructions on Air Quality Control (TA Luft)
- Specification for the biological limit value for carbon disulphide in Technical Rules for Hazardous Substances (TRGS) 903 in conjunction with TRGS 402

Production of Sulphuric Acid

- Approval of the plant according to § 4 of the Federal Immission Control Act (BImSchG) in conjunction with Appendix I of the 4th Federal Immission Control Ordinance (4. BImSchV) No. 4.1.13
- Limitation of emissions from this plant according to the Technical Instructions on Air Quality Control (TA Luft)

Operation of the Power Plant

- Approval of the plant according to § 4 of the Federal Immission Control Act (BImSchG) in conjunction with Appendix I of the 4th Federal Immission Control Ordinance (4. BImSchV) No. 1.1
- Limitation of emissions from this plant according to the 13th Federal Immission Control Ordinance (13. BImSchV)
- Greenhouse Gas Emissions Trading Act
- Cogeneration Act

Operation of the Residue Combustion Plant

- Approval of the plant according to § 4 of the Federal Immission Control Act (BImSchG) in conjunction with Appendix I of the 4th Federal Immission Control Ordinance (4. BImSchV) No. 8.1.1.
- Limitation of emissions from this plant according to the 17th Federal Immission Control Ordinance (17. BImSchV)
- Market participant under the German Federal Emissions Trading Act (BEHG)

Operation of the Biological Wastewater Treatment Plant In Conjunction With the Water Channels

- Approval of the facility according to the Water Resources Act in conjunction with Appendix 22 of the Wastewater Ordinance
- Limitation of emissions from this plant according to the Water Resources Act in conjunction with the Water Framework Directive and the Self-Monitoring Regulation

Operation of Cooling Plants

- According to the 42nd Federal Immission Control Ordinance (42. BImSchV)

We are currently preparing for the upcoming amendments to the Technical Instructions on Air Quality Control (TA Luft), the 13th Federal Immission Control Ordinance (13. BImSchV), and the 17th Federal Immission Control Ordinance (17. BImSchV)

Other significant accompanying legal areas include:

- Operational Safety Ordinance, particularly with regard to explosion protection and fire protection
- AwSV (cross-company): the Regulation on Installations handling substances hazardous to water
- Hazardous Substance Law with CLP Regulation (Classification, Labelling, and Packaging of Substances) and Hazardous Substance Ordinance
- Dangerous Goods Law
- REACH Regulation for Ensuring Chemical Safety

7
Appendix

7.1 Direct and Indirect Environmental Aspects and *Their Assessment*

To determine the direct environmental aspects, the approval notices for the respective areas were initially consulted if available. An immission protection approval is based on expert opinions involving relevant environmental authorities in all environmental sectors. Therefore, expert opinions on the relevance of individual aspects are already available in these areas. This basic framework of classification has been supplemented with practical experience. We considered questions such as "Where do we have particularly high consumption?" or "Where are the highest emissions generated?"

For areas without their own approval notice, we asked these questions and, supported by safety analyses and expert opinions, classified the areas. The result is as follows in the table on the right:

The evaluation is focused on regular operational conditions. In situations of non-routine operation, there may be additional emissions of pollutants or substance releases. Our operational alarm and emergency response plan comprehensively outline our responses to such occurrences. Furthermore, this plan undergoes thorough scrutiny by the relevant authorities. Instances of non-routine conditions encompass:

- Biological wastewater treatment plant: Non-adapted biocoenosis and associated reduced degradation performance during the startup phase due to increased loads.
- Sulphuric acid plant failure: Increased sulphur emissions or higher natural gas consumption in the power plant to compensate for the lack of energy generation from the sulphuric acid plant operation.
- Startup process of the sulphuric acid plant after a plant disturbance: Increased emission of sulphur oxides during the startup process after a plant disturbance.
- Flood management according to the Operational Emergency Response Plan.

