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moment[®]

EJOT Project "recarb"

CO₂-reduced wire goes into
series production

Cooperation with Solarge

Fixing solution for
special solar modules

Courage and entrepreneurial spirit

Protecting the climate
with the start-up bionero

Permanent crisis

More progress and resilience for a world in upheaval



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Dear partners of the EJOT Group,

Crisis is the metaphor that runs like a common thread through this autumn issue of our "moment". After the COVID pandemic, the subsequent supply chain problems, the Russian invasion of Ukraine and the associated energy crisis, we thought that we could get back into calmer waters. This turns out to be a fundamental misconception, as Prof. Dr. Henning Vöpel from the Centre for European Policy (CEP) thankfully points out in an editorial for this issue. The CEP is the think tank in Germany for all European policy issues. We at EJOT are a supporting member because Europe accounts for 80 per cent of our business. If we know today that we in Europe are affected by more than 13,000 regulations, while American companies are only affected by around 3,000 regulations per year, then we realise how important it is to monitor these political activities.

Our old geopolitical, industrial, technological, and climate-related world is in turmoil at many points, says Prof. Dr. Vöpel. This polycrisis is a description of German and European reality. In government and society, we see this in election results. Even crude nonsense finds a following today. In the economy, we recognise the excessive demands placed on European industry by well-intentioned regulation. The consequences can be seen in the automotive industry, the heart of German and European industry. Fines for expected CO2 consumption are estimated to amount to 15 billion euros in the coming year. And these fines could lead to an artificial decrease in demand for cars, which is already weak, if car manufacturers reduce the number of combustion models to avoid high fines. This would then also pull the supplier sector downward. A vicious circle of regulation and subsidisation threatens. Prof. Dr. Vöpel asks why we do not trust the market mechanisms that have created our prosperity more firmly? The examples of German or European "industrial policy" are certainly not encouraging. No better solution can be found at the "green table" (= where bureaucratic decisions are made that bear little relation to reality and practice) than through the market with its infinite number of price mechanisms.

However, this issue also addresses other points in Vöpel's editorial: the climate crisis and the technological upheaval that artificial intelligence is bringing to our lives and economies. Both are important activities for our group, as we demonstrate with our RECARB solution for CO2-reduced steel and the almost "fairytale" connection to bionero. Offers with which we can all – industry and consumers – contribute to a low CO2 future.

Sincerely yours

Christian F. Kocherscheidt
Chief Executive Officer



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Honoured

Key Supplier Recognition 2024



Tony Wiegandt accepted the award from Amelie-Sophia Schmidt and Sebastian Blaues on behalf of EJOT

As part of the EJOT TecDay at Brose's Hallstadt site, EJOT was awarded the "Key Supplier Recognition 2024". With this award, Brose recognises the EJOT Group as a strategic partner in purchasing and certifies that the family-owned company headquartered in Bad Berleburg has very good delivery quality. As Global Lead Buyer at Brose, Sebastian Blaue referred to the decades of reliability of the partner EJOT, even in difficult times. EJOT currently supplies 43 of 69 Brose plants worldwide with 187 different items. According to Sebastian Blaue, EJOT products are used in 551 different vehicles.

Awarded

EJOT is one of Germany's top innovators.

Honoured at the German SME Summit: The well-known science journalist Ranga Yogeshwar congratulates EJOT SE & Co. KG from Bad Berleburg on being awarded the TOP 100 seal. In the scientific selection process, EJOT was particularly convincing in the category "Innovative Processes and Organisation". This is the third time that the company has been one of the top innovators. EJOT is one of the companies that are characterised by outstanding professional innovation management and thus also set international standards," writes the Institute for Entrepreneurship and Innovation at the Vienna University of Economics and Business in the innovation report for the Bad Berleburg-based company. EJOT is therefore part of the performance elite of German SMEs. The picture shows Ranga Yogeshwar, Christian Dreher, Vice President Technology Europe, and Dr. Jens Weber, Chief Technology Officer (CTO).



Pictured (from left): Christian Dreher, Vice President Technology Europe, Ranga Yogeshwar and Dr. Jens Weber, Chief Technology Officer (CTO).



ETA-certified fastening for the CROSSFIX® system

Accelerate construction projects

Modular buildings are produced in modern production halls as ready-to-assemble modules, regardless of the weather, and are assembled cleanly and quietly into modular buildings on the construction site. As a rule, load-bearing timber or steel frame structures are used for this and a façade is subsequently added. The fire protection boards made of plaster or cement between the anchoring base and the wall bracket for the ventilated rainscreen cladding (VHF) pose a challenge here. This spaced installation and the resulting bending moment are an unusual application for the self-tapping and self-drilling screws used. Previously, approvals in individual cases (ZiE) or project-related type approvals (vBG) were required for such construction projects.



With the new ETA-24/0547, EJOT has an approved solution for this application. The ETA regulates the use of self-tapping and self-drilling screws from EJOT with different lengths and diameters for fastening the CROSSFIX® substructure system for ventilated rainscreen façades in modular construction. Thanks to the ETA, such construction projects can be realised faster, easier and more reliably with significantly reduced planning effort.

AZERBAIJAN



Burak Akidil is the managing director of the national subsidiary "EJOT Fixing Solutions Caspian" Azerbaijan, which was founded in July and is based in the capital Baku. Burak Akidil, who was born in Turkey, has been working for EJOT in Azerbaijan since 2016. He has developed a business development strategy, recruited new customers and coordinated logistical processes. In addition, he represented EJOT to business partners and the government.

GREECE



George Andritsos is the managing director of the new national subsidiary "EJOT Fixing Solutions Hellas" in Greece, based in the capital Athens. He has many years of experience in the construction industry and in setting up new companies. Before joining EJOT, George Andritsos worked for Walraven Hellas, Emerson Professional Tools and Fischer, among others.

The first EJOT concrete screw made of stainless steel

More performance, more possibilities



The new JC6 offers high durability and longevity, especially in harsh environmental conditions, thanks to the use of high-quality stainless steel. It is ideal for coastal areas and industrial applications where secure and reliable anchoring is crucial, even in edge areas.

The JC6 is versatile and provides safety for façade scaffolding, temporary fixings or permanent installations in challenging environments. The use of the JC6 in diam-

eters of 6, 8 and 10 mm is regulated in ETA-22/0413, which enables quick and easy pre-dimensioning as well as greater planning security.

In addition to the new JC6 concrete screw made of stainless steel, various versions of the tried and tested JC2 and JC2 Plus concrete screws made of galvanised steel for dry interiors are also available, with different head geometries and in numerous dimensions.

Advantages of the JC6:

- Corrosion resistance: ideal for damp interiors and outdoor applications near the sea
- Quick and easy installation: no special tools required
- Immediate load-bearing capacity: no curing times
- High load-bearing capacity: even with small diameters
- Hardly any expansion forces: low splitting forces
- Demountable: can be removed again at any time

Application range

- Anchoring in cracked and non-cracked concrete
- Canopies, gates, shelving systems, cable traverses
- Handrails and railings, formwork, stadium seating
- Impact protection/ram protection, timber/timber add-on parts (e.g. beam shoes)
- And many more...

GERMANY



Dr. Thomas Johann has been the new Chief Human Resources Officer (CHRO) of the EJOT Group since 1 May 2024. After graduating from high school, Thomas Johann studied business administration and industrial and organisational psychology at the Catholic University of Eichstätt-Ingolstadt. The 46-year-old completed his doctorate in the field of human resource management. After his studies and doctorate, Thomas Johann initially worked at the management consultancy Deloitte, advising companies in the field of human resource management. This was followed by professional positions with management responsibilities in human resource departments in German medium-sized companies. For the last four years, Thomas Johann has been responsible for the HR department at Gedore in Remscheid.

GERMANY



Marvin Michalik is the new Head of Sales for the Construction Fasteners Germany division. He succeeds Stefan Schnaus, who is now in charge of European sales for the Construction Fasteners division. Marvin Michalik has extensive expertise gained during his time working for renowned companies such as the Würth Group, the GC Group and the Berner Group.



Joint venture partners: EJOT CEO Christian Kocherscheidt and Steven M. Perlman, Chairman and CEO of INTEC Group, Inc.

EJOT and the INTEC Group are setting up a joint venture

EJOT and the INTEC Group, a leading supplier of injection-moulded hybrid components, are forming a joint venture as strategic partners. The aim of the joint venture "EJOT-INTEC, LP" is the customer-specific expansion and diversification of the product portfolio in the field of hybrid moulding. The contract was signed in September in Palatine/Illinois, USA, the headquarters of the INTEC Group. "By combining our expertise in the field of plastic injection moulding of metal components with our companies local manufacturing capabilities, we are creating real added value that provides our customers with a direct strategic advantage," says Christian F. Kocherscheidt, owner and CEO of the EJOT Group. The EJOT Group and the INTEC Group each hold a 50 percent stake in the newly founded joint venture. EJOT expects the cooperation with the INTEC Group to provide a strong product portfolio of precision plastic and metal parts, as well as greater customer proximity to automotive manufacturers and suppliers in North America.

