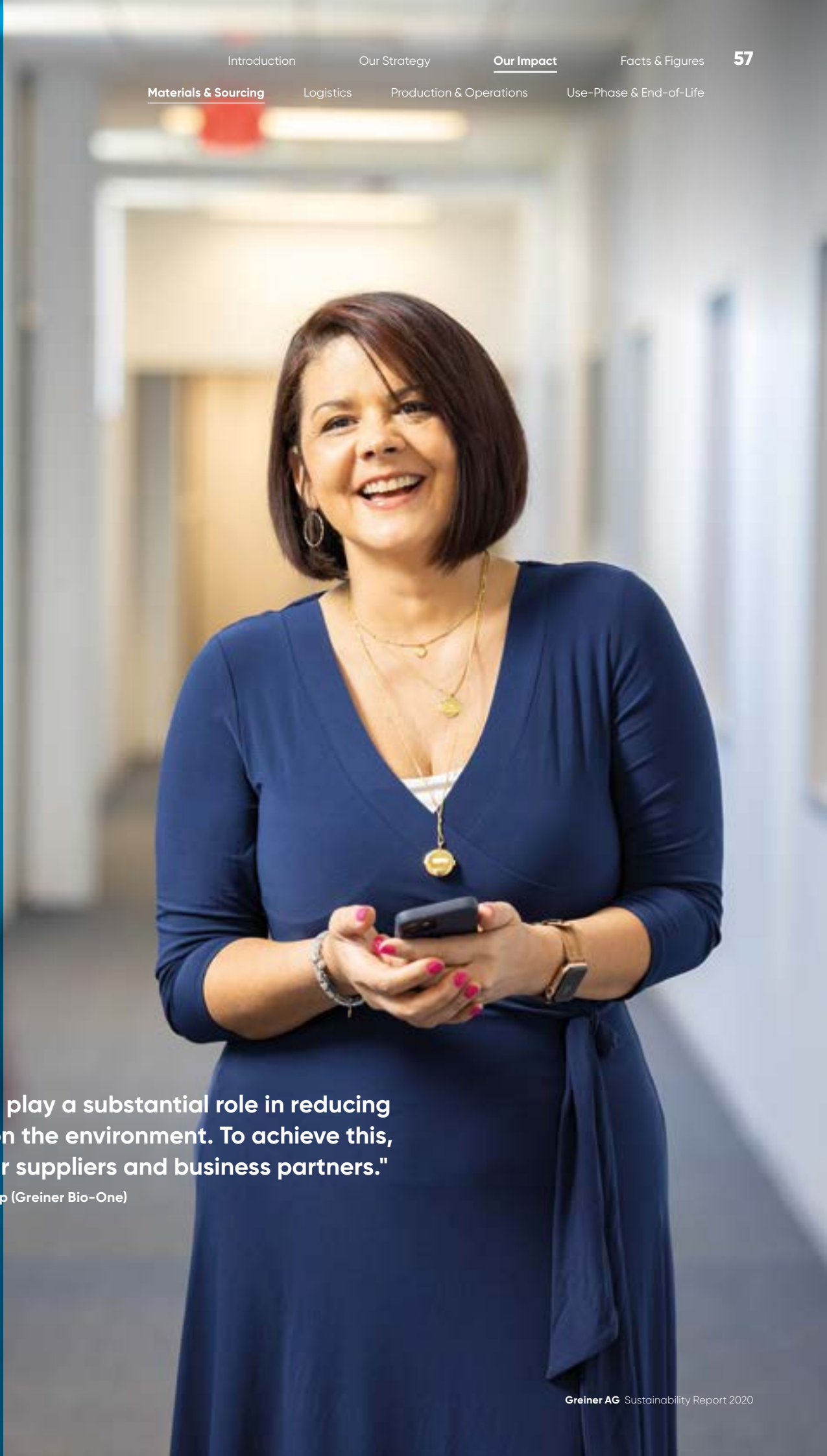
Materials & Sourcing

The upstream stages of our value creation account for a significant share of our environmental impact. This relates mainly to the production of materials, which is the source of a large part of total emissions. If we want to reduce our environmental impact, we essentially have to do two things: Develop new, lower-emission materials with suppliers and business partners and substitute primary raw materials and increase use of secondary materials. To achieve both of these goals, we have been working closely with our suppliers for years and we are making our expectations as regards sustainability increasingly clear, for example through selection of suppliers.



"We want to play a substantial role in reducing our effect on the environment. To achieve this, we need our suppliers and business partners."

Danielle Blankenship (Greiner Bio-One)
Import Specialist

Materials & Sourcing
Procurement

"Our suppliers require transparency. Only when they know exactly what we expect from them in terms of sustainability can they meet these requirements."

Rita Shaw (Greiner Bio-One)
Vacuette Setup

Overshooting

Earth Overshoot Day in 2020 was on August 22. This is the day on which humanity's resource consumption for the year exceeds Earth's capacity to regenerate those resources that year. From this day onwards, we are living out the rest of the year at the expense of future generations. Humanity's demand for natural resources has risen by 240 percent since 1970 to 92 billion tonnes (as of 2017). The higher our consumption of biomass, fossil fuels and metals, the higher the resulting waste and emissions. In addition, the use of materials and activities related to materials are responsible for over half of global greenhouse gas emissions. Consumption of raw materials is forecast to almost double by 2060 due to rising populations and higher standards of living. As a result, the pressure on our environment is continuing to increase, with unpredictable consequences.