Assessment of Direct Environmental Aspects

Operating area	Sub-areas	Air	Noise	Water	Waste	Energy	Safety	Hazardous goods	Radiation protection	Fire protection	Resources	Lands
Supply systems	Heat and electricity	■		●	●	■	▲	●		▲	▲	
	Cold					▲	▲					
	Compressed air					▲	▲					
	Protective gas					▲	▲					
	Water treatment			■	●						▲	
Waste disposal	Residue combustion	■	●	●	■	■	▲	▲	▲	▲	▲	
	Biological wastewater treatment	●	●	■	●	●	●			●		
Production – core areas	Viscose production	▲	●	■	■	●	■	▲		▲	▲	
	Spinning area	■	▲	■	▲	■	▲	▲		■	▲	
Production – support areas	CS_2 recovery	■	▲	●	●	▲	■	▲		▲	▲	
	CS_2 loading / CS_2 unloading			●			■			▲		
	Acid production	●	●	▲	●	■	▲	▲	▲	●	●	
	Zinc plant	▲		▲	■	●	▲	▲		●	●	
	Sulphuric acid plant	■	▲	▲		■	▲	▲		▲	▲	
	Calcination			■		●	●					
	Avivage plant			■	■							
	Colour plant			●		■		■				
Production – downstream areas	Packaging		●	▲						▲		
Location				▲	▲							▲

Table 16

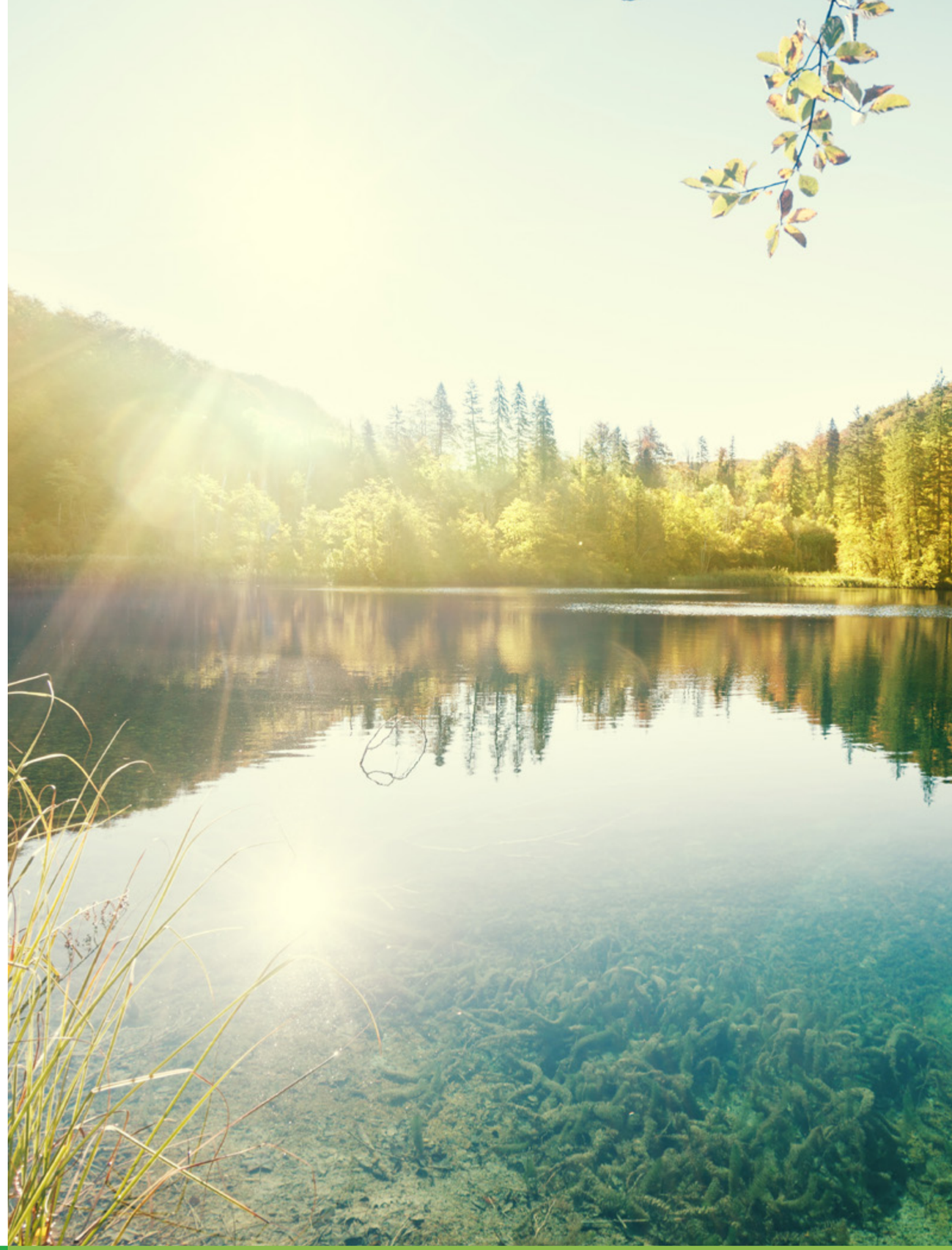
■	Most important aspect	Very high relevance	Very high legal requirements and / or very high consumption / emissions / immissions
▲	Main aspect	High relevance	High legal requirements and / or high consumption / emissions / immissions
●	Secondary aspect	Medium relevance	Legal requirements in place and / or moderate consumption / emissions / immissions
	No aspect	Very low / no relevance	No special legal relevance and no or very low consumption / emissions / immissions

In addition to these environmental aspects over which we have direct influence, the environmental impact of viscose fibre production is also determined by external conditions beyond our control.

