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Tecnaro and the bioplastics industry are ahead of EU regulation

Why renewable carbon is no longer a niche topic, and why Europe risks hindering its own pioneers and innovations once again

The plastics industry faces an uncomfortable truth: It is not plastic itself that is the problem, but the raw material base – and the system by which materials are evaluated after use. This area is precisely where TECNARO has been active for nearly three decades.

Tecnaro was founded in 1998 as a spin-off from the Fraunhofer Gesellschaft and is considered a pioneer in the global bioplastic compound industry. With around 6,000 formulations within the ARBOFORM®, ARBOBLEND®, and ARBOFILL® material families, the company stands for a consistent approach: moving away from fossil-based carbon toward renewable carbon. For Managing Director Jürgen Pfitzer, this is not a marketing issue, but a necessity for industrial policy. He puts it bluntly: *"We must break free from the fossil reflex. Plastics can be part of the solution – but not if we continue to think of them as derived from petroleum."*

Helmut Nägele, Co-Founder and Managing Partner of TECNARO (© Wolfgang Reiher Photography)

From material to system change

Bioplastics have long been an industrial reality: in vehicle manufacturing, in infrastructure projects, in forestry, in high-performance components, and increasingly in new applications such as textiles.

A particularly striking example is the reECONIC concept vehicle from Daimler Truck and FAUN Umwelttechnik, in which Tecnaro is involved. This waste collection vehicle represents a shift in perspective: the circular economy does not begin at the end, but with the choice of raw materials used.

At the same time, *Brembo SGL Carbon's* Lost Core technology demonstrates how deeply biobased materials are already integrated into industrial processes. Complex hollow structures in *Carbon Ceramic Brakes* are realized using biobased Arboform cores – at industrial magnitude and further scalable – and have been since 2005.

This development is also evident in the textile sector: Biobased Arboblend filaments, yarns, and textiles are used in sustainable sportswear. The raw materials issue is thus no longer just an industry-specific debate, but a cross-industry one.

Pfitzer sums it up from his perspective: *"When even highly stressed, safety-critical components, or entire garbage trucks become carriers of biobased materials, then the raw material transition is no longer a lab project. It's on the road."*

Artificial turf without fossil-fuel dependence

A particularly striking example is the NaKura project in Ellwangen. The artificial turf sports field made from various Arboblend recipes meets the highest athletic standards, including *FIFA Quality pro*, while also demonstrating a new approach to addressing microplastics.

While traditional systems are facing increasing regulatory pressure, NaKura focuses on material innovation rather than elimination. Here, sustainability doesn't start at the end, but at the beginning – with carbon.

The regulatory dilemma

This is where the central tension lies. European regulations aim for a circular economy, but in practice, they primarily evaluate compatibility with existing systems.

Only materials that are actually already collected, sorted, and processed on an industrial scale are considered recyclable. For new materials, this means that without existing infrastructure, they are quickly deemed *"non-recyclable."*

Yet the hurdle usually does not lie in the material itself. Many biobased plastics can, in principle, be detected and separated using existing near-infrared spectroscopy.

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However, what is technically possible is not implemented for this purpose for economic or systemic reasons.

The consequence is paradoxical: A material may be detectable, sortable, and even suitable for high-value recycling, but if it is not actively collected separately, it does not exist in a regulatory sense. Thus, it is not the material's properties that determine its fate, but its integration into existing material flows.

Pfitzer puts it clearly from his perspective: *"A material is not 'non-recyclable' because it cannot be recycled technically – but because no one collects it separately and returns it. That is not an environmental criterion – it is a market failure."*

This creates a structural advantage for fossil-based materials. They benefit from material flows built up over decades and subsidized by packaging fees, standardized sorting fractions, and economically optimized recycling pathways. Biobased alternatives must hold their own within precisely these structures – even though they were never developed or designed for them.

This leads to a fundamental contradiction: Regulation calls for innovation, but at the same time evaluates its compatibility with a system based on the status quo of fossil-based materials.

When wood suddenly becomes a problem

Another example of the inconsistency becomes evident in food contact applications. Wood is accepted as a cutting board or cooking spoon and has been for millennia. But when the same raw material becomes a component of a bioplastic, a different regulatory logic applies.

The reason lies in the system: Plastics are subject to positive lists of approved substances, in which natural materials such as wood fibres are no longer systematically included.

Pfitzer sums it up: *"The same material is permitted as a cutting board – but, absurdly, suddenly becomes a problem as a component of a bioplastic."*

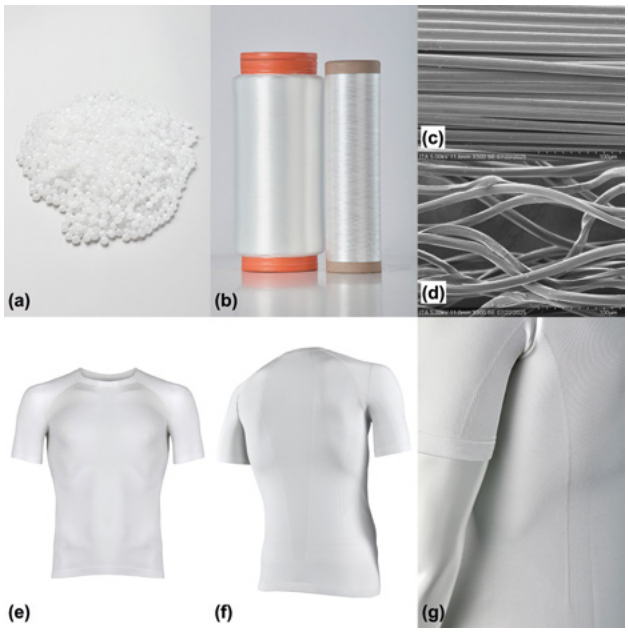
Standardization in the rearview mirror

Standardization, too, is rooted in the status quo and consequently reacts slowly to new developments.