Our goal

We want to be a fully circular business by 2030.

Our targets

80%

By 2020, 80 percent of our total purchasing volume to come from suppliers who have signed the Greiner or an equivalent Code of Conduct.

Scope 3

Inclusion of emissions from our purchasing (Scope 3 emissions) in emission reporting by 2021.

100%

EcoVadis to evaluate strategic suppliers of Greiner Packaging by 2020. External evaluation of strategic suppliers for all divisions by 2023.

Our performance

65%

In 2020, 65 percent of our total purchasing volume came from suppliers who had signed the Greiner Code of Conduct or an equivalent code.

Scope 3

Scope 3 emissions relevant to procurement were included in emission reporting in 2020.

54%

54 percent of all strategic suppliers of Greiner Packaging were evaluated by the end of 2020.

Minimum standards, no ifs or buts

At Greiner, we have stood for sustainable, long-term business for over 150 years. As a global company, we bear responsibility for our employees, society and the environment. To ensure that this responsibility is also reflected in our day-to-day business, we have committed to observing ethical and sustainable practices in all of our business activities. This applies both internally and externally for our suppliers and business partners. We have defined our principles for collaboration in our Code of Conduct for Suppliers and Business Partners. We consider our Code of Conduct a non-negotiable minimum standard underpinning our relationship with suppliers and business partners. All new suppliers and business partners must sign the Code of Conduct. This creates a sound basis for our responsibility for people and the environment, ensuring that our actions and those of our suppliers and business partners are ethical, environmentally sustainable and socially acceptable. For us, sustainability covers the entire procurement process of materials, products and services.

Our Code of Conduct is based on:

- social,
- environmental and
- ethical policies and principles.

Under this holistic approach, upholding human rights, international labor, health and environmental protection provisions and ensuring that business practices are transparent and in line with the law are central criteria when selecting and assessing our suppliers and business partners. If third parties are commissioned as part of a business relationship, we also expect these subcontractors or representatives to work in accordance with the fundamental principles outlined in this Code of Conduct. In individual cases, we retain the right to check compliance with the requirements on site and, if provisions have been violated, to terminate the business relationship.

Our company aspires to live our values and to behave in a legally and ethically impeccable manner. We set up tell-greiner.com as a platform to easily report breaches of this Code of Conduct. This provides our employees, business partners and customers with another way to anonymously report any violations of our Code. There were no reports of breaches of our Code of Conduct by suppliers or business partners in 2019 or 2020.

In 2018, we set ourselves the goal that those suppliers and business partners who make up 80 percent of our total purchasing volume sign either the Greiner Code of Conduct or a similar policy. In 2020, suppliers and business partners representing 65 percent of our purchasing volume had signed the Greiner or an equivalent Code of Conduct. We were unable to achieve our target of 80 percent by the end of 2020. This is partly because the complete takeover of Eurofoam – a 50:50 joint venture between Greiner and the Belgium company Recticel – had a significant influence on the purchasing and thus on the signing of our Code of Conduct. Since November 2020, Eurofoam,

"There were no reports of breaches of our Code of Conduct by suppliers or business partners in 2019 or 2020."

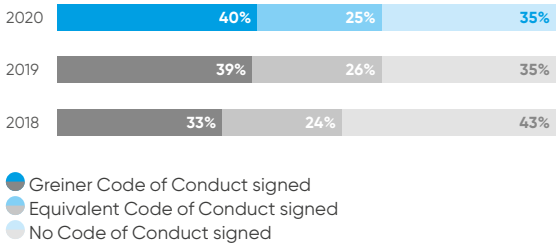
Flavius Rohan (NEVEON)
Export Manager

GRI 102-16

aerospace, Perfoam, PURtec, MULTIfoam, Unifoam and Gukotech have pooled resources in our integrated foam group NEVEON. To close gaps in communicating, establishing and ratifying our Code of Conduct that have emerged as a result of this repositioning as quickly as possible, NEVEON will work closely with all of its suppliers.