More progress and resilience for a world in turmoil

Skilled workers are hard to come by, and inflation is weighing on the economy. Such a confluence of crises is probably unprecedented. But they are no coincidence, because they herald major upheavals – also and especially for the German economy. Its foundations have become fragile: globalisation is faltering, cheap energy is no longer available, and the peace dividend has been transformed into rising costs for more security. We are facing challenging times, in which progress and resilience are needed, but also more courage and optimism. In such a turning point, it is not only the hour of politics but, above all, a time for entrepreneurship.

Description of the current situation: The German economy is at a tipping point.

In the past twenty years, the German economy has probably never been in as critical a state as it is today – and not in terms of the economy due to economic trends, as politicians often claim in the hope of an imminent upturn, but structurally, deep into the substance and core of the economy. Numerous companies, especially traditional ones, are reducing their headcount, cutting back on production, and are increasingly investing abroad. Germany has a location problem: high energy prices, a dilapidated infrastructure and a shortage of skilled workers. Germany is no longer a place where companies can grow. Productivity growth has been very low for a decade. Other economies, on the other hand, are growing much faster and are in a phase of reindustrialisation, including the USA and China.

China is no longer the land of cheap suppliers and a seemingly endless market but is currently growing in German export markets and is thus becoming a direct competitor on the world mar-

kets. The “China 2025” programme, which was launched many years ago, is therefore delivering on time: China has matured into an industrial and technological power, albeit one that is highly subsidised.

The German economy’s “business model,” on the other hand, has come under massive pressure, but a new one is not yet in sight. It is lagging in digitalisation, and artificial intelligence has not yet arrived in companies either. It is time for an honest appraisal and an economic policy that is once again geared towards growth and competitiveness. Because missing the start of a new innovation and investment cycle, of all things, will make it very difficult to catch up. A rapid turnaround is needed to prevent deindustrialisation from reaching a tipping point.

There is no shortage of wake-up calls. In a recent study, the Federation of German Industries (BDI) calculated that almost one and a half trillion euros (!) will need to be invested in Germany by 2030. The former president of the European Central Bank (ECB), Mario Draghi, has presented a report on the competitiveness of the EU to the new Commission under the leadership of Ursula von der Leyen, which relentlessly exposes Europe’s weaknesses. In it, Draghi proposes a mix of high investment, a more strongly coordinated European industrial policy, and massive deregulation.

German economic policy also needs to rethink. The state intervenes too much in the economy. This overexerts the state and weakens the economy. The state first regulates the business models from the market and then subsidises them afterwards. This cannot work economically. One thing is therefore becoming

The global pandemic was not yet over when war broke out in the middle of Europe. At the same time, artificial intelligence is developing at an almost breathtaking pace and climate change is becoming increasingly noticeable.

>>Text: Prof. Dr. Henning Vöpel

increasingly clear: transformation needs growth. In stagnation, it becomes impossible to achieve ambitious goals. The energy transition also shows this. An industrialised country cannot survive without competitive energy prices. But the global challenges are many times greater. It is essential to renew the economy in a very comprehensive sense, to make it more innovative and resilient again. Because the world is facing major, almost paradigmatic upheavals.

Analysis of the causes: the polycrisis as a crisis of order

The ancient Greeks called an unusual accumulation of crises a “polycrisis” because they assumed that the many crises must have common causes. A polycrisis is therefore something like an order crisis, in which it is not superficial crisis symptoms that are at issue but far-reaching structural changes. Institutions, rules, and habits no longer function. On the contrary, they themselves tend to trigger crises. The task of politics is therefore not only to manage the many crises but also to develop new, stable orders, in other words, to fundamentally renew the economy. There are essentially four “orders” that are affected by the major upheavals of the present.

On the one hand, there is the *geopolitical order*. The geopolitical order of the past 80 years, which was largely shaped by the United States, is coming to an end. It is being challenged by China. Furthermore, the dominance of the “West” is being questioned by the so-called “Global South”. New alliances are emerging for a multipolar world order. A period of geopolitical disorder has begun. And Europe is fully caught up in it because it has benefited so much from the multilateral order. In terms of security policy, the USA’s focus is shifting from Central Europe to the Indo-Pacific because the opponent is not the Soviet Union as in the “Cold War”, but China. In this orientation, Kamala Harris and Donald Trump would not differ.

The *industrial order* is also coming to an end. Industrialisation is being replaced by digitalisation. The transition is disruptive because digitalisation is revolutionising the business models and structures of industrialisation, which was so masterfully dominated and shaped by the German SME sector. The German economy is facing not only a technological but also a cultural change because companies must transform themselves into agile organisations in order to keep pace with the speed of change.

The third order coming to an end is the *fossil order*. Sustainability is becoming a condition for global growth, because otherwise growth will destroy the foundations of human life. Climate change requires the restructuring of energy supply towards renewable energies. However, this requires a decentralised system that differs greatly in (infra)structure from the system of centrally controllable energies. However, the green economic miracle is a promise that has so far been disappointed. If there is insufficient internationally competitive supply of clean energy, the domestic industrial sector, especially energy-intensive industry, will



Prof. Dr. Hennig Vöpel

Director of the Centre for European Policy in Freiburg (CEP) and Professor of Economics at the BSP Business and Law School (Berlin/Hamburg)



shrink. All these upheavals also affect the *social order*. The end of linear media leads to a “structural break of the public”, as the philosopher and sociologist Jürgen Habermas calls it. Societies are more polarised than they used to be, the centre is shrinking, and governments are finding it more difficult to build constructive majorities. The model of liberal democracy has come under pressure not only worldwide but also in Europe and even in Germany. Building new systems is a major challenge for politics, business, and society. It requires the courage to let go of the old and the vision to build something new. Both are currently in short supply.

Ways out of the standstill: courage for the future

When systems disintegrate and are not yet replaced by new ones, an unstable intermediate state arises. People find this difficult. You must let go of something before you know what you can hold on to again. This intermediate state or border area is sometimes described by the term “liminality”. “No longer” and “not yet” – the present no longer works, the future not yet. Transformation is therefore not only a structural problem but, above all, a mental one. If politics only deal with crises superficially, it will increasingly have to step in as a “fire brigade” because the tendency towards crises in the “old system” is constantly increasing. It then finds itself in a “present trap”; it becomes more and more difficult to return to the path of sustainable economic policy. The present is increasingly losing its ability to act and shape the future, without new possibilities for progress. The present feels increasingly confined. For this reason, standing still and preserving the status quo is the greatest risk.

It is precisely in these “intermediate states” that companies and true entrepreneurship are needed. Because it is about what companies and entrepreneurs have always done: working on better solutions and thereby shaping the future step by step. Or, as Joseph Schumpeter (Austrian economist and politician, 1883–1950) would say, “creative destruction”, i.e., overcoming the old with the new.

Instead, however, politics is overwhelming the economy with a veritable tsunami of regulations that leads to a lot of bureaucracy but hardly to innovation. Economic policy has focused on redistributing the costs of the crises and forcing transformation with detailed regulation and expensive subsidies. Friedrich August von Hayek (1899-1992), an Austrian economist and social philosopher, called this “presumption of knowledge”.

But progress is necessarily the result of the courage to take risks and optimism for the future. These are the great strengths of the social market economy and liberal democracy. Actually. Because society seems powerless and despondent at the moment. That is why perhaps the most important task for politics today is to create more courage and optimism again. There is still a lot of this in German medium-sized companies. But politics must give companies more freedom again and trust. **E**

CO₂-reduced steel goes into series production

It was a first for the cooperation between manufacturer, processor and end-product manufacturer. In the summer of 2023, the companies Arcelor Mittal, Finkernagel and EJOT presented their project.

>>Interview: Andreas Blecher

ArcelorMittal Hamburg produces highly CO₂-reduced steel from recycled and renewable material with a significantly lower CO₂ footprint than conventionally produced steel, which is processed by Drahtwerk Finkernagel (Altena). EJOT, in turn, uses the drawn wire in a cold-forming process to manufacture fasteners. For the EJOT Group, the decision to start processing CO₂-reduced steel marked

an important step on the road to climate neutrality, especially since the majority of CO₂ emissions are found in the preliminary products (Scope 3). In the meantime, the first tests with the new material have been completed and the results are positive, emphasises Markus Rathmann, Chief Supply Chain Officer of the EJOT Group. In the interview, Markus Rathmann reports on the current status of the further implementation of the project.

Mr. Rathmann, a year ago we reported in the magazine Drehmoment about the cooperation between the steel manufacturer Arcelor Mittal, the wire factory Finkernagel and EJOT as a manufacturer of fasteners. Could you please briefly summarise for our readers what this cooperation is all about?