Indirect Environmental Aspects

Aspect	Explanation	Impact	Evaluation	Explanation
Composition of product range	The composition of our product mix continues to develop in the direction of specialty fibres	Water: The higher the proportion of specialty fibres, the higher the specific water consumption Energy: The mix of dry and wet fibres also has an influence on energy consumption Customer requirements are decisive here	high	The trend towards specialty fibres is already clearly visible The water consumption of specialty fibres is significantly higher; although energy consumption is trending downwards, it is also more volatile
Life course	Especially in focus: End-of-life, what happens to the end product after use?	Fibres are not classified as plastic or microplastic. → Proof of complete biodegradability or compostability according to DIN and OECD methods; Low recyclability of hygiene products	high	Legal labelling obligation if products were classified as plastic, Circular economy
Life course	Environmental aspects of cellulose production	Scope 3 of the life cycle assessment and the LCA is influenced	medium	Pulp cannot be easily replaced; the only degrees of freedom are the pulp supplier and the medium-term development of new pulp sources
Selection of services	Transportation of our products	CO_2 emissions, NO_x emissions	low	Transportation is not a major factor in the CO_2 balance, the savings potential is quite low
Environmental performance and behavior of contractors, subcontractors and suppliers	Suppliers of our raw materials	Manufacturing processes also have an impact on carbon footprint and the LCA results	low	Due to the quantity of specialty raw materials, the range of suppliers is small and our ability to exert influence is therefore very limited

Tabelle 17



7.2 Key Performance *Indicators*

Key performance indicators have been established to enhance the transparency of our company's environmental performance. Following a significant fire incident in 2018, we are currently in the process of rebuilding our spinning area, which has led to constrained production capacities.

Our commitment to sustainability goes hand in hand with transparency and credibility.

Timo Thunitgut, Sustainability Manager, Kelheim Fibres

	Absolute Figures				Values for Input / Output Related to Production Quantities			
	2020	2021	2022	Unit	2020	2021	2022	Unit
Production Quantity								
Fibres produced	55,521	62,911	50,896	t				
Sodium sulphate	31,212	33,542	28,108	t				
Sulphuric acid	54,564	60,204	60,308	t				
Energy								
Power (total energy consumption)	86,376,490	102,056,327	90,946,319	kWh	1,556	1,622	1,787	kWh / t fibres
Steam	411,489,848	473,344,501	435,196,000	kWh	7,411	7,524	8,551	kWh / t fibres
Renewable energy	0	0	0	kWh	0	0	0	kWh / t fibres
Fuel vehicles	178,654.6	204,776.7	167,001.6	kWh	3.2	3.3	3.3	kWh / t fibres
Gas use without power plant	36,233,972	38,479,099	34,851,644	kWh	652.6	611.7	684.8	kWh / t fibres
Total energy	534,278,964.6	699,165,500.7	561,160,964.6	kWh	9,623.0	11,114.1	11,025.6	kWh / t fibres
Material								
Cellulose	57,328	64,778	52,158	t	1.033	1.030	1.025	t / t fibres
NaOH	28,661	32,352	25,787	t	0.519	0.514	0.507	t / t fibres
H_2SO_4	41,785	47,899	38,040	t	0.753	0.761	0.747	t / t fibres
CS_2	4,773	5,458	4,630	t	0.086	0.087	0.091	t / t fibres
Water								
Well water	14,014,095	14,710,176	13,823,260	m^3	252	234	272	m^3 / t fibres
Danube water	6,784,080	7,311,867	6,743,943	m^3	122	116	133	m^3 / t fibres
City water	16,181	16,980	17,770	m^3	0.291	0.268	0.348	m^3 / t fibres
Waste								
Total waste	5,984	6,072	6,249	t	107.8	96.5	122.7	kg / t fibres
Process waste for recycling	117	112	206	t	2.1	1.8	4.1	kg / t fibres
Process waste for disposal	2,062	2,274	1,728	t	37.1	36.1	33.9	kg / t fibres
Other waste	3,805	3,687	4,315	t	68.5	58.6	84.7	kg / t fibres
Total hazardous waste	1,201	736	1,195	t	21.6	11.7	23.5	kg / t fibres
Hazardous process waste for recycling	35	32	18	t	0.6	0.5	0.4	kg / t fibres
Hazardous process waste for disposal	113	82	78	t	2.0	1.3	1.5	kg / t fibres
Hazardous other waste	1,053	622	1,099	t	19.0	9.9	21.6	kg / t fibres
Land Use								
Total land use	211,934	211,934	211,934	m^2	211,934	211,934	211,934	m^2
Total sealed area	177,544	177,544	177,544	m^2	177,544	177,544	177,544	m^2
Total semi-natural area at the site	34,390	34,390	34,390	m^2	34,930	34,930	34,930	m^2
Total semi-natural area away from the site	–	–	–		–	–	–	
Emissions								
Total greenhouse gas (Scope 1+2)	102,081	112,825	89,055	tCO_2e / t fibres	1.84	1.79	1.75	t / t fibres
Total greenhouse gas (Scope 1+2+3)	215,584	224,660	210,357	tCO_2e / t fibres	3.88	3.57	4.13	t / t fibres
Total dust	83	95	71	kg	1.49	1.50	1.4	g / t fibres
SO_2	129,590	143,917	129,723	kg	2.33	2.29	2.55	kg / t fibres
NO_x	55,904	65,978	53,585	kg	1.00	1.05	1.05	kg / t fibres

