



Chemistry Redefined 2050

Avantium's Sustainability Strategy



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Foreword

It all started two decades ago with a simple sachet of sugar: a lightbulb moment in Avantium's canteen that sparked a breakthrough in what was possible for plastic.

Ever since, we have innovated tirelessly to develop technologies that support the shift to bio-based feedstocks and to create high-performing, recyclable materials. Our game-changing circular plastic is called releaf®, as a nod to its plant origins and its ability to relieve the world from fossil-based incumbents. Now, it has the potential not only to transform the chemical industry but to catalyze the global plastics transition.

After all, redefining the industry's approach to polymer chemistry is key to securing a sustainable future for generations to come. At Avantium, sustainability is in our nature. From our roots as a disruptor in sustainable chemistry R&D to our scale-up and transformation into a commercial organization bringing solutions to the market, sustainability has always been – and will remain – the driving force behind all we do.

“Redefining polymer chemistry is key to securing a sustainable future”

This is reflected in the way our sustainability strategy is intrinsically integrated with our corporate strategy. Each supports the other: our sustainability ambitions and related actions underpin our commercial performance, while Avantium's success inherently correlates with our contribution to a more

sustainable world. At the same time, we recognize that our work creates further impacts, both positive and negative, that it is our responsibility to manage.

“Our sustainability ambitions and related actions underpin our commercial performance”

Since we set out our original sustainability strategy in 2019, our operating environment, stakeholder expectations, and business priorities have evolved. As a result, we have matured and updated our approach to better reflect our current trajectory and future ambitions.

I am therefore pleased to present **our new sustainability strategy: Chemistry Redefined 2050**. Named after our vision of a fossil-free chemical industry by 2050, it gives us the framework we need to bring this vision to life. I invite you to read more about why it matters and what it entails in the pages that follow.

Our mission of accelerating the transition to fossil-free and circular materials is already well underway. Now, we are even more strongly positioned to drive positive change at the speed and scale our world needs.

Tom van Aken
CEO, Avantium



Sustainability: Our Story So Far

The Problem with Plastic

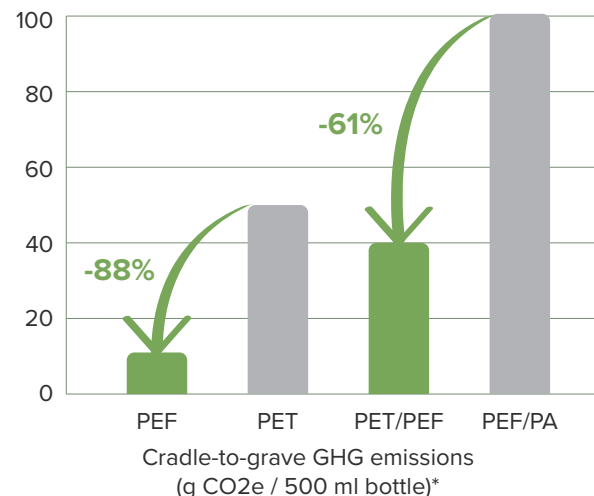
Although plastic offers immense value during the use phase of its life cycle, current approaches to its production and end of life contribute significantly to the climate crisis and other environmental challenges.

At the start of the life cycle, conventional plastics use fossil-based inputs, requiring energy-intensive processes and depleting finite resources. The use phase can be limited by a lack of durability, depending on the material's performance properties and application. And when the useful lifetime ends, the disposal of plastic is a major source of land and marine pollution, with many products remaining in the environment for hundreds of years.

Avantium's Solution: releaf®

We know there's a better way. In fact, our innovative YXY® Technology and revolutionary plant-based FDCA (a valuable chemical building block) and PEF (known as releaf®) are already changing how players along our value chain approach plastic.

First and foremost, releaf® sets us apart. This bio-based, circular plastic has the potential to revolutionize society's collective approach to a material that currently puts unsustainable pressure on our planet. A 2026 life-cycle assessment (LCA) shows that using releaf® instead of fossil-based PET in 500 ml bottles can reduce lifetime greenhouse gas (GHG) emissions by 88%. At Avantium, we are therefore determined to put this game-changing renewable plastic in the hands of as many consumers as possible and help drive the transition to a circular bioeconomy in Europe and beyond.



