RENEWABLE CARBON INITIATIVE
INTERVIEW

Henkel

Since the beginning of the fiscal year 2023, Henkel has been organised into two operational business units: Adhesive Technologies and Consumer Brands.

Adhesive Technologies is the global leader in its markets, with a broad portfolio of high-impact solutions including adhesives, sealants and functional coatings. The three business areas of Mobility & Electronics, Packaging & Consumer Goods, and Craftsmen, Construction & Professional allow us to make more efficient use of scaling and strong competencies while ensuring proximity to customers and markets.

The integrated Consumer Brands business unit combines our consumer facing businesses and brands. Our focus here is on the global business areas of Laundry & Home Care and Hair. We are also active in selective markets in the personal care sector with our Other Consumer Business division.

We hold leading positions in numerous markets and categories, and have a strong brand portfolio. We offer consumer-relevant innovations that create added value for our customers and consumers, and we sell our products in brick-and-mortar retail, in hair salons and via digital distribution channels.

The alignment of our sustainability strategy is also reflected in the strategies of our business units. They align their businesses, brands and technologies to sustainable development in line with the specific challenges of their product portfolio and have prioritised their focus points accordingly. In 2023, we further embedded sustainability into our business strategies by developing our approaches, and adjusting our activities and investments based on these developments. We strive to achieve a circular economy: a net-zero future for our CO_2 emissions and a circular economy.

Interview

with **Adrian Brandt**
Head of Bio-Renewable Materials Platform
Henkel Adhesive Technologies, Germany

with **Christine Schneider**
Senior Manager Global Sustainability
Henkel Consumer Brands, Germany

Adrian Brandt holds a PhD in Chemistry from Westfälische Wilhelms-Universität Münster. In 2014 he started his career at Henkel AG & Co. KGaA in Germany. Since November 2021 he is leading the Bio-Renewable Materials team at Henkel Adhesive Technologies.

During his 10 years in the adhesive industry, while working in different innovation related functions, he contributed to several technology developments, publications and patents in the field. He was supporting Henkel's latest biobased adhesive product launches.

Christine Schneider holds a degree in engineering from the Technical University of Berlin for Technical Environmental Protection.

Since October 2022 she is heading the Central Office, responsible for supply-chain certifications of the Bio-Renewable Materials team at Henkel Consumer Brands.

At Henkel's Steering Committee Sustainability she is responsible for Palmkernel oil related topics, other renewables, as well as scope 3 emissions related to land use and the ongoing respective stakeholder dialogue.

What role does renewable carbon play in the individual areas and where are they already being used or will be used in the near future?

Henkel has been a founding member of the Renewable Carbon Initiative since 2020. We fully support the aim to accelerate the transition from fossil- to renewable carbon for all organic chemicals and materials.

Adhesive Technologies is pioneering new solutions for adhesives, sealants and functional coatings that replace fossil carbon-based raw materials with renewable materials. We follow both approaches drop in and new high performance raw materials providing additional technical benefits. Recently, we have developed a range of bio-based adhesives,

such as hotmelts for packaging (Technomelt® DM ECO), structural adhesives in electronics (Loctite® 3544F) and wood bonding adhesives (Loctite® HB S ECO and CR 821 ECO).

The so-called mass balance concept will be key to transform from fossil to renewable raw materials at large scale for both company business units. It is a transparent model for tracking the amount of certified and non-certified material along the entire production process. By the end of the reporting year, seven production sites of our Adhesive Technologies business unit will be fully certified under ISCC PLUS or RedCert, globally recognised certification systems for mass balance.

We also use ingredients based on renewable raw materials in our hair and body care products. We refer to the use of individual nature-based active ingredients or fragrances if these are associated with specific properties – for example, the care properties of shea butter or the soothing effect of aloe vera. We are also working to further increase the proportion of ingredients based on renewable raw materials in our hair and body care products and to use fewer fossil resources, wherever this is possible and appropriate. For example, guar is a nourishing ingredient that is used in products in our professional hair care and styling brand Authentic Beauty Concept (ABC).

In 2020, Henkel launched the fabric softeners Vernel and Silan Naturals, which consist of 99 percent nature-based ingredients. Since its relaunch in 2023, the product range now contains 100 percent biodegradable ingredients. To achieve the best washing performance, we use a mixture of different surfactants. In more than half of them, the lipophilic part is based on renewable raw materials. We have been working with BASF since 2022 to increase the amount of renewable raw materials used to produce the ingredients in hair and body care products, as well as in laundry detergents and household cleaners. Also here, we apply the biomass balance approach.