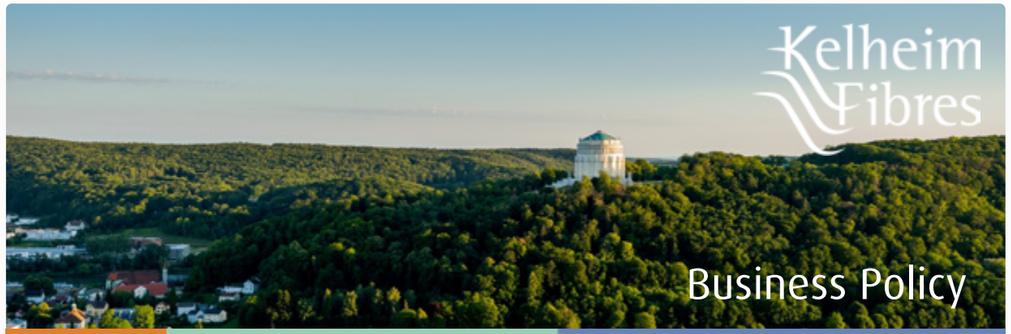
Table 18

7.3 EU-BAT *Definitions*

Aspect	Unit	EU BAT	EU BAT Status	Kelheim Fibres
Consumption Data				
Energy intensity	GJ / t fibres	20 – 30	✓	19.38
Cellulose	t / t fibres	1.035 – 1.065	✓	1.025
H_2SO_4	t / t fibres	0.6 – 1.0	✓	0.747
NaOH	t / t fibres	0.4 – 0.6	✓	0.507
CS_2	kg / t fibres	80 – 100	✓	91
Zn	kg / t fibres	2 – 10	✓	4.2
Avivages	kg / t fibres	3 – 5	✓	3.0
NaOCl	kg / t fibres	0 – 50	✓	8.5
Process water	m³ / t fibres	35 – 70	✓	38
Cooling water	m³ / t fibres	189 – 260	✓	210
Specific Emissions / Volume				
COD (chemical oxygen demand)	m³ / t fibres	3 – 5	✓	4.41
Hazardous waste	kg / t fibres	0 – 2.0 kg	✓	1.9
Noise	dB(A)	55 – 70	✓	
Sulphur in the air	kg / t fibres	6 – 9	✓	≤ 5.5
Recovery Rates / Cleaning Performance				
COD wastewater	%	85	✓	≥ 96
CS_2 recovery	%	97	✓	≥ 99
Total sulphur to air	%	97	✓	≥ 97.5
Energy				
Efficiency	%	50 – 60	✓	≥ 88
High efficiency criteria	%	10	✓	≥ 15
Biodegradability				
Biodegradability of fibres			✓	OECD 301 B DIN EN ISO 14851

Table 19

7.4 Business *Policy*



OUR COMPANY

In Kelheim, we have been producing viscose fibres for more than 85 years, making us the world's longest-operating viscose fibre plant. We manufacture wood-based specialty fibres for a sustainable lifestyle. As one of the leading global manufacturers of specialty viscose fibres, Kelheim Fibres contributes to the success of many brands and products. To ensure this continues in the future, our business policy is built on innovation, continuous improvement, specialisation, and reinvestment. At the same time, as a market-leading company, we secure a multitude of high-quality jobs within the region.