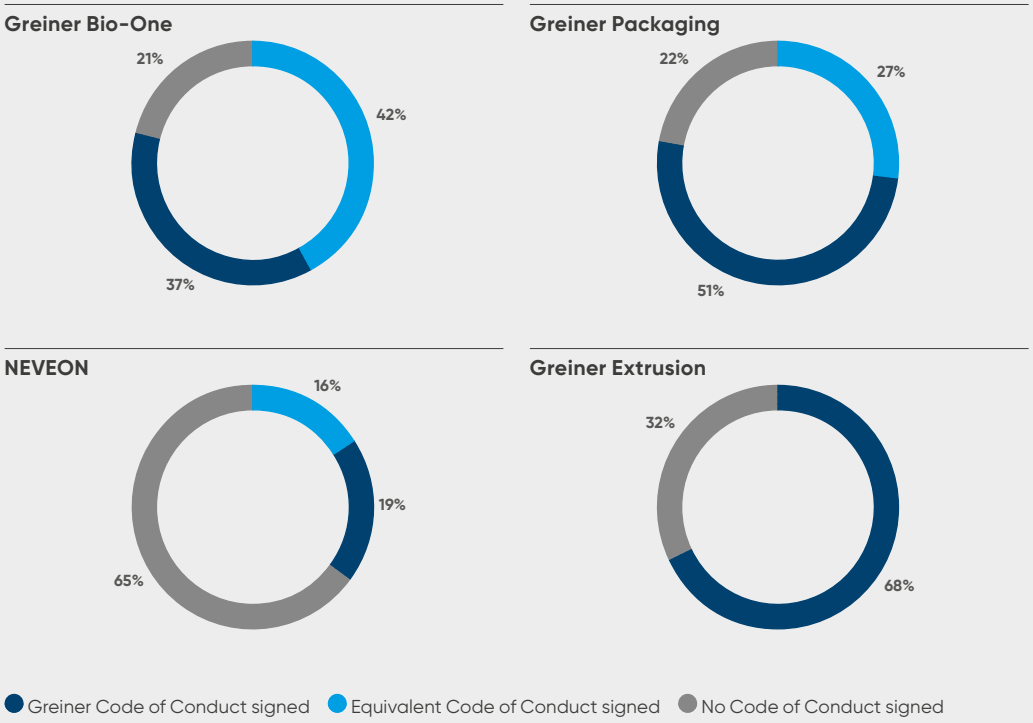
Greiner suppliers are as international and diverse as our company. With our commitment to sustainable procurement, we aim to ensure that the values that represent the core of our company are also observed in our supply chain. Most environmental and social impacts occur in our supply chain. Our procurement therefore provides a strong basis on which to stimulate positive changes towards sustainability and a circular economy. With an independent Sustainable Sourcing Policy, we have defined a framework for sustainable procurement. In terms of our procurement, this means acquiring processes, products and services in a way that takes account of an array of social, environmental and economic factors from manufacturing to disposal. If a supplier or a business partner is unable and/or unwilling to meet our requirements in one way or another, we will sit down together and work out an action plan to discuss what measures to take to resolve the issue. If the supplier or business partner proves permanently unwilling to cooperate or if the measures taken fail, the business relationship is the last resort.

Share of suppliers and business partners with a Code of Conduct (by purchasing volume)



Responsible procurement has a positive impact on global challenges and all players along the value chain. In our holistic approach, sustainability criteria such as environmental protection and occupational safety as well as compliance with human rights are included in the selection and evaluation of all suppliers and business partners. We have long-standing business relationships with most of our suppliers and they have known about our high standards for a long time. When working with new suppliers and business partners, we believe it is important that we leave no room for ambiguity when communicating our expectations.

Share of suppliers and business partners with a Code of Conduct in each division (by purchasing volume in 2020)



GRI 102-16

Procurement

Materials such as granulates, fibers, chemicals and metals account for most of our total purchasing volume. When procuring these materials and other services, at Greiner we make a concerted effort to do business with local companies. We critically evaluate procurement from "risk countries" (as classified by the Business Social Compliance Initiative), which feature high levels of corruption or political instability. In this way, we minimize the risks in our supply chain. As well as third party supplier assessments, we also use sustainability ratings and audits to review compliance with our principles. In this way, as purchasers, we exert influence on our suppliers so that they improve working conditions and environmental protection. For 2021, we aimed to more firmly anchor our Sustainable Sourcing Policy in the company and to raise awareness of this among our colleagues in procurement. For this to succeed, we will step up our training sessions on sustainable procurement. By 2023, we aim to have given sustainable procurement training to all employees who have a hand in purchasing. Our purchasers are required to attend training on this every two years.

As well as the obligation to uphold our Code of Conduct and self-declarations by our suppliers, we also use external ratings to assess suppliers and business partners in order to receive an objective assessment from independent evaluation platforms. Our main tool to assess our suppliers is the evaluation platform *EcoVadis*. This platform allows us to reduce sustainability risks and improve the environmental and social footprint in our supply chain. *EcoVadis*'s methodology is based on international sustainability standards. Participating companies receive a sustainability scorecard that uses 21 criteria in the four areas of environment, labor and human rights, ethics and sustainable procurement to illustrate the company's performance. In 2019, we began using this evaluation for Greiner Packaging suppliers.

We achieved our goal of having all Greiner Packaging strategic material suppliers evaluated by *EcoVadis* by the end of 2020. More than 50 percent of the strategic material suppliers have so far been evaluated in terms of their sustainability performance. As our next intermediate target, we are aiming to establish evaluation platforms in all of our divisions by 2023. As the *EcoVadis* supplier evaluation began only recently and currently covers only one division (Greiner Packaging), we do not yet differentiate between new and existing suppliers when assessing their social and environmental performance. However, once the evaluation approach has been fully implemented, we will be able to make this distinction in our sustainability reporting, too.

Greiner Packaging contacted a total of 123 strategic suppliers in the 2019 and 2020 reporting period. 68 of these suppliers agreed to be evaluated by *EcoVadis* and to share their scorecard with us. The suppliers who did not accept our invitation explained that they did not have the resources to carry out the evaluation on account of the 2020 coronavirus pandemic. When selecting our suppliers for 2020, we focused on suppliers who operate in risk countries. 36 of all suppliers evaluated operate in risk countries. Nevertheless, *EcoVadis*'s total score averaged 55 out of 100 potential points. The evaluation of suppliers also showed that 70 percent of all suppliers assessed by Greiner improved their score over recent years. The *EcoVadis* supplier evaluation of Greiner Packaging found that one supplier may have a negative environmental and social impact. This company, which works in the wholesale trade of chemicals, is located in the US and has a low *EcoVadis* score. This partly reflects a lack of management systems. In addition to environmental and social aspects, business ethics are also very important to us. Another company from our supplier list scored poorly in this area. The supplier company operates in the paper industry and is based