We are trying to promote the use of green steel along our supply chain, from the steelworks to the wire drawing company and to us. This requires extensive testing because we naturally want to ensure that products made from CO₂-reduced steel meet the same high quality standards and fulfil the same delivery specifications as products made from conventionally manufactured steel.

What has happened at EJOT since then?

We have carried out a whole series of test orders with green steel in order to analyse all the properties of the wire in processing from a materials and forming point of view. To this end, there was and is close coordination in the supply chain, particularly in the field of materials engineering. We are now able to use the CO₂-reduced wire under series production conditions. This opens the door for the "recarb" project. We are sure that we will not have any quality impact by using the CO₂-reduced wires.

Can you briefly explain how the EJOT products that are manufactured with CO₂-reduced wire will be marketed in the future?

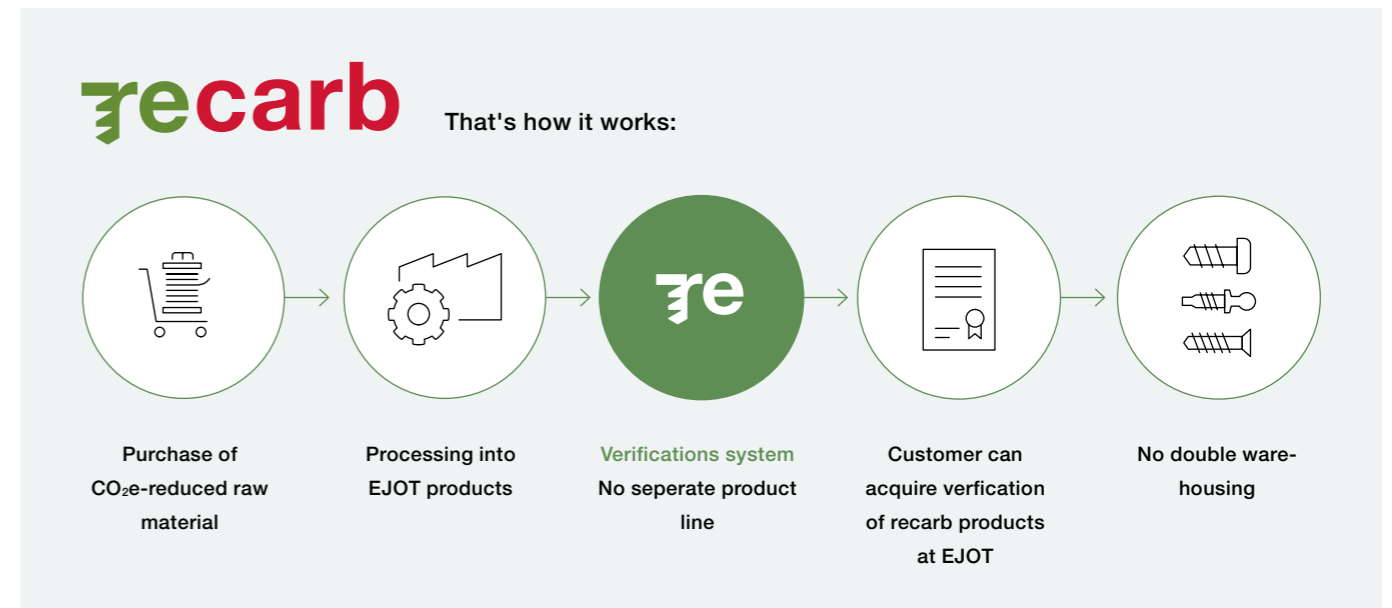
There are two ways to get CO₂-reduced fasteners from EJOT. For new products that we manufacture for the first time, we

can ensure from the outset that only green steel may be used for this new material number at the customer's request. We can determine a Product Carbon Footprint (PCF) specifically for the product and report it accordingly. The additional costs for the green steel are included in the product cost calculation from the outset. The second way is to use the verificat.



Markus Rathmann

Chief Supply Chain Officer /
Geschäftsführender Direktor der EJOT Gruppe



What exactly is a verificat? How does the "recarb" verification system work at EJOT?

The verificat is ultimately proof of the saved CO₂e. We calculate the wire according to the PCFs provided by our suppliers at approx. 2.2-2.9 tonnes of CO₂ per tonne of wire. The CO₂-reduced wires we use only account for about a quarter of the CO₂e value. With CO₂-reduced wires, we can pass on the reduced CO₂e value of our products to the customer.

What are the advantages of "recarb" for the customer?

The customer can very quickly halve the CO₂e value of the screw ordered, without any administrative effort, for example, by changing a material number.

The steel from which the wire for the EJOT fasteners is made has a high scrap content of up to 70 percent. How do you ensure the quality of EJOT products?

The wire meets our strict delivery specifications. That is guaranteed. In addition, we support this through measures in materials technology and quality management. The next few years will show in practice up to which scrap content even demanding products in terms of forming technology can be manufactured.

What impact does the use of this "green" wire have on the reduction of Scope 3 emissions at EJOT?

The influence of the wire on EJOT's carbon footprint is significant. Of the approximately 251,000 tonnes of CO₂ that we produce per year, around 90,000 tonnes come from steel. By using CO₂-reduced wires, this amount could be reduced to about a quarter.

Finally, a question that is of particular interest to our customers. Can you already quote prices for the purchase of the verifications?

For the verifications, we will base our prices on the CO₂ price in European certificate trading and the surcharge for the CO₂-reduced wire. For a small percentage surcharge on the end product, the customer can halve the CO₂ footprint of the products purchased from us.



The path to technical cleanliness

There are terms that seem to reveal their meaning to the observer at first glance due to their descriptive character. However, it may subsequently become apparent that without suitable definitions, the information conveyed linguistically may result in the content not being grasped beyond doubt.

>>Text: Prof. Dr. Ralph Hellmig

The term “technical cleanliness” also belongs in this category. As we know from our own life experience, “cleanliness” can mean very different things. In combination with the adjective “technical” the meaning may no longer be as clear but it does evoke a multitude of possible associations.

In practical life, cleanliness is usually understood to mean “optical cleanliness”, which is determined by a visible impression. When applied to technical systems, it is usually not the appearance but the functionality that plays the decisive role. This can be affected above all by the presence of particles of various kinds. Their influence on product properties and function can be significant. Thus, conductive metal particles, which, through their size, can cause a short circuit on the increasingly denser conductor tracks used today, can have numerous unexpected

impacts on an electrical system. Similarly, residual particles in image-recognising camera systems can lead to surprising misinterpretations, which can be a hindrance, for example, in the automatic recognition of traffic signs. In addition, particles can have a purely mechanical effect, for example, by clogging valves or by having abrasive properties in flowing liquids.

These few examples illustrate that there are numerous applications, especially with today’s highly integrated components, in which particle contamination should be kept to a minimum.

The VDA 19.1 and VDA 19.2 guidelines have been developed to provide assistance in determining and evaluating particle contamination on components. In practical terms, the technical cleanliness of a component is determined by the measured

residual dirt contamination according to a specified test procedure. This procedure can be clearly illustrated in the case of screws and small cold-formed parts.

The components to be tested are sprayed in a rinsing cabinet with a rinsing liquid at a defined pressure and quantity, and all mobile particles in the cabinet are collected using a suitable filter system. The dried filters then form the basis for the analysis of the defined detached particles and, if necessary, fibres. With a measuring microscope and automated image evaluation, it is possible to classify and quantify the particles on the filter. In this context, it is particularly important to classify the particles into the size classes specified in the guidelines and to distinguish between metallic shiny and apparently non-metallic particles. It is also possible to determine the total amount of residual dirt using gravimetric analysis.

If a precise determination of the size distribution of metal particles is required for a critical electrical application, a supplementary follow-up examination using scanning electron microscopy (SEM) is inevitable. Here, a solution is called into action that makes it possible to fix the particles on the filter and to examine them in a purposefully semi-automated manner in the SEM. With the help of so-called energy-dispersive X-ray spectroscopy (EDX), the different elements within a particle can be unequivocally determined by analysing the X-ray spectra. For that, an electron beam is used to activate X-rays that are characteristic of the various elements during the EDX. This also makes it possible to determine whether the particles originate from the surface coating (e.g. zinc or zinc/nickel) or from process contamination.

IR spectroscopy can also be used to analyse the composition of organic contaminants, which provides a basis for identifying and, if necessary, eliminating particle sources in the process chain.

To achieve targeted technical cleanliness, the focus must always be on the entire process chain, from screw production to suitable packaging. The last steps in this chain are ultra-fine cleaning and subsequent packaging. Since relative movement of the screws during subsequent transport can lead to abrasion, but customer requirements for technical cleanliness

naturally usually concern the delivered products, an abrasion- and impact-resistant type of packaging must be chosen. To meet these requirements, the screws are vacuum-packed in small quantities and packed with appropriate inserts. If the packaged screws arrive at the customer’s premises with an intact vacuum, it can be assumed that technical cleanliness has been maintained.