OUR CLAIM TO SUCCESS

We strive for sustainable economic and ecological success. We have a clear vision of being the driving force behind the best individual solutions for a healthy lifestyle while simultaneously protecting the environment for future generations. In this way, we aim to propel the transition from a fossil-based to a bio-based society.

OUR VALUES

Our business policy encompasses three core values that we actively live and promote: trust, commitment, and innovation shape our daily work.

Trust: The reputation of many international brands depends on our performance. Customers and end consumers rely on the highest standards, which we ensure through extensive quality assurance systems. Trust also defines our relationships with employees, suppliers, and other stakeholders. Transparency is one of the key pillars of trust.

Commitment: Commitment to our customers, products, employees, and suppliers holds a high value at Kelheim Fibres. Being committed means always giving our best and advancing both large and small projects with expertise and passion. This way, we can achieve exceptional results and be successful together.

Innovation: Innovations form the foundation of our success. We passionately pursue an open and creative corporate culture that generates new ideas. At Kelheim Fibres, this approach results in products and processes that convince customers and set standards within the industry.

HOW WE OPERATE

◊ We consistently act in accordance with laws and regulations and uphold fairness in all areas.

◊ We value the diversity of the people who work with us and individually promote their different abilities, talents, and compe tencies — regardless of race, ethnic background, age, religion, gender, sexual orientation, or disability.

◊ We strive for continuous improvement in all areas. To achieve this, we regularly set goals to enhance our performance, identify and implement appropriate measures, and assess their success.

◊ Customers and end consumers rely on our fibres to meet the highest quality and hygiene standards. We ensure this through comprehensive quality assurance systems.

◊ We employ state-of-the-art environmental, energy, and process technologies to minimize our impact on the environment and set new standards. In maintenance and new plant projects, we prioriti-se efficient technologies.

◊ We are committed to the resource-efficient use of raw materials and energy. To achieve this, we continuously optimize the material and energy flows in our production, as well as the recycling of our inputs and the utilisation of residual energy.

◊ In our annual environmental statement, which is accessible to the public, we document our environmental goals as well as our progress in achieving these objectives.

◊ Sustainability encompasses the life cycle of our products, from raw material extraction, such as from sustainable forestry, through the environmental impacts along the value chain, to the end of their product life cycle.

◊ Responsible and trained personnel are the foundation for achieving our goals. We demand standards from our suppliers and service providers that align with our policies. Regular audits serve to monitor the effectiveness of our system and specific measures for goal attainment.

◊ The health and well-being of people are central concerns for us. Therefore, in all activities, processes, and products within our enterprises, we actively advocate for safety and health.

◊ We commit to the requirements of EMAS, ISO 14001, ISO 9001, ISO 50001, OHRIS, ISO 45001, and ISO 19600.

September 2022

Craig Barker
CEO, Kelheim Fibres GmbH

7.5 Environmental *Targets*

With EMAS, we commit ourselves to doing what is already anchored in our business strategy: to further optimize our environmental performance. Our environmental program covers the greatest environmental aspects and includes measures in all areas of our plant.

● implemented ● in progress ● not implemented

7.5.1 Water

Goal	Measure	23	24	25	26	Status	Status November 2023	Responsibility
Comparison of the inflow loads	Integration of the Vertical Bioreactor 1 as an upstream expansion tank	×	×			●	The project is currently close to the implementation phase. Most of the conversion work has been completed and we will begin integration at the end of the year	Environmental Systems
Reduction of the specific water demand by 10% by the end of 2025	Completion of an accurate water balance Completion of a master's thesis on the topic: "Water management in resource-intensive production processes – the water footprint as an operational control mechanism and for identifying potential for improvement"	×	×			●		Energy Department / CSR
Reduction in well water consumption by 7% by the end of 2024	Determination of measures resulting from the balance sheet and master thesis		×					Energy Department / CSR
Conservation of resources Replacement of urea and ammonium sulphate by June 2025	Addition of external wastewater containing nitrogen to conserve resources; replacement of urea or ammonium sulphate		×	×	×			Environment Department / CSR