More secondary materials, fewer primary raw materials

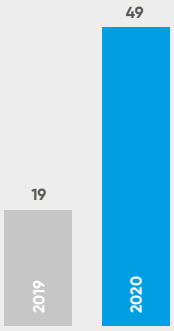
Collaboration with *cirplus:* setting standards

Establishing a market for secondary materials requires a standard. To achieve this, we are working with a young company that operates in precisely this area. *cirplus* is a digital marketplace that links companies with the plastics and recycling industry. The platform simplifies complex transactions, most of which used to be done offline. By joining up fragmented and non-transparent markets, *cirplus* is the key digital link needed to make plastic waste a valuable resource again. Trading recycled materials and using them in industry requires a standardized description of the material requirements that all stakeholders in the circular economy can use as a basis. In light of this, we are working with *cirplus* on developing DIN SPEC – standards for (online) trading in plastic waste and recycled materials and processing these. The aim is to evaluate and categorize minimum quality standards of recycled materials and potential deviations in the form of quality bands and to create guidelines for labeling these in regranulates and compounds.

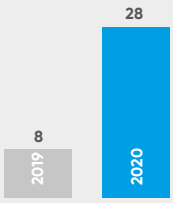
GRI 308-1, GRI 414-1

Supplier assessments at Greiner Packaging

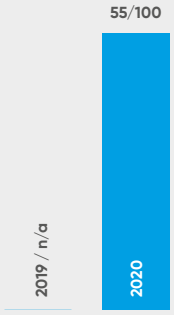
Number of suppliers assessed



Suppliers assessed from risk countries



Average *EcoVadis* overall score



	2019	2020
Suppliers identified with significant current and potentially negative environmental impact	n/a	**1**
Suppliers identified with significant current and potentially negative social impact	n/a	**1**
Suppliers identified with significant current and potentially negative ethical impact	n/a	**1**
Suppliers identified with significant current and potentially negative impact in sustainable procurement	n/a	**3**

More secondary materials, fewer primary raw materials

Acting together: *Forum Rezyklat* in Germany

Above all, using more recycled materials requires trust and dialog between individual stakeholders. In terms of the technology, lots is already possible outside the food sector. Greiner Packaging has been a member of the *Forum Rezyklat* (recycled materials forum) in Germany since 2020 as a way of promoting dialog. *Forum Rezyklat* was launched by *dm-drogerie markt* in 2018. Today, over 30 members work on increasing the use of recycled materials across value creation. Members are located along the entire circular economy value chain. Together, the initiative works on raising awareness of the circular economy among consumers to ensure that recyclable materials are clearly separated. The aim of this is to increase the recycling rate in the long term and the proportion of recycled materials in products and packaging. Furthermore, the Forum aims to reduce packaging and to ensure as early as the development process for new packaging that it can be recycled and are therefore preserved as a resource in the circular economy.

↘ GRI 308-2, GRI 414-2

in Russia. Last but not least, we expect that our suppliers expect the same from its suppliers as Greiner does. Three of our suppliers rated poorly in sustainable procurement. Two of these suppliers are in Russia and one is in Germany. Their low score is due to a lack of policies and key performance indicators relating to procurement. In 2021, we will develop an action plan together with the suppliers to make improvements to these areas.

It is not only our suppliers that we examine closely: we like to set a good example ourselves, too. In order to set high standards not only for our suppliers and business partners but also for ourselves, we tie the assessment of our sustainability performance by *EcoVadis* to ambitious targets. This is in line with customers' expectations and our own. Above all in the Greiner Packaging division, we see a continuous demand for information on our business and production processes. This is one of the reasons we have had Greiner Packaging evaluated by *EcoVadis* since 2014. The results show that our *EcoVadis* performance has improved steadily in recent years. This is because we take these evaluations very seriously. Numerous colleagues are involved and all results are communicated internally, areas for improvement are discussed and then an action plan and necessary measures are drawn up. Every evaluation is a way for us to learn something new. Our actions are rounded off by audits – both by Greiner and by third parties in the case of new suppliers or if there are quality problems at existing suppliers. Greiner Packaging was awarded the *EcoVadis* Gold prize in 2020, which we consider the great success of all these efforts. Greiner Packaging is thus in the top three percent of companies evaluated by *EcoVadis* in the plastics manufacturing sector.

Greiner Packaging *EcoVadis* scores

More secondary materials, fewer primary raw materials

Ocean plastic – reusing plastic waste from the sea

Another project in our development pipelines looks at ocean plastic. It is no secret that just a dozen of the world's rivers are responsible for about 90 percent of all plastic waste in the oceans. In 2019, we therefore decided to support the social company *Plastic Bank*. *Plastic Bank* aims to turn plastic into gold. *Plastic Bank* buys plastic waste from collectors. In return, they receive a premium from *Plastic Bank* for the plastic they have collected and thus an income – and so plastic in effect becomes a valuable currency. To help make this concept a viable and sustainable success, we took a closer look at the plastic collected – known as ocean plastic – during our development tests. We are convinced that we can reuse the material collected for regular products. This closes the cycle and demonstrates the value of the material. To do so, however, the ocean plastic must meet the highest quality standards. We will therefore keep testing in the future and, together with our customers, take a look at how to use these recycled materials that – without our joint commitment – would continue to pollute the oceans.