Cleaning – especially in the case of lubricated thread-forming screws – requires a well-balanced process. This is where there is a conflict between corrosion resistance and fastening properties on the one hand and cleanliness on the other. So, there must always be a balance between the maximum possible cleanliness requirements and the resulting applicability of the product.



Likewise, the preliminary processes have a strong influence on the effectiveness of the final cleaning of the screws. Too many transport, bulk and sorting processes can have a particularly negative effect on the adhesion of galvanic layers. The quality of the preliminary products also plays a decisive role.

In order to meet the increasingly demanding customer requirements, the entire process chain is therefore included in the evaluation of corresponding requests in order to determine whether certain demands can be reliably fulfilled by the process.

With the measuring technology available in the EJO CLEAN® laboratory, questions about technical cleanliness can be answered perfectly in accordance with the definitions given in the guidelines – without any room for interpretation of the terms. And perhaps this way, it will also be possible to see the descriptive character of the term “technical cleanliness” in a new light.



The future of solar energy

The first contact was made in 2018, when the newly founded start-up Solarge, based in the Netherlands, contacted EJOT in Bad Berleburg. They were looking for a technology that can be used to solve fastening challenges for solar modules made of lightweight sandwich structures.

>>Text: Andreas Wolf

The result is a prime example of successful cooperation between two partners. Starting with these fastening challenges, an intensive technical dialogue and many tests ultimately lead to a perfect, customized fastening solution for the customer.

Meanwhile, series production has started at Solarge. In May 2023, the young company opened its new factory in Weert in the province of Limburg. The capacity is up to 200,000 solar modules per year. The start-up's initial ideas date back to 2017. The three founders, Jan Vesseur (Chief Executive Officer), Huib van den Heuvel (Chief Commercial Officer), and Professor Gerard de Leede (Chief Technical Officer),

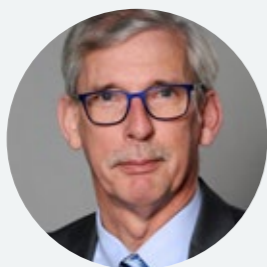
with a lot of experience in the construction and solar industry and the expertise of polymer supplier SABIC, pursued the idea of developing solar modules based on plastic composites (polymers) instead of glass. With success. Solarge currently employs 60 people.

“Our modules are more than 50 percent lighter than glass solar modules,” emphasizes Huib van den Heuvel. This has a significant impact on the use of solar energy: around 60 percent of industrial roofs in the Netherlands are not at all suitable for conventional solar technology because the solar modules are too heavy. “The weight-reduced alternative opens up new opportunities and also opens



3 QUESTIONS FOR

>> by Andreas Wolf



Niko Müller & Bernard van Spanje

Huib van den Heuvel

What are the special features of TSSD® technology?

TSSD® is an EJOT development that enables a secure fastening in lightweight materials such as sandwich materials. Thanks to a robust friction welding process, this technology can be used flexibly with a wide range of thermoplastic and thermoset composite materials. The installation process can be fully automated and is perfect for applications on the scale of Solarge. High quantities can be realized thanks to extremely short cycle times. Together with the direct screw fastening using EVO PT®, all the advantages of these EJOT products are used to their optimum.

Are there any joint projects?

A TSSD® variant and an EVO PT® are currently in series production at Solarge for assembly of solar panels to the corresponding substructures for mounting on roofs. The focus here is on roofs with low load capacity, where this solution can utilize its weight advantages.

What are the prospects for further collaboration?

We hope to be able to realize further projects together with the young and innovative company Solarge. Solarge, like EJOT, has products that make an important contribution to reducing CO₂ emissions.

Currently, a major problem is that subsidized solar cells from China are flooding the market, which are up to 50 percent cheaper than a product produced in Europe. Manufacturers in Europe are facing existential challenges. How do you assess the current situation?

Yes, we are very concerned that China is flooding the EU markets with its dumping practices. We are trying to explain to the political decision-makers in the EU that this must change. At the same time, we are also focusing on explaining the value and benefits of our products to our potential customers and business partners. With our modules, we can realize the use of solar energy more sustainably than with conventional panels from China.

Could the Net Zero Emissions Industry Act be the EU's answer?

Our lobby aims to introduce legislation in the EU that considers what is important to us: high-quality products manufactured in Europe for our own clean future. The avoidance of chemical waste and disposal of valuable materials, as well as the reduction of CO₂ emissions.

Instead of a linear economy, should the focus be on a circular economy?

Exactly, this needs to be focused on even more. The energy transition should also be seen as a material transition. We should no longer view polymers as waste; they have now become circular building materials that can also be produced from organic raw materials.



up new fields of applications beyond roof use,” emphasizes Huib van den Heuvel.

The polymer used by Solarge enables more environmentally friendly production because all components of the solar module can be recycled at the end of its service life and reused at the same application level. In addition, the polymer used does not contain PFAS, a chemical with negative effects on health

and the environment. “With our solar modules, there will be no waste in the future, whereas conventional glass modules are not designed for recycling because the toxic semi-metal anti-mony contained in the glass has to be disposed of,” explains Huib van den Heuvel.

When solving the fastening problem for the solar modules from Solarge, the focus was on the TSSD® technology (“thermal adhesive bonding boss”) at a very early stage of development, as Niko Müller, former TSSD® Project Manager at EJOT, explains. It became clear at an early stage that a customized solution based on TSSD® had to be developed to ensure reliable fastening in Solarge’s lightweight sandwich materials, adds Bernard van Spanje, Key Account Manager at EJOT. This is ultimately realized using TSSD® technology associated with an EVO PT® screw, continues Niko Müller. The EVO PT® screw is the latest generation of self-tapping screws in thermoplastic materials.

The compass at Solarge is clearly focused on growth: “We will continue to increase our production volume in the coming years,” announces Huib van den Heuvel. The company has defined a licence model for this, consisting of the product and manufacturing technology as well as the EJOT assembly technology. Solarge is currently expanding on the European market and is planning a branch in the USA. Enquiries are now coming in from numerous countries. A current major project in cooperation with the energy supplier ENGIE in Belgium is the world’s largest solar plant with approx. 4,600 fully recyclable solar modules from Solarge. **E**