Table 20

7.5.2 Air

Goal	Measure	23	24	25	26	Status	Status November 2023	Responsibility
Reduction of SO_2 emissions in the operation of the sulphuric acid plant: max SO_2: 600 mg / Nm^3 Ø SO_2: to 400 mg / Nm^3	Downstream exhaust gas purification unit		×	×		●	Preliminary planning, Inclusion in investment plan	Technology / Recovery Plants

Table 21

7.5.3 Noise

Goal	Measure	23	24	25	Unit	Status	Status November 2023	Responsibility
Reduction of immissions	Carrying out immission measurements at the relevant points to verify the previous measures from the noise abatement program (reference: specifications from subsequent order)	×			DB (A)	●	Immission measurements not yet carried out	CSR

Table 22

7.5.4 Waste

Goal	Measure	23	24	25	Status	Status November 2023	Responsibility
Improving operational safety	Addition of high calorific value, external waste	×	×	×	●	Trials with plastic compacts are currently underway. These are again being accompanied by extensive emission measurements	CSR/ Environmental Systems
Reduction of mercury waste	Change of method for BOD5 determination: replacement of the Winkler method by oxygen probe	×	×		●		Chemical Laboratory
Implementation of the circular economy	Feasibility study on the use of alternative pulps	×	×	×	●	The technical feasibility of the project with Renewcell is currently under evaluation, aiming to integrate it into production The Business Case and the implementation of the concept are developed in parallel In addition, the other alternative cellulose materials, such as SaXcell are being evaluated	Fibre & Application Development

Table 23

7.5.5 Energy

Goal	Measure	23	24	25	26	Unit	Status	Status November 2023	Responsibility
Increase the share of renewable energy generation to 2%	Feasibility study for the construction of a 2,000 kWp PV system as a basis for operational implementation	×	×				●	Feasibility study in progress as a medium-term project. This is a planned energy transformation project	CSR
Step-by-step plan for energy transformation	Fuel switch from natural gas to hydrogen: • Modification of the power plant • Replacement of natural gas with hydrogen by 40%	×	×	×	×		●	Measures defined and entered as part of the climate protection contract	CSR/ Energy Department
Reduction of electricity consumption by 1% annually	Continuous improvement process from energy management as the sum of all energy projects	-1	-1	-1	-1	[%]	●	In 2022, a reduction of 4.7% was achieved through energy-saving projects	Technology/ Operations