In addition, Henkel and Shell Chemical LP entered into a five-year cooperation in 2023 with the aim of replacing fossil raw materials with renewable materials in the production of surfactants for detergents.

How do you ensure that your products and their packaging are indeed circular?

When it comes to recycling, we are actively supporting the circular economy by ensuring proper design-for-recycling for the packs, including recycled plastic from post-consumer waste and support financially the waste infrastructure with EPR fees.

We believe a fossil material can never be sustainable. However, a renewable material is not always sustainable. We advocate for a fair comparison independent from feedstock source. For critical supply situations we request certificates and standards that prove a responsible sourced circular supply. Most of our customers request a certain proof for a circular material and the answer is usually a label or certificate. We continuously work on full transparency concerning our products.

In general, we follow the RCI guidance to consider biomass, waste (recycling) and CO_2-based materials as circular materials, whereas recycled materials should ideally come from non-fossil carbon, meaning biomass or CO_2-carbon in the future.

Do you prefer recyclability or packaging reduction?

We are following the waste hierarchy and circular economy principles:

#1 Reduce packaging as much as possible.

#2 Offer and enable reuse.

#3 Recycling.

In many cases we have reached a certain optimum for packaging reductions. Our customer can use adhesives for “less plastic” design or paper-based

packaging. In Adhesive Technologies, we have first products and development prototypes that either enable recycling by debonding mechanisms or are not hindering recycling (Loctite® Liofol RE range).

For consumer brands packaging several improvements on packaging circularity have been made in the recent years, like launching Pril Mix & Clean super concentrated to dilute refill bags, which is contributing to an absolute reduction of plastic packaging.

Stronger focus on recyclability as we have reached already technical optimum for reduction by digitalisation, e.g. thin layer 3D technology to ensure safety of goods during transport.

Do you have a strategy on how packaging not only becomes recyclable, but also how it is properly recycled?

There is a clear need for a political framework supporting the development of recycling infrastructure and the upscaling of recycling technologies.

Key for a circular packaging economy are the improvement of the collection and sorting of post-consumer packaging waste as well as the advancement of infrastructure for collection, sorting and recycling.

As Henkel, we cooperate with key stakeholders across the value chain to further improve packaging recycling. Three examples:

- We engage with operators of materials recovery facilities (MRFs) to examine how the acceptance of aerosols can be improved through the implementation of safe and cost-effective standards. Therefore, we also joined the UK Aerosol Recycling Initiative in 2023, which aims to achieve a national aerosol recycling rate of 50 percent by 2030.
- Together with our supplier Ampacet we are working on innovative solutions for fully recyclable dye-free black packaging, which is recognised in the automatic sorting process. Currently, dye use (carbon) poses a challenge to recyclers. The Cyclos-HTP institute, specialised in classifying, assessing and certifying the recyclability of packaging and products, has confirmed that Henkel's bottles, in black color and carbon-free, are fully detectable and sortable.
- Henkel also launched a partnership with the non-profit foundation Circular Valley in 2023. The aim of this partnership is to promote the circular economy and to close material loops in existing value chains, develop policy recommendations and inform the public about innovations.

In addition, we engage with consumers through awareness-raising campaigns and are constantly striving to make improvements in the value chain, with a particular focus on improving sorting ability.

Furthermore, since 2019, Henkel has invested into the recycling startup Saperatec, which develops wet-mechanical recycling processes for multilayer composites. The prototype for the new packaging consists of a two-layer design made entirely of polyethylene (PE), with the inner sealing layer consisting of more than 50 percent recycled "low-density" polyethylene (LDPE) from beverage carton waste. The outer layer is printed with a surface coverage of less than 50 percent and laminated with a Henkel adhesive that has been optimised for recyclability.

Last but not least, the topic of the circular economy is becoming increasingly relevant for investors and the financial markets. In 2019, Henkel invested in the Circularity European Growth Fund I LP, an impact fund managed by Circularity Capital. This investment of 5 million pounds sterling enables Henkel to drive its venturing activities forward while also supporting the development of a circular economy. In April 2022, Henkel Adhesive Technologies invested in the Emerald Technology Ventures Sustainable Packaging Innovation Fund. The focus is on packaging solutions with a reduced carbon footprint, improved recyclability and increased product safety.