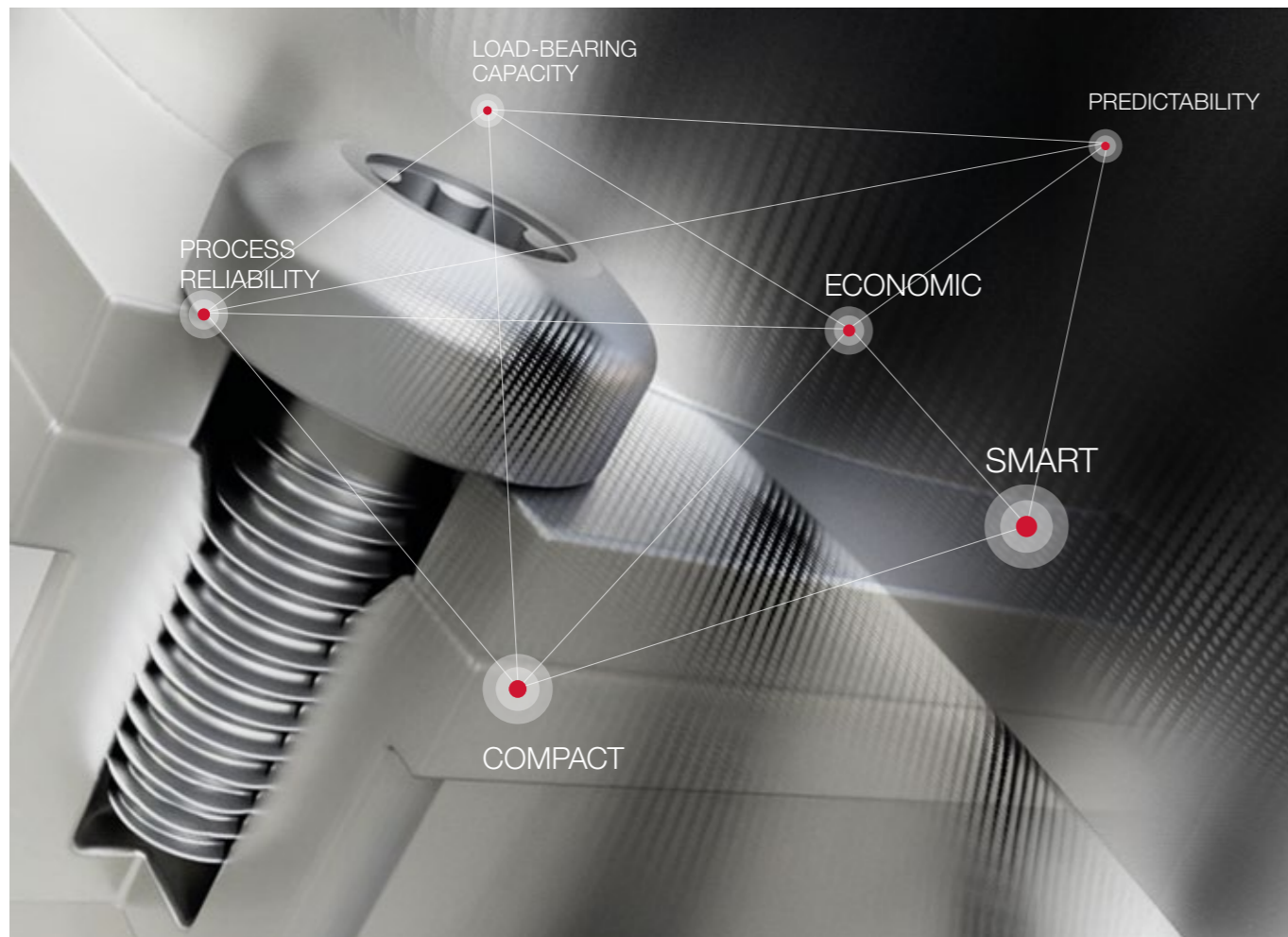


On the left, the EVO PT® screw and on the right, the TSSD® component

Optimised Cost Engineering with ALtracs® Xt

Product development is under increasing pressure to develop cost-effective products. With the usual approaches, higher costs often arise at the beginning of series production than were originally anticipated. Various scientific sources assume that 70 to 80 % of subsequent product costs are already determined at the design stage. Even the most favourable purchase prices cannot compensate for an unfavourable component design. Thus, cost-optimised product design plays an important role in the product development process.

>>Text: Christoph Sinner, Andreas Blecher



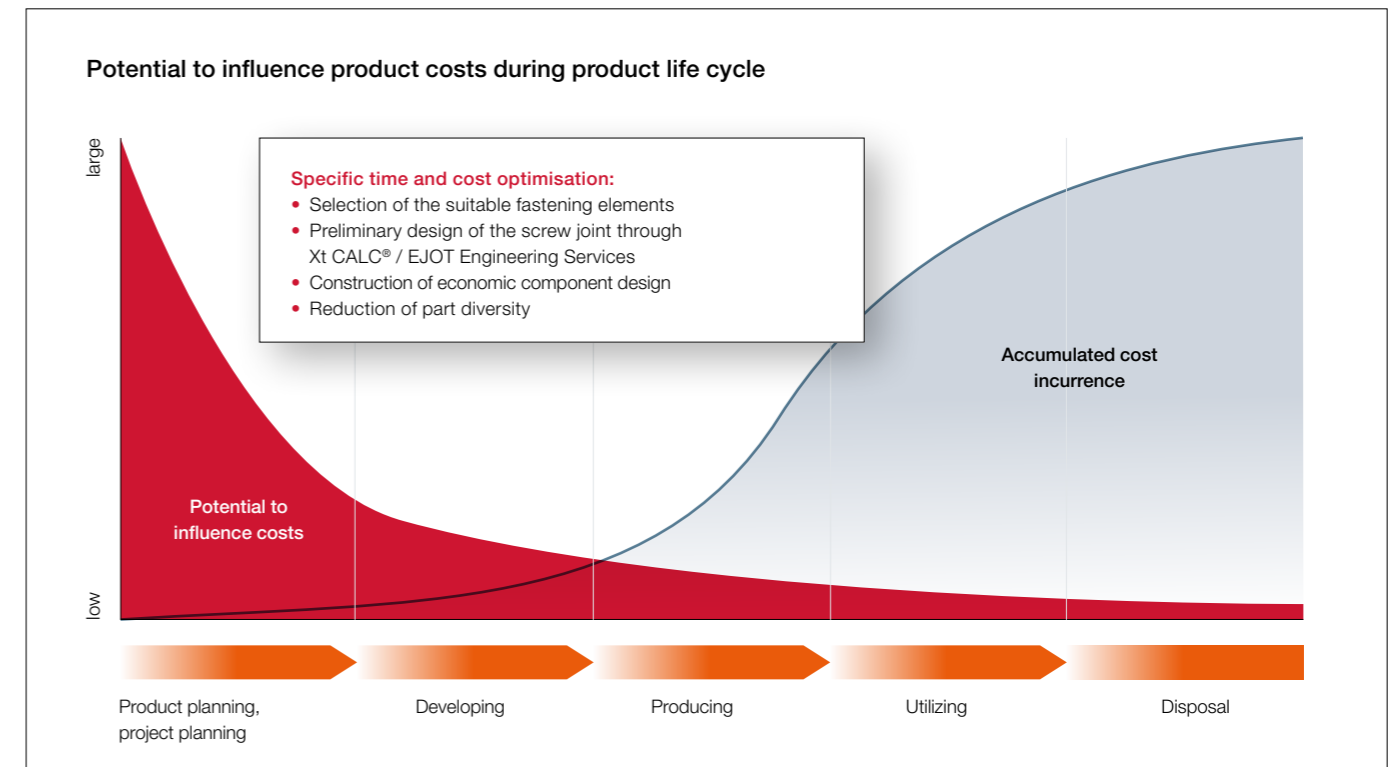
In this context, the keyword “design-to-cost” is often used. Design-to-cost is a collective term for different methods of realising a cost-optimised component design. Optimising the total costs, which include not only the purchase prices but also other dimensions such as process costs, logistics, etc., is a central goal here.

Reduction of process costs

In comparison to conventional screws, thread-forming screws generally offer a great potential for reducing the costs per screw

joint. Depending on the thread design, different processes can be left out on the way to the completely mounted screw joint. Thus, the processing steps of tapping and cleaning are not necessary when using a self-tapping screw.

The screws of the EJOT ALtracs® product family are also characterised by the fact that pre-drilling can be completely omitted. These screws can directly work in a – for a casting process typically conical – pre-hole. In this case, the process stability in the assembly is essentially dependent on the accuracy



or dimensional stability of the cast pre-hole. In the case of aluminium or magnesium die casting, this requirement for dimensional stability sometimes results in shorter tool life and increased inspection effort on the part of the foundry.

More cost-effective component design

Thanks to the optimised thread geometry, the new ALtracs® Xt achieves significantly greater process stability in the assembly process. Conversely, this means that the requirements for the accuracy of the castings can be reduced. Larger permissible tolerances on the diameter of the cast pre-hole and larger permissible draft angles enable a casting-friendly and thus more economical component design.

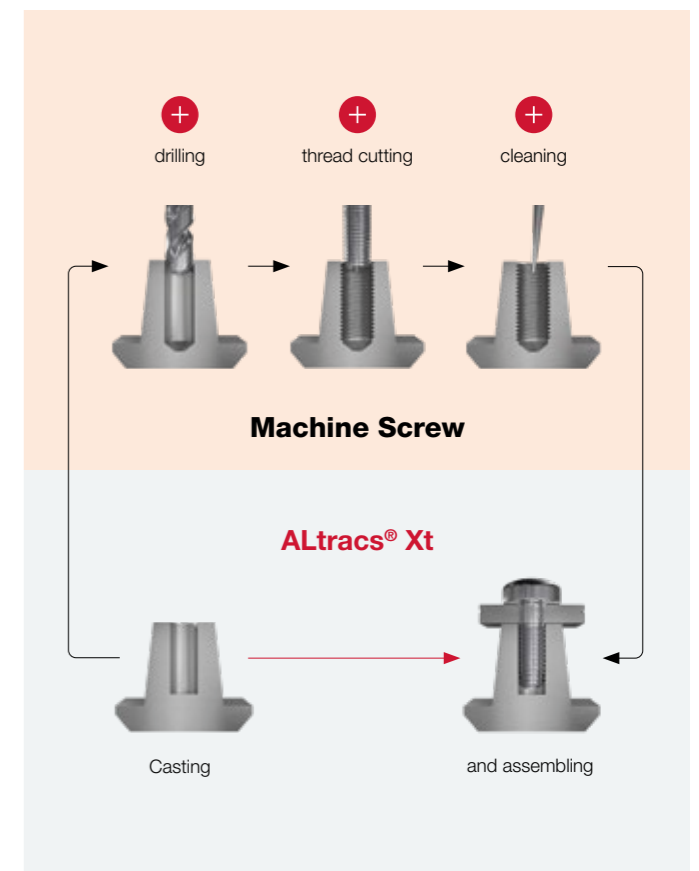
Shorter time to market

In addition, the specially developed ALtracs® Xt calculation programme Xt CALC® can be used to save valuable time and resources during the development phase. Xt CALC® enables the analytical pre-design of the thread forming fastening including all relevant process parameters (e.g. torques, clamp loads forces or failure mechanisms). Furthermore, EJOT offers customised engineering services as support in the development phase. The focus is on the influence of one or several fasteners on the complete component. Thus time- and cost-intensive component tests can be reduced to a minimum.