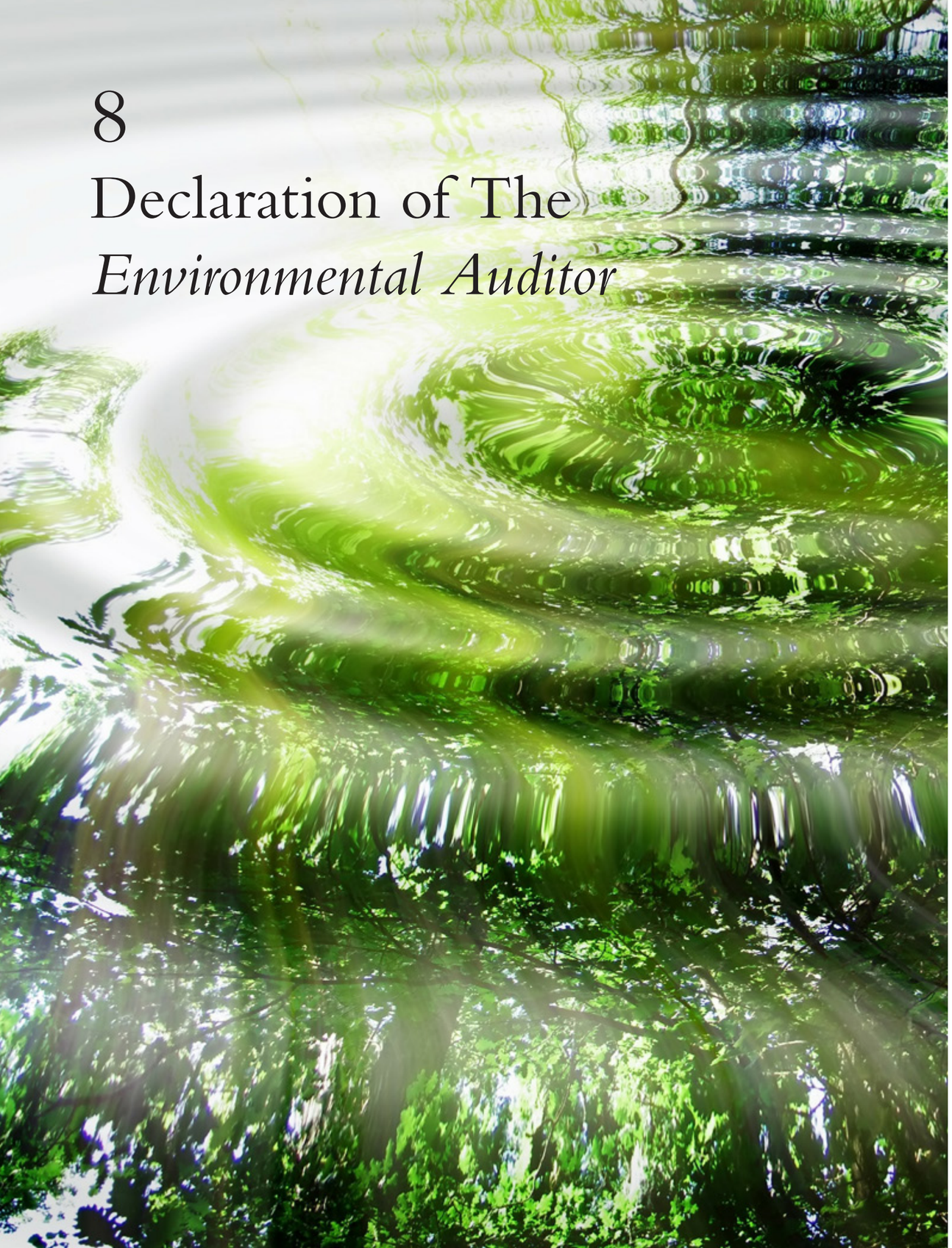
Table 24

7.5.6 Sustainability

With the various measures to be implemented within the framework of the environmental programme, we aim to improve our environmental performance.

Goal	Measure	23	24	25	Status	Status November 2023	Responsibility
Annual sequestration of 10 t CO_2 per hectare with a soil organic carbon buildup of 0.2%	Project sponsorship for soil carbon sequestration programs in agriculture				●	Project was discontinued	Management
Plastic reduction, materials made from renewable resources	Project Femcare – development of sustainable feminine hygiene products	×	×	×	●	• Phase: Incorporation of fibres into end products • Product development (commercial end products in collaboration with end product manufacturers, both established players and startups, in the single-use sector such as pads, liners, and tampons, as well as reusable products like menstrual underwear) • Goal for single-use products: Replace petroleum-based fibre solutions with biodegradable / bio-based specialty viscose fibre while maintaining comparable end product performance • Goal for reusable products: Textile solution for multiple uses with high performance to further enhance sustainability values The concepts have been developed, and we are currently in the phase of implementing the products in the market in collaboration with customers. Furthermore, both approaches will be further pursued to expand the product range	New Business Development
Tracing of sustainable textiles through viscose marker fibres	Go-to-market activities for viscose fibres with incorporated marker pigments to depict traceable supply chains (blockchain) for unequivocal identification of sustainable solutions and identification of product compositions for meaningful integration into circular loops	×	×	×	●	Two concepts are being pursued: • Blockchain with TextileGenesis™ • Physical tracing with FibreTrace® In addition, a project is being initiated to systematically explore other tracing options. Simultaneously, partners in the supply chain are being identified	New Business Development
Use of alternative / cellulose-based raw materials (other than wood) to diversify the raw material landscape and demonstrate circular approaches	Screening of cellulose-containing raw materials for suitability in the viscose fibre process (feasibility study on a laboratory scale) (e.g., food waste, recovered cellulose from textile recycling, agricultural by-products / waste)	×	×	×	●	A dedicated project has been initiated to address this issue from a technical perspective The project partially overlaps with the "Implementation of Circular Economy"	New Business Development

Table 25



8 Declaration of The *Environmental Auditor*

Validation

The environmental verifiers listed below confirm that they have verified that the site, as described in this environmental statement of the organisation Kelheim Fibres GmbH with the registration number DE-166-00081 meets all the requirements of Regulation (EC) No.1221/2009 of the European Parliament and of the Council of 25 November 2009, as amended on 28 August 2017 and 19 December 2018, on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS).