Our business model for releaf® further strengthens our position. As well as producing releaf®'s key building block at our own FDCA Flagship Plant in the Netherlands, our strategy is to license our proprietary YXY® Technology to large-scale partners around the world who will increase production and impact to transformative scale.

Redefining the Chemical Industry

From day one, sustainability has been at the core of Avantium's business. It is embedded in our vision and mission. It is integrated into our strategic direction. And, most importantly, it is the power behind our actions every day: developing and commercializing products and technologies that accelerate the de-fossilization of the chemical industry, enable the shift to a circular bioeconomy,

and generate sustainable – in every sense – value for our stakeholders.

In 2019, we formalized our sustainability strategy, publishing it the following year under the name Chain Reaction 2030. Since then, we have made progress on many of the goals set out in the strategy, reporting annually on our performance.

Over the same period, however, much has changed, from our operating environment and the regulatory and reporting landscape to our stakeholders' expectations and Avantium's own business priorities. In parallel, our sustainability approach and ambitions have also shifted.

“Our sustainability approach and ambitions have shifted”

We therefore decided it was time to update our sustainability strategy so that it more accurately captures Avantium's new maturity as a commercial organization, the sustainability topics that are material to us and our stakeholders, and our approach to managing positive and negative impacts responsibly.

As presented in the following pages, Chemistry Redefined 2050 comprises four focus areas and nine priorities that integrate with and support Avantium's commercial strategy and success. It will enable us to build on what we have learned so far while focusing more effectively on the areas that matter most in our next phase. It also strengthens our ability to monitor our progress and report clearly and meaningfully on successes and challenges alike.

**Carried out by Avantium, Tereos, and nova-Institut, with support from the European Commission's PEFerence project, this LCA is one of the most comprehensive and industrially grounded evaluations of PEF to date.*

Forging a Circular Value Chain

Our value chain includes two channels through which we put releaf® into the hands of consumers.

Offtake Channel

The process begins with us procuring the **raw materials** we need to produce FDCA, with sugar as the main feedstock. We then apply the **YXY® Technology** process steps – sugar dehydration, oxidation, and purification – at our **FDCA Flagship Plant**, which has an annual production capacity of up to 5 kilotonnes of FDCA.

Some of this FDCA is sold directly to our **offtake partners**, but most of it is further converted into PEF with the support of our polymerization partner. At this stage, plant-based MEG is added. Production takes place at our partner's **polymerization plant** using its equipment and workforce, strictly according to Avantium's specifications.

We sell the resulting PEF to offtake partners: typically, **brands, retailers, and converters**. These first movers in the innovative polymers market take further steps to transform FDCA and PEF into **consumer products** such as bottles, films, textiles, adhesives, and more. These products can be **recycled** after use, creating the potential for a circular loop in which used materials return as next-generation inputs.

Licensing Channel

Licensing forms the core of Avantium's business strategy and builds on the proven success of the offtake channel. The goal of the licensing track is for Avantium to enable large-scale FDCA and PEF production by granting technology licenses to partners such as feedstock suppliers, chemical companies, and PET/polymer producers. These partners invest in building production facilities and infrastructure and in securing the necessary **input materials**.