GRI 308-2, GRI 414-2

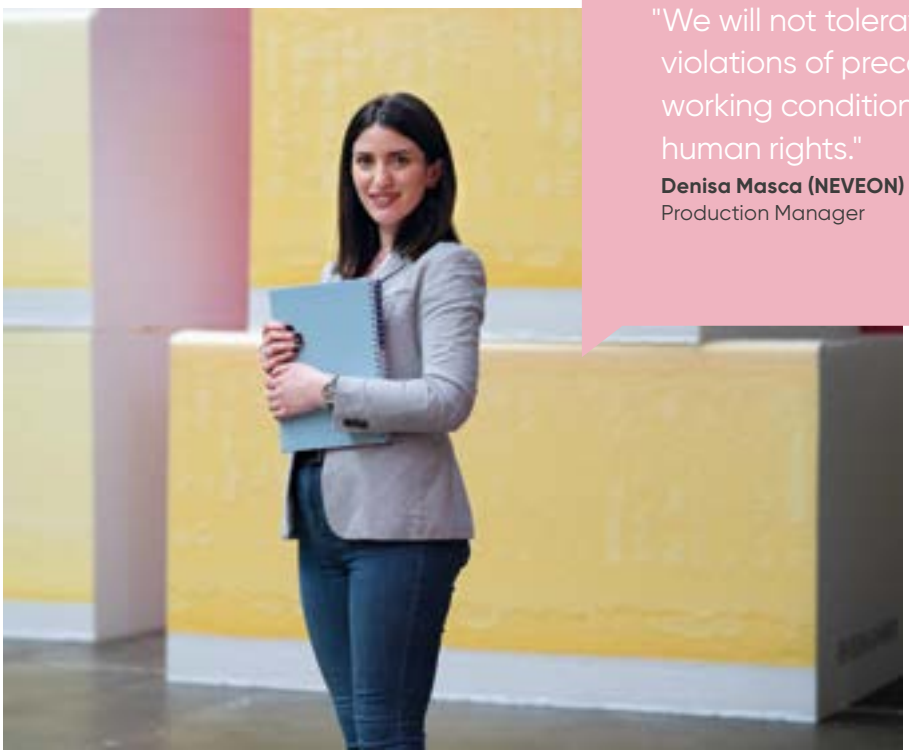
At Greiner, we are constantly working on creating a working environment in which our employees can best develop, work innovatively and provide outstanding services. Treating all employees fairly and with respect is fundamental to this and an essential aspect of our corporate culture. As a logical consequence of this, we are fully committed to the principles of the *UN Global Compact* initiative, the central values of which are also reflected in our Code of Conduct. This explicitly states that our suppliers and business partners must respect the globally applicable regulations for the protection of human rights as fundamental and universal requirements. This includes in particular that they must not use either forced labor nor child labor, and must abide by Convention 138 (Minimum Age), Convention 182 (Worst Forms of Child Labor) and Convention 105 (Abolition of Forced Labor) established by the *International Labor Organization* (ILO).

Our company operates almost 140 sites (including sales offices) in more than 30 countries. Some of these are classified as high-risk countries regarding the probability of employing workers forced into modern slavery. We also purchase goods, components, raw materials and services from a large number of suppliers based in many different countries. Some of these countries are also considered high-risk countries in terms of modern slavery. These include India, China, Pakistan, Bangladesh, Russia, Indonesia, Egypt, Myanmar, Iran, Turkey and Thailand. In addition, we also have representatives, distributors and joint ventures, some of which work in these high-risk countries. Many of these suppliers and the goods and/or services are essential for our business operations.

To mitigate the potential negative impact of key suppliers who are involved in modern slavery, we collaborate with multiple suppliers to procure important raw materials. This gives us greater flexibility to stop doing business with suppliers found to have violated our company values. To further minimize risks associated with human rights, we will carry out audits to ensure that our suppliers also comply with all established standards in this area. This strategic decision to make an active stand against slavery and other human rights abuses in our supply chains goes hand in hand with the need to clearly communicate the importance of this issue internally and externally.

This includes:

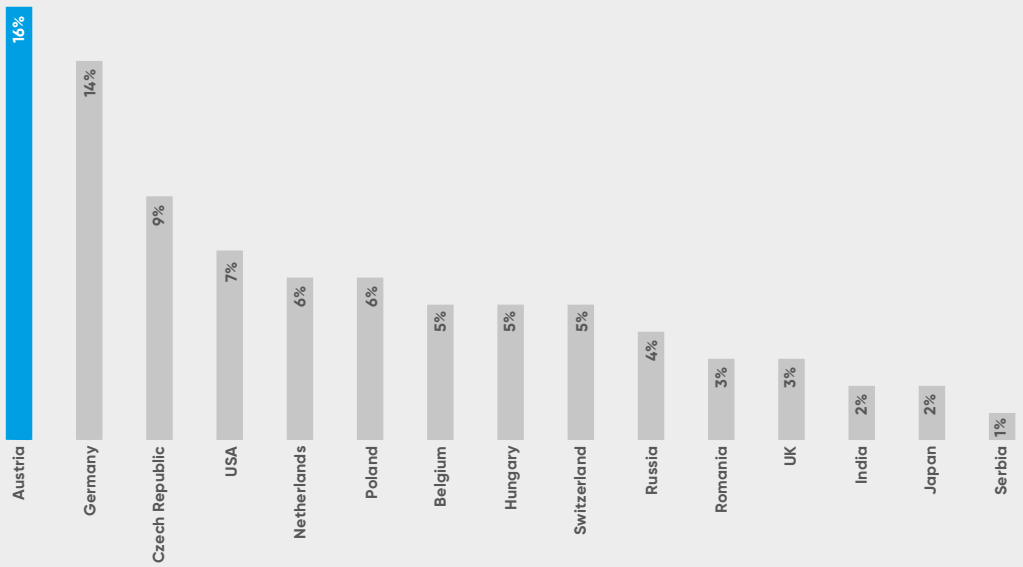
- Training programs on slavery and human trafficking for our employees, especially in purchasing,
- identifying parts of the company and business processes than are more prone to risk,
- due diligence processes for compliance with our due diligence obligations regarding human rights in the company and value chains and
- regularly reviewing the effectiveness of these measures using suitable indicators and criteria.