While existing standards are geared toward conventional plastics and their value chains, biobased innovations often do not fit into this framework. Pfitzer puts it bluntly: *"We regulate based on what we know – and overlook what we actually need."*

Coffee capsules as a case study

The debate over coffee capsules illustrates this dynamic. At one point, there was consideration of making single-use capsules mandatorily compostable – a potential catalyst for biobased and biodegradable solutions.



SustainableSportswear: © FALKE/ITA

After intensive lobbying by providers of competing systems, this approach was rejected and ultimately at least qualified to be permitted if a member state decides to. What remained was a compromise that protects existing systems and squanders the impetus for innovation.

The consequences are also evident in economic terms. The market for compostable bio-coffee capsules based on Arboblend, which Tecnaro and its partners had established and which had already reached a production volume of around 500 million units in 2021, has collapsed dramatically due to regulatory uncertainty and the lack of a clear regulatory framework. Pfitzer views this critically from his perspective: *"In the end, it is not the better solution that wins – but the existing one..."*

NaKura Ellwangen mit Wuchshülle: © Tecnaro

© Wolfgang Mock

Greenwashing or system failure

Stricter rules for environmental claims make sense, but they create new areas of tension. Biobased materials must simultaneously demonstrate their origin, degradability, sustainability, and real-world system integration – often based on methodologies not designed for them. In contrast, conventional plastics face no comparable requirements and have decades of head start.

Materials can be ecologically sound – and yet fail to meet regulatory standards. Pfitzer puts it this way: *"Preventing greenwashing must not mean that a better material then fails because of a worse system."*

ArboTrade: Application is key

Through its subsidiary Arbotrade, Tecnaro is translating the raw material transition into concrete applications, such as biobased and biodegradable tree shelters in the forestry sector.

While fossil-based variants often remain in the forest and can contribute to the microplastic problem in the long term, biobased biodegradable solutions are designed to reduce it. It is striking that these solutions had to prove their environmental compatibility over many years, while fossil-based systems were used as the default without comparable requirements.

What is needed now

Europe does not need special treatment, but fair framework conditions: recognition of biobased carbon as a climate factor, no structural disadvantages caused by existing recycling logistics, public procurement as a driver of innovation, differentiated assessment of sustainability claims, and further development of infrastructure.

"We don't need a plastic revolution against plastics. We need a raw materials revolution within the plastics industry", says Pfitzer. *"As long as fossil carbon is structurally favoured and biobased materials are treated less favourably under the regulations than recycled materials – with their recycling quotas – in the EU's Packaging and Packaging Waste Regulation (PPWR), the transition will remain half-hearted. The opportunity to count biobased content here – and thereby also improve the supply of raw materials – has once again been missed. Those who replace fossil carbon must not be disadvantaged by regulations."*

The biggest mistake would be to let biobased materials fail because of the structures that made fossil fuels so dominant.

The future of plastics isn't decided in the trash. It begins with carbon. ■

www.tecnaro.de

Arbotrade Wuchshuelle aus Arboblend © Arbotrade/Tecnaro

About Tecnaro
Tecnaro – Bioplastic pellets from Ilsfeld for the world!

Tecnaro (**TEC**hnologie **NA**chwachsende **RO**hstoffe) was spun off from the Fraunhofer Institute for Chemical Technology (ICT) in 1998 as a pioneer in bioplastics. Today, Tecnaro is one of the global leaders in technology and innovation.

Sustainability is in Tecnaro's DNA!
Based in Ilsfeld in the Heilbronn region, Tecnaro develops, produces, and distributes exclusively climate-friendly, CO_2-neutral Arboform, Arbofill, and Arboblend bioplastic granules made from renewable raw materials for the plastics processing industry. These are processed using conventional plastic processing machinery to produce, for example, reusable biobased coffee cups, UHU glue sticks, Edding markers, highlighters, Mockmill housings, and even parts for the carbon-ceramic brakes from BREMBO SGL CARBON or for RUD Ökomat snow chains.
Tecnaro's work has received numerous awards. For example, ZDF's (German TV station) programme WISO awarded Tecnaro the TV Start-up Prize as early as 1999, the European Inventor Award 2010 from the European Patent Office, the Rudolf Diesel Medal in 2011, and the *GREEN BRAND GERMANY* for the seventh consecutive time in 2025. The World Market Leaders Congress honoured Tecnaro with second place in the Innovation Champion Award in 2020. In 2025, Baden-Württemberg's Minister of the Environment, Thekla Walker, honoured Tecnaro as a "*Zukunfts.Länd.Macher*" (Future State Maker).
In 2020, the two Tecnaro CEOs, Jürgen Pfitzer and Helmut Nägele, were appointed by Walter Döring to the German Senate of Economy and the Senate of Economy Europe.