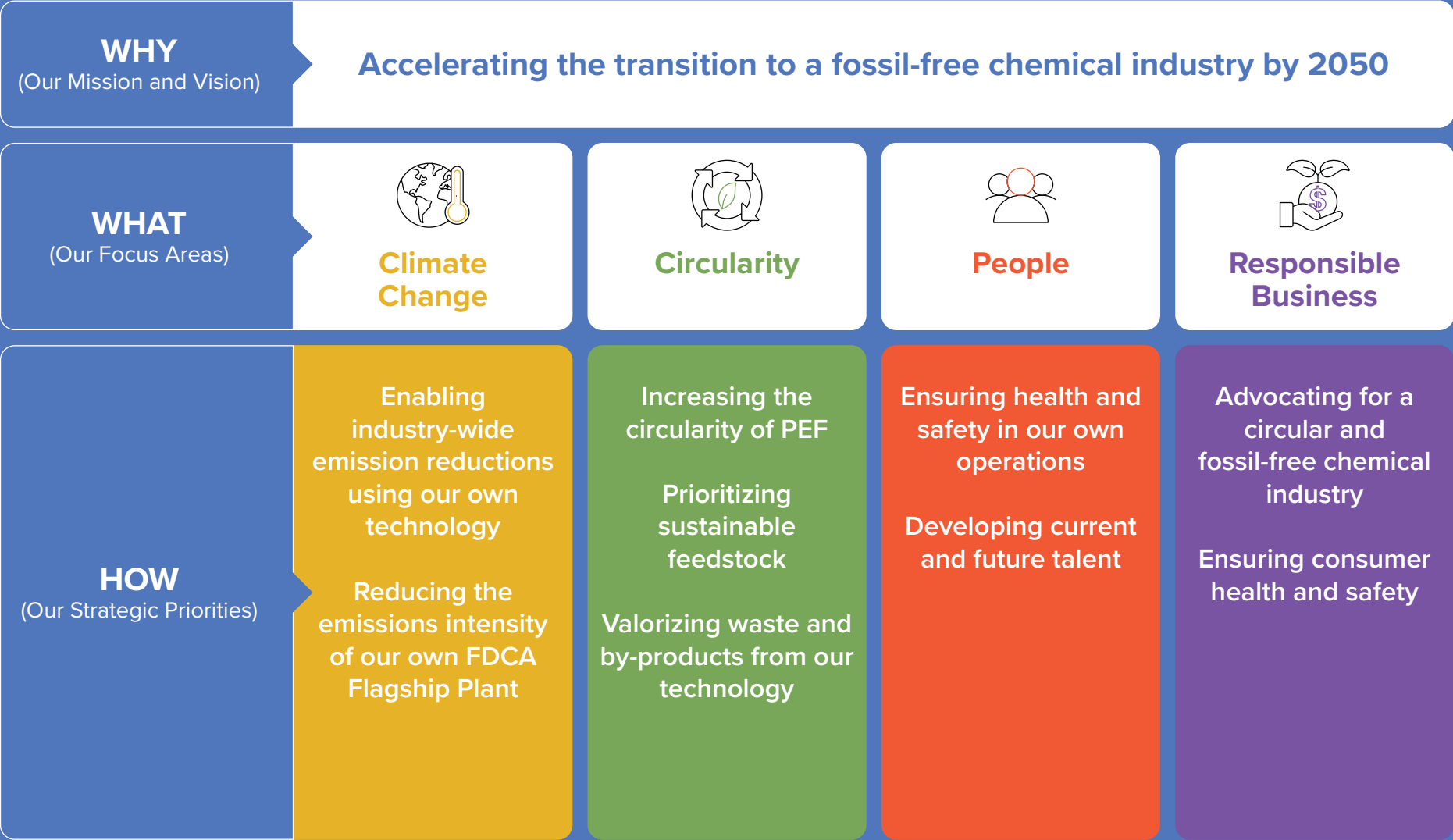
Avantium's role in this channel is to provide the **technology development, intellectual property, technical specifications, and services** required for partners to establish and operate the FDCA and PEF production process, as defined in the licensing agreements. The PEF produced by our partners at their **licensed production plants** is distributed through their own value chains to **brands, retailers, and converters** and transformed into a wide range of **consumer products** that can be **recycled** after use.



Introducing Chemistry Redefined 2050

Avantium’s sustainability strategy encompasses four focus areas across the environmental, social, and governance (ESG) spectrum. We have carefully identified these focuses not only as topics that we have a responsibility to address as a commercial chemical company, but also as areas where we are uniquely placed to make a positive and lasting impact with our sustainable chemistry and plant-based plastic. Within each focus area, we have further identified several strategic priorities that align with and advance our integrated approach to Avantium’s commercial and sustainability progress.

Together, these focus areas and strategic priorities form our pathway to our bold ambition of achieving a sustainable chemical industry within a generation. This vision is reflected in the name of our sustainability strategy: Chemistry Redefined 2050.