Reduction of logistics costs

With conventional screws, the torque for thread forming increases relatively strongly with increasing installation depth. Thanks to the optimised thread geometry of the ALtracs® Xt, the torque increases only slightly with additional installation depth. This makes it possible to screw different clamping part thicknesses with one screw dimension. Despite different installation depths, the process window remains stable and enables assembly with a uniform torque. Identical screw dimensions,

depending on the individual circumstances even across multiple components, ensure a reduction in the variety of parts. This results in cost savings through optimised production, logistics, warehousing, and quality processes, as well as positive quantity effects in procurement.



ALtracs® Xt: More cost-effective screw connections by eliminating additional work steps

EJOT EXPERT DAYS in Bad Berleburg

“April showers bring May flowers” – this was the motto for the EJOT EXPERT DAYS on the 14th and 15th of May. The new edition of the EJOT customer seminars, which have been established in the market for many years, provided design engineers and product developers with a broad spectrum of knowledge in two days in order to be prepared for future fastening challenges.

>>Text: Andreas Blecher

The venue of the EXPERT DAYS offered “great cinema” in the truest sense of the word: a former cinema, converted into an event location, that is the New CAPITOL in Bad Berleburg. It combines a multifunctional (cinema) hall with a modern hotel and a restaurant with upscale gastronomy – ideal conditions for a special seminar experience

The first day of the EXPERT DAYS also took place in the New CAPITOL cinema hall, which was dedicated to theoretical knowledge transfer. EJOT experts informed the participants about self-tapping fasteners into plastics and light metals, functional plastic parts, metal plastic components, precision cold-forming parts as well as calculation options for direct fastening and CAE services.

On the second day, “practice” was at the top of the agenda. Starting with a tour of the Herrenwiese plant, where visitors were able to immerse themselves in the world of fasteners at EJOT – with insights into the production of fasteners, the logistical processes and the EJOCLEAN® centre for techni-

cal cleanliness. The tour then continued to the Berghausen plant, which offered interesting live insights into the production of complex precision plastic parts.

One of the highlights of the event was certainly the subsequent workshop in the APPLITEC screwdriving laboratory. There the participants were able to find out first-hand about the latest fastening technologies and analysis methods and even take matters in their own hands at the various screwdriving and test benches.

The EJOT EXPERT DAYS impressively demonstrated what digital training formats are not capable of: Personal exchange, not only on fastening technology topics, direct trying out and testing in the APPLITEC, many impressions from the various production areas – all this cannot be experienced on a screen but rather at first hand.

In short: an all-round successful seminar package, not only from the participants' point of view. To be continued – next year!

E



Artificial intelligence – opportunity or threat

When asked if they had ever read or heard about artificial intelligence, 92 % of the 1,000 respondents in a Bitkom survey last year answered yes, seven percentage points more than in the previous year. Today, it is likely to be even more.

But what exactly do we mean by AI?

>>Text: Prof. Dr.-Ing. Marco Huber

Experts distinguish between the terms artificial intelligence (AI), machine learning (ML), artificial neural networks (ANN) and deep learning (DL). While AI generally describes the solving of problems that require human intelligence and represents a collection of different technologies, ML – currently the most important AI technology – is used to learn patterns in data. The most active field of research within ML is

artificial neural networks (ANN). These are connectionist models that are roughly modelled on the human brain. If these models consist of many layers of artificial neurons, the term used is deep learning (DL). This enables the efficient processing of complex information and precise predictions and decisions in a variety of applications. DL forms the basis of large language models (LLM) such as ChatGPT.



From the Turing Test to ChatGPT

It has been 75 years since the first chess computer was built, and we have come a long way since then, with the widespread use of internet-based programmes such as Siri and ChatGPT. However, the development has been exponential recently, and it won't be coming to an end anytime soon. We have long since integrated AI into our everyday lives with Siri, Alexa, facial recognition with smart mobile phone cameras, or ordinary translation programmes.



Photo: © Alamy

Whether artificial intelligence will ever truly match human intelligence has been the subject of heated debate for years. Although AI is superior to humans at highly specialised tasks, such as playing chess and certain image recognition tasks, humans are masters of a wide range of tasks and will therefore continue to score points for a long time to come thanks to their versatility.

Important or dangerous?

Due to its high financial potential, AI is of enormous importance in business and politics. According to a 2018 study by

the consulting firm McKinsey, AI is expected to contribute an additional 1.2 % annual increase in global GDP by 2030, significantly outpacing the growth effects of historical key technologies such as the steam engine, industrial robots, or information and communication technologies. The contribution to GDP by 2030 would therefore be around 13 trillion euros. For Germany, the additional GDP growth is estimated at almost half a trillion euros.

On the other hand, there are ethical and security-related issues. AI's preferences for a gender, skin colour or nationality led to unfair results. The "bias" strikes.

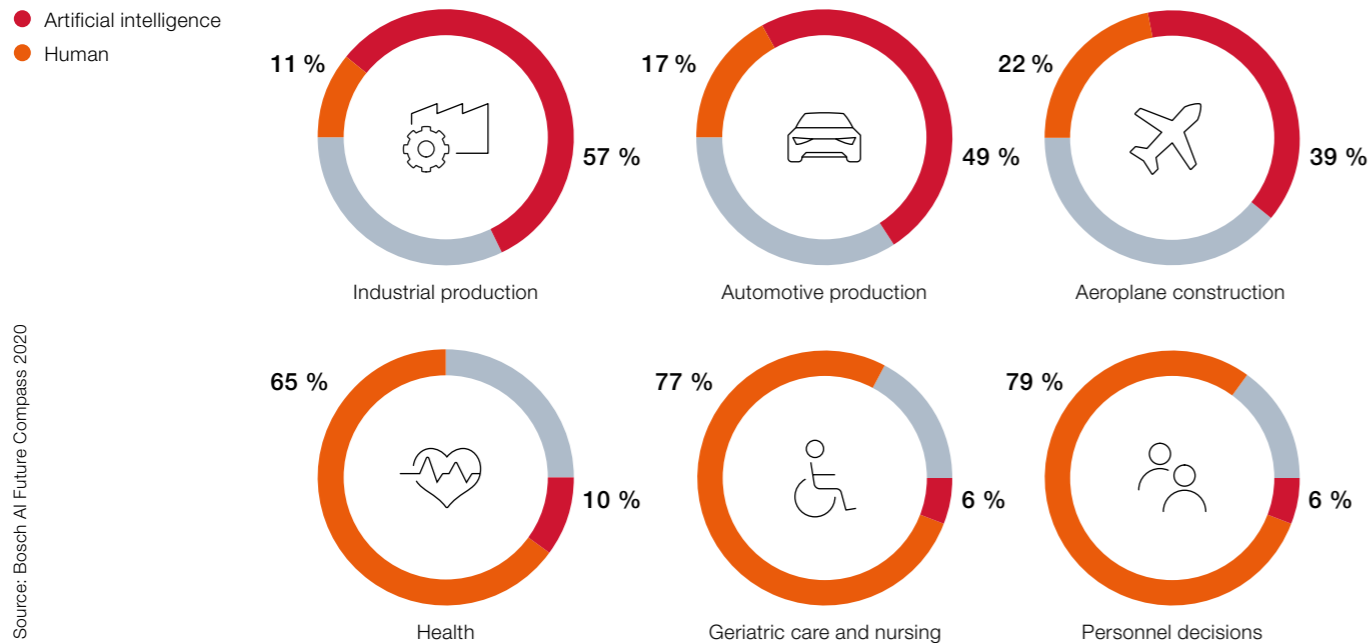
There are many positive reports about the medical application of AI. For example, in the evaluation of ultrasound or X-ray images. But there is also the other side of the coin: a broad scientific study on Corona from 2021 finds no AI model that would be suitable for clinical use because they have methodological weaknesses or are subject to bias.

AI is a relatively new field of application with a high need for regulation. The use of AI therefore had to be secured according to European standards. The EU's regulatory proposal, which was finalised after three years in 2024, divides AI into three risk classes using the traffic light principle:

- Behavioural manipulation, social scoring, and (to a limited extent) biometric identification are prohibited (red).
- A high risk (yellow) is posed, for example, by medical technology applications, the operation of critical infrastructure, and law enforcement.
- Everything else (green) is therefore subject to a low risk, although there may still be transparency obligations here.

Confidence in different application situations

(in percent)



Source: Bosch AI Future Compass 2020



Prof. Dr.-Ing. Marco Huber

... is the Scientific Director for Digitalisation and AI and Head of the Research Division for Artificial Intelligence and Machine Vision at the Fraunhofer Institute for Manufacturing Engineering and Automation IPA in Stuttgart. He is also the Head of the Department of Cognitive Production Systems at the University of Stuttgart's Institute for Industrial Manufacturing and Management (IFF) and its Deputy Director.

fits were greatest for consultants with below-average performance, although top consultants also benefited from ChatGPT. In the end, the intensive users of AI could eliminate themselves. However, it can at least be assumed that many white-collar jobs – i.e., knowledge-based occupations – will change significantly. Blue-collar jobs in trade, manufacturing, or nursing, on the other hand, are only marginally threatened by AI.