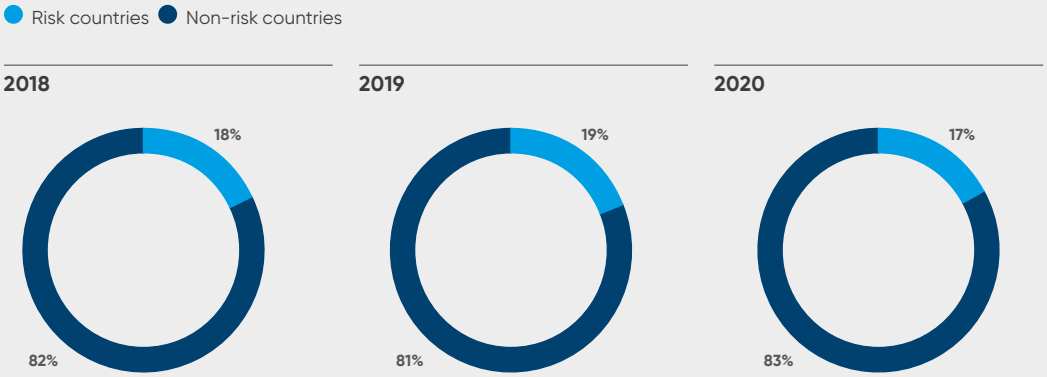
"We will not tolerate violations of precarious working conditions or human rights."
Denisa Masca (NEVEON)
Production Manager

GRI 408-1

Total purchasing volume by country – TOP 15 (2020)



Total purchasing volume by risk country & non-risk country



We purchase raw materials from the following risk countries:

- Egypt
- Bosnia and Herzegovina
- Brazil
- China
- India
- Mexico
- Romania
- Russia
- Serbia
- South Africa
- Syria
- Thailand
- Turkey

Country risk classification is based on *amfori BSCI*'s Countries' Risk Classification. A country's risk is rated on a scale of 0 to 100, with 0 representing the highest risk and 100 the lowest.

amfori BSCI divides countries into two categories:

- Risk countries: Countries with WGI average rating between 0-60 or three or more individual dimensions rated below 60.
- Low risk countries: Countries with WGI average rating higher than 60 and no more than two individual dimensions rated below 60.

The future: secondary materials

That resources are finite is an old truth of which we are now aware with increasing urgency. Even in the 21st century, most natural resources that we use are primary raw materials. Demand for raw materials will continue to increase as a result of global population growth. In light of this, we will have to ask ourselves how we can either use resources more efficiently or increase our use of secondary raw materials. Secondary raw materials are not from natural sources – at least not directly. Instead, they are produced by reprocessing primary raw materials. This means that recycling gives us secondary raw materials and the more and the better we recycle, the more secondary raw materials we get.

Above all, secondary raw materials are the better option because they have less of an environmental impact. The packaging sector is of particular interest when discussing secondary raw materials. Especially in the food industry, primary raw materials are used almost exclusively. The EU Commission has stipulated that all plastic packaging must be reusable or recyclable by 2030. Only if packaging is recyclable can the material be converted into secondary materials. Greiner Packaging has set even more ambitious targets: 100 percent of plastic packaging is to be 100 percent reusable, recyclable or compostable by 2025. We have also made it our goal to use recycled materials in 10 percent of our packaging.

More secondary materials, fewer primary raw materials

Hospicycle – Turning hospital waste into valuable recycled materials

Our production of plastic packaging is particularly affected by the trend towards more recycled materials. Colleagues at Greiner Packaging are thus hard at work developing, testing and researching alternatives for the basic raw materials used at present to ensure a higher share of recycled materials in production. One specific example of our search for new solutions is our *Hospicycle* project. There are only slight differences in the materials used for consumables packaging (e.g. saline solutions, liquid food products) and laboratory equipment in hospitals (mostly PP/PE or PET). These products are rarely or never dyed and are instead always white/transparent and minimally decorated. Furthermore these materials are always food safe. These attributes mean that they would be perfect for recycled materials approved for food use from mechanical recycling. However, the main problem with this relates to collecting these in a medical setting.

As part of *Hospicycle*, the quantities of packaging waste and where this waste is generated are to be recorded. As well as assessing recyclability,would also like to develop a logistics concept. These results are to be transferred to additional hospitals and, if evaluation is successful, result in an application at the European Food Safety Authority (EFSA). As well as Greiner, partners of this very ambitious project include the Plastics Cluster for Lower Austria, the Upper Austrian healthcare company Walter Kunststoffe and Altstoff Recycling Austria (ARA).

Procurement

Our purchased materials can be grouped into five material groups and account for around 40 percent of the total purchasing volume. As well as raw materials, we also buy semi-finished and finished goods. We are currently working on improving the quality of data and want to include this in the next reporting cycle by 2023.