Governance and Reporting

We developed our sustainability strategy with significant input from the double materiality assessment (DMA) carried out in 2024/2025. The material topics that emerged as being of the highest priority for our business and stakeholders are all among the nine strategic priorities; we also added several other priorities on the basis of in-depth discussions with key stakeholders.

Most of these priorities can be closely mapped to the goals of our previous sustainability strategy, Chain Reaction 2030. Chemistry Redefined 2050 therefore represents a natural evolution in our sustainability approach, reflecting recent changes both in our wider operating environment and within our business as it has matured.

Avantium's Management Team is responsible for steering the implementation of our sustainability strategy, with ESG targets forming part of its variable remuneration. We set mid-term goals for each strategic priority, with a member of the Management Team taking responsibility for each goal. At the day-to-day level, the relevant departments are responsible for translating these goals into annual targets and key performance indicators (KPIs).

We are committed to reporting transparently on our sustainability performance, providing details of our progress and challenges in our [integrated annual report](#). There is significant overlap between the European Sustainability Reporting Standards (ESRS)-aligned material topics identified through our DMA and the focuses and priorities within Chemistry Redefined 2050, thereby supporting clear and consistent reporting guided by the EU's Corporate Sustainability Reporting Directive (CSRD).

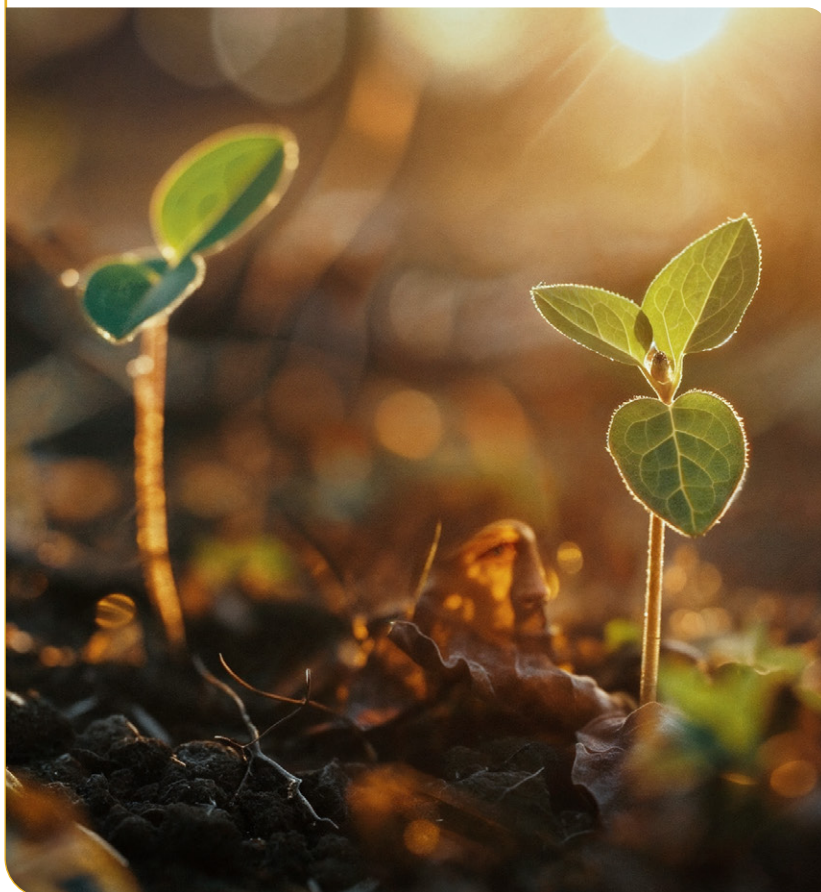




Climate Change

The EU has set a bold target of reducing net GHG emissions by 90% by 2040. To meet this target, the chemical industry must undergo a significant transformation, prioritizing enhanced resource efficiency, circularity, and low-carbon energy.

Avantium is well placed to be a driver of this transformation. Our technology delivers considerable CO₂ savings by increasing production efficiency and offering novel materials with a lower environmental impact than fossil-based incumbents. To maximize the impact of this innovation, we are focusing on two strategic priorities.



Enabling industry-wide emission reductions using our own technology

We know that our YXY® Technology can enable emission reductions on a massive scale, and we aim to realize this through our licensing strategy.