On the other hand, AI is generating a whole range of new jobs, such as that of the prompter engineer. This expert formulates the text input – the prompt – so precisely and comprehensively that the AI can provide the answer largely correctly and solve the task completely. However, since these systems currently tend to hallucinate – this is what the creative invention of answers that sound good but are factually incorrect is called – the AI will remain dependent on the intelligent, critical human being for the time being.

Can AI also do art?

Eight years ago, a computer-generated painting was auctioned at Christie's for half a million dollars. Does this mean that AI has now been given the accolade in the art world? Or is it true, as many experts claim, that there is no art without intention? Voice commands, the "prompts" mentioned above, are used to create literature, music, images, and films that are sometimes better than human-made works. But AI is always unintentional information processing; computers have no will and therefore cannot produce art, according to the purists.

No sign of true intelligence

So, what is still missing for a truly intelligent AI? What are the problems? Even though LLMs can generate texts that appear to be made by humans, the so-called "stochastic parrots" are not able to understand the meaning of what is being said. Language models merely repeat the content of the data with which they were trained, and even add some fuzziness (randomness) "stochastically".

Furthermore, AI models lack a general reference to the world, which is clearly different from human intelligence. Machines, including computers on the internet, do not have an overarching model of the world that they can access. The internet is at best a tiny part of the world.

And then there is the problem of consciousness. There is no consciousness in machines. Large language models do not show so-called "emergent" behaviour. The principle of emergent systems such as consciousness or swarm behaviour has not yet been explained. And finally: AI is only capable of generalisation to a limited extent. Thus, it is very dependent on the data used.

Whether we like it or not, AI is here to stay. It will probably take a long time before we achieve so-called strong AI, which is truly on a par with humans. However, in a few special applications, so-called weak AI is already significantly more efficient than humans. This provides us with a powerful tool that particularly facilitates routine tasks. Ultimately, it is up to us how we design AI and use it to our advantage.

Man or machine, who is trusted?

The gradual realisation that humans are imperfect, which has emerged through science – I also call this "insult" – has a centuries-old tradition. After the cosmological shock of the Copernican revolution (the Earth is not the centre of the universe), the biological shock of Darwin (humans descend from apes), and the psychological shock of Freud (we are driven by instincts), we now seem to be entering a fourth period of human profanation, namely through AI. In industrial production, he already sees himself in the weaker position today. However, he does not yet trust AI when it comes to dealing with people, for example in nursing or in personnel decisions. A matter of time?

AI mainly affects well-paid jobs

The higher the salary, the greater the influence of AI on the job. How can that be? The tool that is probably most frequently used with AI at the moment, ChatGPT, consists of – unsurprisingly – the final exam of the MBA programme at the Wharton School, the law exam at the University of Minnesota Law School, and the admission test for American doctors – but it only managed a grade of 2.0 for the Bavarian school-leaving certificate. A Harvard Business School study shows that consultants at all qualification levels at the Boston Consulting Group benefited significantly from the AI addition. The bene-



Flowers and bees instead of concrete

This was the slogan used by the Bundesverband GebäudeGrün (BUGG) to promote green roofs and façades as part of a campaign week.

>>Text: Andreas Wolf

What sounds rather cute with bees and flowers has a serious background. Hot days, tropical nights and heatwaves have a considerable impact on the quality of life in cities. Above all, they are a serious health risk.

Greening is one of various measures to alleviate heat in cities. Green roofs and balconies, green façades and water sources have a cooling effect. Evaporated water lowers the ambient temperature. Plants support this effect by allowing water to evaporate through their leaves. Trees and green spaces provide shade and purify the air. Materials such as concrete, glass or metal store heat. Cities therefore cool down much more slowly at night. The stored heat rises in the evening and ensures high temperatures.

Green houses and streets are not only beautiful to look at, but also make an important contribution to heat protection and improving our quality of life. "If people really knew how many ways a square metre of green can improve their lives, then all houses would be green," says Dr. Gunter Mann, President of the German federal association GebäudeGrün. Green buildings improve air quality, act

as natural air conditioning systems, store rainwater and protect against flooding. Bees and other insects are also happy, as greenery helps to preserve biodiversity by creating new habitats.

But greening buildings not only makes ecological sense, but it is also economically attractive, both for owners and for cities. This is because green roofs and façades protect the building envelope from the weather, extend its service life and thus reduce maintenance costs. They also improve the living environment and thus increase the attractiveness of entire urban neighbourhoods.

A new urban neighbourhood called "Die Welle Köln" is currently being built in the Marienburg district of Cologne (see interview), in the implementation by EMPIRA Asset Management GmbH Cologne and MBN GmbH as general contractor. The greening of façades also plays an important role in the sustainability concept. The EJOT Iso-Bar ECO is used here, a system that is used specifically for fastening of greening systems on façades with thermal insulation (ETICS). The focus here is not only on secure fastening, but also, on thermal bridge-optimised anchoring in the substrate. The glass fibre reinforced plastic of the Iso-Bar ECO enables a

minimal thermal bridge effect. Unnecessary heat loss can thus be avoided. The reliable seal protects against penetrating moisture. It is anchored using injection mortar and can be installed in concrete, solid and perforated bricks and autoclaved aerated concrete and can support high loads.

This fastening system was honoured with the "German Innovation Award" in 2022 for its outstanding product properties. The laudation states, among other things: "The Iso-Bar ECO is the first approved system on the market that takes into account the special challenges of ETICS."

EJOT's products offer potential for the conversion to climate-friendly, new technologies in building insulation, the use of renewable energies and their secure fastening.



The EJOT Iso-Bar ECO, a system that is specially designed for fixing greening systems to façades with thermal insulation (WDVS)

3 QUESTIONS FOR

>> by Andreas Wolf

Dominik Landis, Project Developer
EMPIRA Asset Management GmbH
Cologne

With your "Die Welle Köln" construction project in Cologne-Marienburg, you are creating urgently needed living space in Cologne's urban area and also as well as fulfilling the latest ecological and economic requirements with this new neighbourhood. Can you give us some key data on the project?

The Marienburg district in the southern part of Cologne was once home to the Deutsche Welle broadcasting centre. The striking building, which was constructed between 1974 and 1980, served as the headquarters of the German international broadcaster "Deutsche Welle" (DW) for many years. After the broadcaster moved to Bonn in 2003, the building remained unused for a long time. The former Funkhaus district in Cologne will be called "Die Welle Köln". This name was chosen to emphasise the historical connection to "Deutsche Welle" and its former headquarters in the Funkhaus. The development of the area is one of the most significant neighbourhood developments in Cologne this decade. It offers a unique opportunity to redevelop the wasteland and revitalise it with new functions. On a plot area of approx. 5 ha, 752 residential units, commercial space, gastronomic facilities and a day care centre for children will be built.

The ecological aspect is inextricably linked with modern architecture. What is planned in this area?

The district will implement an energy-efficient supply and building concept with a KfW40 NH standard. Compared to conventional new buildings, only about 40 per cent of the energy is required here. Photovoltaic systems with a

tenant electricity model will be installed on the roofs of the buildings. The heat supply will be provided by district heating, which has a low primary energy factor and is therefore very sensible from a sustainability point of view. Green spaces and open spaces are further important aspects of these green courtyards. Not only do they serve to enhance the quality of life for residents, but also provide retention areas during heavy rainfall to prevent flooding. In addition, three green garden courtyards are being created, including an orchard, a forest garden and a city square, as well as an urban gardening area to grow fruits and vegetables. These green oases serve as meeting places and communal areas as well as creating living spaces for insects and other living organisms.

People in large cities in the Rhineland are also confronted with high temperatures in the summer months. Intelligent greening of residential neighbourhoods has been proven to help reduce heat stress in cities. What have you planned in terms of greenery in the new residential neighbourhood?

Extensive, and in some cases even intensive, green roofs are being installed to improve the urban climate and promote biodiversity. In addition, 10 per cent of the facade surfaces are covered with climbing plants to provide shade for the neighbourhood, and particularly the façades. And, thus reducing heat stress in the entire neighbourhood when temperatures are high. The numerous new tree plantings and the many planned green spaces will also help to achieve this.

70 million square metres in need of refurbishment

By 2050, buildings in Germany are to become almost climate-neutral. The German government has set itself this goal as part of the energy transition. “The measures required to achieve this have been known for decades, but there is still a lack of implementation,” criticises the Federal Environment Agency in Berlin.

>>Text: Andreas Wolf

The operation of buildings in Germany accounts for around 35 per cent of final energy consumption and around 30 per cent of CO₂ emissions. Time is therefore pressing, as even motivated action means a decades-long transformation for the building stock.

each year to achieve a climate-neutral building stock by the middle of the century. The German Economic Institute calculates a rate of two per cent. In terms of figures, this would mean that all buildings in Germany would have been refurbished in around 50 years.