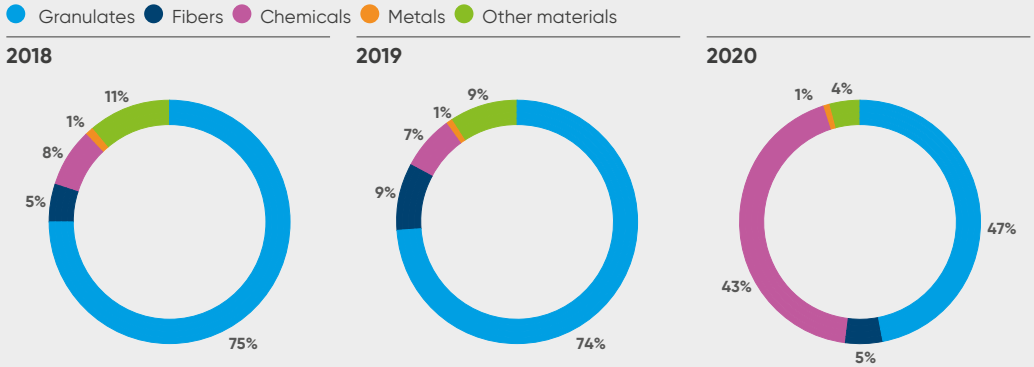
The development of our total material consumption shows a rapid rise in 2020. This reflects the Eurofoam takeover described above, which also explains the sharp increase in the share of chemicals in total materials consumption.

Some of our production processes require the use of chemicals which – if improperly used – can be harmful to human health. Use of these chemicals is strictly monitored and controlled by corresponding regulations. In Austria, ionized radiation is also used to sterilize our medical products. This is generated either by electron accelerators or, for high density products, by radioactive decay of the Cobalt-60 isotope. The use of ionized radiation in Austria is regulated under the Austrian Radiation Protection Act and the Austrian Radiation Protection Regulation. Authorities perform annual checks to monitor compliance with these regulations.

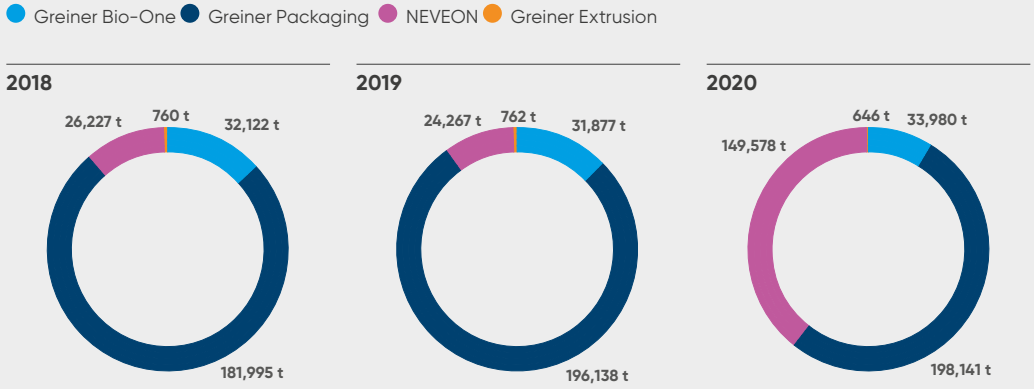
Proportion of secondary materials relative to total materials consumption[1]

	2018	2019	2020
Greiner	8%	9%	**7%**
Greiner Bio-One	1%	1%	**0%**
Greiner Packaging	7%	7%	**7%**
NEVEON	27%	38%	**7%**
Greiner Extrusion	0%	0%	**0%**

Purchasing volume by material group



Total material consumption*



*Total materials consumption comprises all purchased raw materials and auxiliary materials that are directly used or consumed as part of production.

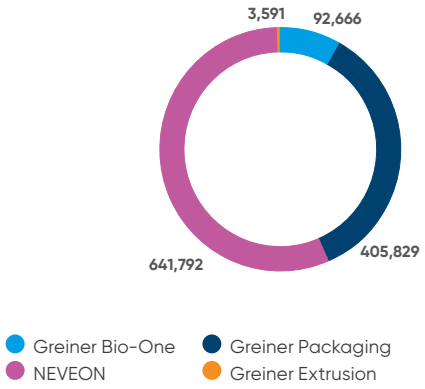
1 Secondary materials (recycling materials) are created by reprocessing material that has been disposed of and can be reused multiple times as part of a material cycle. They make up the starting material for new products and differ from primary raw materials (extracted from nature).

GRI 301-1

Foam production at NEVEON relies on the purchase of primary raw materials. Incorporating Eurofoam thus resulted in a lower proportion of secondary materials.

For the first time, our 2020 report contains emissions data from our value chain. The figure below shows Greiner's total emissions (1,114,837 tonnes of CO_2e) resulting from procurement of our raw materials. The high proportion of emissions in the foam division NEVEON is a result of the extensive use of chemicals.

Emissions generated by our production materials and consumables in 2020[1] (t CO_2e)

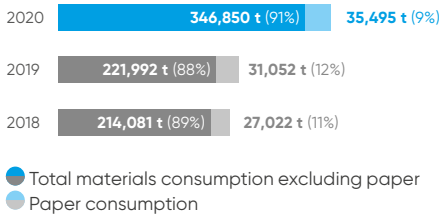


We have set the following targets here for the next two years:

- By 2023: Improve the quality of data for Scope 3 emissions categories already reported in collaboration with our suppliers.
- By 2023: Include data on packaging materials consumption and the emissions associated with this.
- By 2023: Include data on all forestry raw materials used at Greiner: timber, cattle, palm oil, rubber and soy.
- By 2023: Expand data collection to include purchased semi-finished and finished goods.