LCA results show that replacing fossil-based carbon in PET with 100% renewable carbon in PEF reduces GHG emissions by 88% over the full life cycle of a 500 ml bottle. The launch of industrial-scale FDCA facilities (100 kilotonnes or more) will therefore lead to significant CO₂ savings across the industry, with larger-scale facilities also able to access significant efficiency savings that can ameliorate emissions during production.

Reducing the emissions intensity of our own FDCA Flagship Plant

Emissions are also a focal point for our own operations. While the start-up and stable operation of PEF's FDCA Flagship Plant in Delfzijl lays the foundation for PEF's commercialization and proves our technology to more licensees, it also means an increase in emissions.

With this in mind, we have switched our focus from decreasing net

emissions to reducing emissions intensity per kilo of FDCA produced, starting from the moment that the FDCA Flagship Plant is fully operational. Although our potential efficiency savings are limited by the small scale of our operations, we aim to optimize the process and stabilize our energy consumption over time.

We track our progress on this priority by assessing Scope 1, Scope 2, and certain categories of Scope 3 emissions in line with the GHG Protocol.





Circularity

Large-scale change is needed in how we create, use, and dispose of plastic products to reduce consumption and waste and create a truly circular economy. At Avantium, we believe our biggest contribution to this effort is through safe and sustainable design.

Our innovative PEF plastic facilitates more efficient material production, extends material durability, and can be reincorporated into the material stream after use. However, as we pursue performance improvements for PEF, we also recognize three priorities that can help us move closer to true circularity.

Increasing the circularity of PEF

To scale PEF as a truly circular plastic, we are working to ensure that recyclability is available from market introduction and can evolve as volumes grow.

Technical assessments show that PEF is chemically close to PET and can be processed in existing PET recycling systems at low concentrations without compromising recycle quality; in some cases, it can even improve properties such as haze. This provides a practical short-term route for PEF to enter compatible PET recycling streams while market volumes are still limited. In parallel, we are working with recyclers, sorting technology providers, brand owners, and producer responsibility organisations to build the experience, endorsements, and infrastructure needed for dedicated PEF recycling streams once sufficient scale is reached.

Prioritizing sustainable feedstock

At Avantium, we have founded our business model on replacing fossil-based feedstocks with plant-based feedstocks to create products that combine competitive performance with environmental sustainability. Our suppliers must therefore adhere to strict sustainability standards: as well as environmental standards, we require compliance with social standards such as

human rights, prohibition of child and forced labor, and workers' living conditions.

We require all our feedstock suppliers to agree to Avantium's Sustainable Supplier Code, either through the General Terms and Conditions in our purchasing procedure or in explicit agreements.

We are also exploring second-generation feedstock technologies to further diversify the feedstock options available for our YXY® Technology.

Valorizing waste and by-products from our technology

While it is impossible to completely eliminate waste in the FDCA and PEF manufacturing process, we are actively pursuing waste valorization methods for our technology, with a primary focus on FDCA production in Delfzijl.

The sugar dehydration process at our FDCA Flagship Plant creates by-products that can either be valorized as input materials for other processes or be incinerated to generate energy for use in the plant or elsewhere.



People

The chemical sector in the EU employs just over 1.2 million people, around 0.8% of the total workforce*, representing an important facet of the EU economy. At Avantium, we understand that offering a safe, supportive, and stimulating working environment for specialized and technical professionals is crucial not only to our own operations and long-term resilience, but also to ensure the wider industry is able to thrive.

**CEFIC Facts and Figures 2025*

Ensuring health and safety in our own operations

Occupational health and safety (OHS) is a non-negotiable priority in the chemical sector. We maintain strict policies and management systems, ensuring that all onboarding, training, and work practices are properly followed. Procedures, risk assessments, and monitoring activities are continuously updated and enforced. Hazardous materials are managed under stringent guidelines.

Developing current and future talent

In addition to health and safety, we are committed to the overall well-being and engagement of our employees. We support work-life balance, provide flexibility where possible, and aim to create a work environment that enables long-term engagement and talent retention. We also invest in the development of our employees and the chemical industry pipeline.