In your opinion, is biodegradability a sensible end-of-life option?

Biodegradability is a sustainable solution particularly in those cases where products inevitably end up in the environment, or when there is a high risk of ending up there. Because the product is being broken down in nature, CO_2 and other gases will be released. So, besides being biodegradable, products should be based on renewable carbon or circular feedstocks.

If possible, collection, reuse or even incineration of materials would be great, when combined with energy use and carbon emissions capturing as well as utilisation technologies. Classical examples are shampoos, shoe soles, tyres, mulch films, coffee filters or fruit stickers. In some of these, we will find adhesives or surfactants that should better biodegrade.

Your products have been used and proved for decades and are of consistent quality. In your opinion, is it possible to exchange the required fossil with bio- or CO_2-based feedstocks?

Yes, this is technically possible.

But we will need all three renewable carbon sources from biomass, waste and atmospheric CO_2. The majority has to come via the mass balance concept for all 3 renewable carbon sources in our industry sector. This also requires a broad acceptance of this concept, that works similar like eco-power in Germany, in any raw material related regulation.

This will help to speed up investments in technologies to produce at scale:

- bio-naphtha, biogas
- CO_2-based methanol or syngas
- and pyrolysis oil from mixed waste streams such as household waste

With these streams any chemical and material we are using today can be produced with circular raw materials. This includes adhesives, detergents and cosmetics from Henkel but also any other of the materials worldwide.

90–95% of everything society produces relates to chemistry and is usually based on fossil carbon for both embedded carbon in the material and process energy.

Are all product properties retained as a result, or are new recipes required / do recipes have to be changed? Or do you even see (unexpected) product improvements as a result of the switch?

It is a mix of both, even today we have products on the market that are pure drop-ins. They can rely on mass balanced materials that have identical properties compared to its fossil counterparts. We also have products that are based on unique bio-based structures from segregated, in difference to mass balance, production value chains. Other products contain new and drop-in ingredients. In the future, we will see this mix more and more. The unique high-performance ingredients will come from biomass and they are combined with large scale commodity materials from mass balanced renewable carbon raw material streams.

Do you produce and / or apply intermediates with new properties that can only be received by making use of biotechnology or electrochemistry?

Henkel is not a classical chemicals producer. In most cases we buy raw materials and formulate them to products. In some cases, we are backwards integrated to produce polymers or other more basic raw materials.

However, we use ingredients from biotech, such as polyols, surfactants, enzymes and fragrance molecules that end up in our product formulations

or in our inhouse polymer production. In these cases, we indeed see differentiated performance and unique characteristics that provide us best in class performance.

Biotech, electro-chemistry or other new production processes enable us the manufacturing of novel structures with unique performance. Usually, we are collaborating with our supplier network in this field.

We have many different R&D projects including public ones that deal with biotech or new production processes for unique target molecules.

What added value do you expect from your participation in this initiative?

We are a founding member of the RCI because we belief in the need for defossilisation of the industry; this relates to energy as well as to chemical substances. Henkel is fully dedicated to support this revolution with our experts in R&D, Sustainability and other functions.

We expect from our active participation in several RCI WGs to better tackle this challenge together as a team including the nova-Institute as a think tank and our strategic suppliers. With the power of RCI we hope to convince politics, suppliers and customers to join forces.

RCI is a neutral organisation representing many different stakeholders and does a great job to support all its members with scientific data and reports to back-up the whole transition. We've already learned and acknowledged that for a true circular economy, the transition to renewable carbon is a must. Without renewable carbon, especially chemical recycling, no true circular economy will be realised in the future.

How can the RCI profit from your membership?

Henkel is one of the few brand owners in RCI and can help to advocate for defossilisation across their broad customers and supply chain network. Henkel consumer brands is close to end consumers and will demonstrate further progress in circular packaging solutions as well as LCA case studies together with our strategic suppliers. We actively develop the renewable carbon label that might be seen on selected products soon.

Adhesives, coatings and sealants are used in all industrial segments. Being industry leader, Adhesive technologies can contribute to shape the future by providing directions and thereby helping to create the required dynamics for the renewable carbon revolution. Our customers that are using our adhesives in their products can hopefully more often claim: Even the tiny adhesive bond line in our product is now fossil-free. We take climate change and sustainability seriously. If you are able to change adhesives you can change everything.