Name of the environmental verifier	Registration number	Approved for the sectors (NACE)
Dr. Ulrich Wilcke	DE-V-0297	20 Manufacture of chemicals and chemical products
Jochen Buser	DE-V-0324	

By signing this declaration it is confirmed that:

- the assessment and validation have been carried out in full compliance with the requirements of Regulation (EC) No 1221/2009 as amended by Commission Regulation (EU) 2017/1505 and (EU) 2018/2026,
- the result of the assessment and validation confirms that there is no evidence of non-compliance with applicable environmental legislation; and
- the data and information in the environmental statement give a reliable, credible and true picture of all the organisation's activities.

This declaration cannot be equated with EMAS registration. EMAS registration can only be carried out by a competent body in accordance with Regulation (EC) No 1221/2009. This statement may not be used as a stand-alone basis for informing the public.

Berlin, 16.11.2023

Dr. Ulrich Wilcke
Environmental verifier DE-V-0297

Jochen Buser
Environmental verifier DE-V-0324

GUT Certifizierungsgesellschaft
für Managementsysteme mbH
Environmental verifier DE-V-0213
Eichenstraße 3 b
D-12435 Berlin

Tel: +49 30 233 2021-0
Fax: +49 30 233 2021-39
E-Mail: info@gut-cert.de

Contact People

Contact People for the environmental statement of Kelheim Fibres GmbH are:

Theresa Schreiner, Environmental Engineer
+49 9441 99-404
Theresa.Schreiner@Kelheim-Fibres.com

Timo Thunitgut, Sustainability Manager
+49 9441 99-311
Timo.Thunitgut@Kelheim-Fibres.com

Next Release

The next release for our environmental statement is 11/2024.

Our aim is to constantly improve and prove that ecology and economy can be in harmony. Acting in accordance with the law is always the basis of our manufacturing processes. In addition, we use the most modern environmental and process technologies. We regularly set, track and review targets to improve environmental performance. Being in harmony with nature, for the benefit of our customers, our employees and our neighbourhood, is and remains our constant claim and mission.

Glossary/Abbreviations

AC	Alkali Cellulose
approx.	approximately
bar	Pressure specification
BEHG	Fuel Emissions Trading Act
BImSchG	Federal Immission Control Act
BImSchV	Federal Immission Control Ordinance
BREF	Best Available Technology reference document
CFR 21	Code of Federal Regulations Title 21
CHP	Combined heat and power
CLP	Chemical Labelling and Packaging; Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COS	Carbonyl sulphide
CS_2	Carbon disulphide
CSB	Chemical oxygen demand
CSR	Corporate Social Resposibility
dB(A)	Decibel A-weighted (sound pressure level)
DIN	German Industry Standard
DIN EN	German Institute for European Standardization
EMAS	EU Eco-Management and Audit Scheme
FDA	Food and Drug Administration (USA)
FSC™	Forest Stewardship Council (a certification for sustainable forest management)
g	Gram (unit of weight)
H_2S	Hydrogen sulphide
H_2SO_4	Sulphuric acid
IE	Industrial Emissions Directive
ISEGA	ISEGA Forschungs- und Untersuchungsgesellschaft mbH (ISEGA Research and Investigation Company mbH)
ISO	International Standards Organisation
ISO 14001	International Standard For Environmental Management Systems
ISO 17025	General requirements for the competence of testing and calibration laboratories
ISO 50001	International standard for energy management systems
ISO 9001	International standard for quality management systems
IUK	Information and communication technology
kg	Kilogram (unit of weight)
KPI	Key Performance Indicators
KWK	Combined heat and power (cogeneration)
LCA	Life Cycle Analysis
m^3	Cubic meter
MMCF	Man-Made Cellulosic Fibres
NaOH	Caustic soda
NH_4-N	Ammonium nitrate
NOx	Nitrogen oxide
OECD	Organisation for Economic Cooperation and Development
OHRIS	Occupational Health and Risk Management System
PEFC	Program for the Endorsement of Forest Certification (a certification for sustainable forest management)
REACH	Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
S	Sulphur
SO_2	Sulphur dioxide
SUPD	Single-Use Plastic Directive
S_x	Sulphur compounds
TA Lärm	Technical Directive on Noise Pollution Control
TA Luft	Technical Instructions on Air Quality Control
TRGS	Technical Rules for Hazardous Substances
WHO	World Health Organisation
ZDHC	Zero Discharge of Hazardous Chemicals
Zn	Zinc
$ZnSO_4$	Zinc sulphate

Tables

Figures

Kelheim Fibres GmbH
Regensburger Straße 109
93309 Kelheim, Germany

Phone: +49 9441 99-0
E-Mail: info@kelheim-fibres.com
Internet: www.kelheim-fibres.com

Kelheim Fibres