We aim to build a stronger, more sustainable future for the chemical industry by engaging with students about our science as much as possible. We do this through digital channels as well as physical events that see us hosting students at our sites. In addition to school-age students, we also engage with young scientists at the PhD level, with several doctoral candidates conducting research at Avantium every year.

As well as investing in the next generation of talent to support the health of the wider industry, this approach also helps to attract talent to Avantium specifically. Once employees have entered our workforce, we ensure they receive equal opportunities for advancement. We actively promote diversity, equity, and inclusion across our workforce, including gender balance and representation at different organizational levels. We foster an inclusive culture where employees feel safe to contribute and speak up, supported by engagement surveys, open dialogue, and accessible reporting mechanisms such as our whistleblower policy.





Responsible Business

We strive for sustainable practices in our own operations and ensure we conduct our business according to the required legal and ethical standards. Within this focus area, we recognize two strategic priorities for Avantium as a renewable chemistry leader.

Advocating for a circular and fossil-free chemical industry

At Avantium, we believe that the materials sector should move from fossil dependence to circular, sustainable systems. To enable and accelerate this transition, the policy landscape and market environment need to provide the right foundation. We therefore use our voice to target the practical barriers to scaling innovative renewable and circular materials.

We advocate for:

- Market-pull measures that create high and predictable demand for bio-based and circular materials, thereby reducing investment risk and encouraging financial support for first-of-a-kind and scale-up projects.
- Circular economy rules that allow the early integration of innovative materials into existing recycling streams, rather than requiring significant market scale before access is granted.
- Clear and practical verification frameworks for bio-based materials, including for responsible sourcing, land use and biodiversity safeguards, and independently verified GHG performance.
- Coherence across renewable and circular carbon pathways, ensuring that regulation supports de-fossilization without locking in one route at the expense of another.

Through direct dialogue with policymakers as well as coalitions and value chain partnerships, we bring practical implementation insights into major EU policy files. We use public events, publications, and stakeholder outreach to build recognition and support for policy solutions that allow innovative, bio-based materials to scale within existing circularity frameworks as infrastructure adapts.

Ensuring consumer health and safety

The transition toward more sustainable and high-performance materials such as PEF is not achieved by default, particularly within a regulatory landscape defined by stringent safety requirements and well-established materials. For a novel polymer to be accepted, Avantium must demonstrate a level of safety assurance that goes beyond baseline regulatory compliance, providing clear and robust evidence that consumer health is fully protected under all intended conditions of use.

In this context, market acceptance is closely linked not only to regulatory approval (e.g., under EU food contact legislation and US FDA Food Contact Notification frameworks), but also to the confidence of customers and globally recognized brand owners, who often apply additional internal standards and require extensive data to support material substitution. As a result, Avantium must proactively generate comprehensive evidence, covering material characterization, migration behavior, and

toxicological safety.

At the same time, as PEF is a novel material, its supply-chain ecosystem is still developing. This requires close collaboration with suppliers to ensure alignment with the highest standards of purity, traceability, and regulatory compliance, while also meeting the expectations of downstream users and brand owners.

To support this transition, Avantium maintains an active and continuous program of testing and assessment of its materials and processes, ensuring that safety data remains robust, up to date, and fit for purpose across global regulatory frameworks. Through this approach, Avantium aims to enable not only regulatory approval, but also broader acceptance of PEF as a safe, reliable, and sustainable alternative within highly demanding food contact applications.



Next Steps



It all started with a few grains of sugar. Now, Avantium is redefining the chemical industry.

Our new sustainability strategy gives us the framework we need to make a fossil-free world a reality. Across Climate Change, Circularity, People, and Responsible Business, we are committed to maximizing the positive impacts we can create with YXY® Technology and releaf® and to minimizing negative effects from our business.

We will continue the work we have already started, with a sharpened focus on the sustainability topics that matter most to our stakeholders. Along the way, we will report regularly and transparently on our progress toward our ambitious targets and other KPIs.



We welcome feedback and partnership from like-minded organizations, up and down our value chain.

Contact us to start the conversation – and then let's turn conversation into action together.

sustainability@avantium.com



www.avantium.com