Although the proportion of paper in our total materials consumption has declined slightly, our demand for paper still accounts for almost 10 percent – a substantial share. We have therefore decided that we will buy paper for secondary and tertiary packaging from FSC or equivalent certified paper sources by 2025.

Proportion of paper consumption relative to total materials consumption



More secondary materials, fewer primary raw materials

Pilot project: Closing the cycle for soup packaging

At Greiner Packaging, we have been testing various recycled materials for producing our cardboard/plastic packaging for some time now. As part of a test project for *Unilever*, for example, we use a certified circular polypropylene. Mixed post-consumer plastics that would otherwise be burned or sent to landfill are used as raw materials. The certified circular PP polymer from *SABIC's* TRUCIRCLE™ portfolio is broken down into its molecular components to create new plastics, including for recyclable tubs and lids. The project aims to produce about a million Knorr™ bouillon powder packages made from 100 percent circular polymers for *Unilever*. In doing so, we are demonstrating the progress that is possible with recycled materials in the food sector.

It also shows that we are achieving consistent advances in the development towards a circular economy in this industry, too. The ISCC-plus certified material provides a simple replacement solution for fossil-based plastics in the packaging industry without jeopardizing product purity or food safety. The packaging solution is suitable for powered foodstuffs, cereals, animal feed and various non-food uses. After use, consumers can simply remove the cardboard sleeve and dispose of the two pieces of packaging separately. Alternatively, the resealable and dishwasher-safe tub can also be used to store food after finishing the original contents, a popular and very sustainable practice both in private households and in restaurants. This means that we are not only using secondary materials for production, we are also creating a product with a far longer life cycle.

1 Figures include emissions generated in the production of our raw materials but not the emissions of semi-finished or finished goods that we purchase as a company. The calculation also does not include packaging materials. A detailed description of how our CO_2 emissions are calculated can be found at the end of this report.

GRI 305-3

Solution in the form of renewable raw materials

Of course, our search for new materials also encompasses alternative sources. Examples of these include bio-based plastics and foam materials. Both of these are deemed bio-based if they are derived from renewable raw materials. What sounds like an attractive proposition – using renewable raw materials – needs to be looked at in more detail. The environmental impact need to be closely analyzed, even for bio-based raw materials. The debate over the harm caused by bio-based plastics shows how challenging it is to switch to sustainable raw materials.

Germany's Federal Environmental Agency takes a critical view of bio-based materials: "From comparing the environmental footprint of simple objects and packaging we know that the effect on the environment is not significantly better when the raw materials are bio-based as opposed to fossil-based. Instead, the effects are simply different: Whereas traditional fossil-based plastics release more CO_2 that affects the climate, the environmental footprint of bio-based plastics takes the form of higher potential acidification and euthropication and certain land requirements. This is because of the agricultural production of the raw materials. It may result in competing against food production for land or there may be fewer "compensation areas" and forests."

Nevertheless, we will leave no stone unturned. Colleagues at NEVEON, for example, are using castor oil as a bio-based raw material: A renewable raw material accounts for about 20 percent of our *EMC verde* series product. This is castor oil that comes directly from the plant and can be used without any additional processing. By contrast, other NOPs (natural oil polyols) that are based on soy, palm oil or rapeseed oil must be chemically modified before they can be used, a time-consuming process that massively reduces sustainability. As castor oil is not a foodstuff, it is also an ethical raw material for sustainable industrial use in terms of food safety.

"Colleagues at NEVEON, for example, are using castor oil as a bio-based raw material: A renewable raw material accounts for about 20 percent of our *EMC verde* series product."

Eduard Trache (NEVEON)
Electromechanical Engineer

"Our numerous r-PET initiatives clearly show that an increased use of recycled materials is the future at Greiner Packaging."
Peter Fessl (Greiner Packaging)
r-PET Business Manager

More secondary materials, fewer primary raw materials

Milk packaging: High temperature stress test for recycled material

Although we have had some successes, producing packaging from recycled materials is a challenge for the food industry. Given the very high standards for the quality and purity of the materials and thus the packaging, this industry sector constitutes a particular challenge for us. The common plastic PET comes into play here as it is widespread and thus readily available for recycling. However, its material properties meant that there were limits to its use for dairy packaging until now. This is subject to special requirements on account of the high temperature sterilization needed (up to 120 degrees Celsius) that the material must withstand. By successfully testing the use of recycled PET (r-PET) for dairy product packaging, Greiner Packaging again demonstrated its materials expertise. r-PET is currently the only recycled material approved for food use, as other recycled plastics such as r-PS and r-PP are still in the testing or approval stages. The aim is for dairy factories not to have to make any changes to their bottling processes when using the recycled materials.

Here, Greiner Packaging is working intensively with dairy factories to find a solution, and it will be interesting to see what results further tests reveal. We are also focusing our efforts on securing an alternative to PET bottles, i.e. procuring other recycled material from different sources. For r-PET to be approved for food packaging, more than 95 percent of the material has to come from materials that have already been used in food applications. The use of recycled polyolefins is also permitted outside the food sector and the material is used primarily for plastic pallets. In collaboration with our customer and brand manufacturer *Henkel*, we have developed a packaging made out of 50 percent post-consumer PP waste. Not only do we use only plastic recycled materials here, we also use 40 percent less material than previous packaging. The World Packaging Organisation jury awarded this packaging innovation the *Worldstar Global Packaging award* in 2021.