In 2022 the refurbishment rate was 0.88 per cent and in 2023 around 0.7 per cent. The Federal Ministry for Economic Affairs reaches a significantly higher figure of 1.9 per cent of residential buildings in Germany that would need to be refurbished

“We run the risk of not achieving our climate and efficiency goals,” emphasises Andreas Holm, Head of the Research Institute for Thermal Insulation (FIW) in Munich. According to the FIW, 270,000 residential units (apartments/single-family



homes) will have had their building envelopes refurbished in 2023. In order to achieve the goals, set by the German government, around 460,000 residential units would have to be refurbished in the coming year; by 2030, as many as 730,000, according to the FIW.

The Association for Insulation Systems, Plaster and Mortar (VDPM) quotes another figure that illustrates the considerable need for refurbishment even more clearly: around 70 million square metres of energy-efficient modernisation are required in existing residential buildings every year. The VDPM and FIW prefer to use the much more meaningful absolute figures of modernised residential units or building floor areas in square metres to quantify the annual energy modernisation measures carried out on buildings instead of the usual renovation rate in percent.

The refurbishment rate has been used for decades as an indicator of the upgrading of existing buildings, particularly in terms of energy modernisation. The need to significantly increase this figure to achieve political and ecological objectives has long been a topic of public debate. This applies both nationally and internationally. The European Union’s (EU) “Renovation Wave” aims to at least double the renovation rate over the next ten years.

The refurbishment rate is a ratio of the components, buildings, flats or living space modernised in a specified period to the respective total number.

According to the VDPM and FIW, the percentage figure calculated in this way and communicated everywhere is imprecise in parts. New construction in Germany is currently outstripping




demolition, which means that the building stock is growing. If the number of buildings refurbished each year remains the same, the refurbishment rate will fall. This effect also occurs if the usable floor space is chosen as the reference value instead of the number of buildings.

The forthcoming EU Energy Performance of Buildings Directive (EPBD) will in the future require member states to draw up an annual national building refurbishment plan. It contains information on the absolute number of modernised buildings or residential units and the total modernised building area. These figures should also apply in Germany in the future.

In a recent study commissioned by the Federal Ministry of Economics and Climate Protection (BMWK), FIW calculated the following annual target values on this basis in relation to the total number of residential units and the usable building area.

As the refurbishment status of façades is especially worse than that of other building components, the square metres of modernised external wall surfaces should also be shown as an indicator. This would require around 70 million square metres per year in the residential building stock alone, which corresponds to 750,000 to 800,000 residential units. Currently, not even half of this is being realised in Germany. This means that there is still a huge gap in energy modernisation regarding the achievement of the German government’s climate goals. If climate goals are to be achieved, then this can only be done via the “building stock” lever.

Study by the Research Institute for Thermal Insulation (FIW)

Type of building	Amount of living units in 1,000		Floor space in million m ²	
	2022	Aim	2022	Aim
 Single- and two-family houses	145	250–350	250	600
 Multi-family houses up to 6 living units	160	300–400	140	300
 Bigger multi-family houses	35	75–100	40	100

Protect the climate with bionero.

The start-up bionero stands for change: “We have to be willing to leave old habits behind us in order to create a future of which we can be proud.” With a clear goal in mind, the start-up, based in Thurnau in Upper Franconia, develops solutions for the sustainable use of organic materials.

>>Text: Andreas Wolf

Not only is a product developed and sold, but something is also being done about climate change. Courage, a strong team that sticks together even in times of crisis, and entrepreneurial foresight characterise the success story of bionero.

Founded in 2018, the family-owned company is pursuing three successful business models based on pyrolysis technology: the production of vegetable carbon, which is used to create a particularly fertile black earth called Terra Preta according to a special recipe. The binding of carbon and the generation of sustainable energy. Bionero's partner is the EJOT Group,

which will use the start-up's technical expertise in the field of sustainable energy.

The starting point for bionero's success story is a rather simple question: “How do we dispose of our horse manure?” This was the question facing the Saßmannshausen family, who run a horse pension in 2016. A few years earlier, the family had bought an old farm with around 11 hectares of land and converted it into a horse pension, which Anja Saßmannshausen runs together with her daughter Paula. When the German Fertiliser Ordinance was tightened in 2016, the 11 hectares of land suitable for spreading horse manure were no longer sufficient.



It is difficult to acquire land at short notice, and reducing the boarding business is not an option either. So how can the problem at the manure disposal site be solved?

The answer is provided by Aaron, the then 17-year-old son of Anja and Uwe Saßmannshausen: “I’m setting up a company because I want to produce biochar. I will refine this biochar into Terra Preta.” This is a fertile, black soil, similar to that found in the Amazon basin. This soil saves water and fertiliser, yet still ensures healthy plants, beautiful flowers, and high yields in the vegetable patch. “That’s how Aaron revealed his career plans to us over dinner that evening,” says his father Uwe, who at the time was in the process of retiring from the management consultancy he had founded. As a teenager, Aaron had been

intensively involved with science, agriculture, and technology. Biochar? Terra Preta? “As a lawyer, I had never heard of any of this,” says Uwe Saßmannshausen. He makes an agreement with his son Aaron: “You finish your A-levels and provide us with information on the subject. And if we find even a single justification to start a joint project, then we will do so.” Intensive research shows that neither industry nor trade deal with the topic of biochar or Terra Preta. In science, on the other hand, the topic is well known but without a business approach.

The project is picking up speed. In 2018, bionero was founded. Lennart, Aaron's brother, has also graduated from high school and is joining the company. He is responsible for “Sales & Business Development”. Father Uwe and sons Aaron and Lennart



get started and invest in land, machinery, and equipment. They began production in autumn 2018, followed by entry into the retail business in 2019. Paula Saßmannshausen, who began her training as a businesswoman specialising in e-commerce four years ago at the age of 16, completes the family business.

The three founders obtain external expert support from an advisory board: First and foremost, Professor Dr. Bruno Glaser, one of the world's most recognised experts on the subject of biochar and Terra Preta, Manfred Nüssel, Honorary Chairman of the Supervisory Board of BayWa AG and long-standing President of the German Raiffeisen Association, Prof. Dr. Stefan Leible, President of the University of Bayreuth, as well as Herbert Seuling, auditor and tax consultant and member of the supervisory board of FlatexDEGIRO AG.

A start has been made, but it is a very complex one. Because at this point, there are a lot of unresolved issues for the three founders. "Every little stone we pick up together turns out to be a complex bouquet," is how Uwe Saßmannshausen describes the situation at the time. And many stones are carefully



The founders: Aron, Uwe and Lennart Saßmannshausen (from left)

put back down again for the time being. How do you produce biochar? How do you produce merchandise? How do you get it ready for shipment? There are many questions and new topics to be dealt with. The young company's first contact with the trade was through BayWa AG to the Hellweg Group in Dortmund. There, bionero is able to serve 155 retail outlets in Germany and Austria. Not with its own range, but with an item supplied under a private label of the Hellweg Group.

"We entered competitions to raise our profile in the trade," explains Lennart Saßmannshausen. With success. In addition to being nominated for the German Sustainability Award in 2021, bionero will receive the "Taspo Award" in 2022, the Oscar of the green industry (see info box).

The coronavirus crisis does not initially have any negative impact because DIY and garden stores are considered essential during the first lockdown and are allowed to open. However, the next lockdown from December 2020 to June 2021 also affects DIY and garden stores. "We had just about established ourselves in the trade," recalls Lennart Saßmannshausen. "At that point, our business was basically dead." Give up? Not an option. The start-up company used the time to develop a full Terra Preta range of products, from organic potting soil and organic potting soil for tomatoes to organic raised bed soil and organic turf soil, as well as to set up sales structures and a field sales force. The credo is: a crisis is always also an opportunity.

"We are currently well positioned with our range. We are no longer the stepchild with an item in the furthest corner but are instead clearly represented with our products in the most important DIY stores," explains Uwe Saßmannshausen. This is an extremely challenging task: getting a product onto a retail floor is one thing, but keeping it there permanently is quite another. The decisive factors here are the size of the area, sales, and time: "The product has to sell quickly, otherwise the article's performance is immediately called into question," emphasises Uwe Saßmannshausen.

Prizes/awards

In 2020, the start-up bionero was honoured with the BHB Branchen Award by the German DIY association (BHB): as a finalist in the "Best of Eco" category and as the winner in the special category "Entrepreneurship & Pioneering Spirit". In the laudatory speech by the jury chairman, Prof. Dr. Roland Mattmüller, it was stated, among other things, that "A convincing, innovative product as the result of a bio-economic business idea is actually worthy of an award in itself, but the jury was even more impressed by the courage and entrepreneurial passion involved in not only finding a gap in a market that is already more than saturated, but really wanting to make a difference and achieve lasting change for people and the environment."

The start-up bionero also won the "Oscars of the green industry", the Taspo Award. In 2022, it was named the best company in the "Environment and Sustainability" category. One year later, bionero was a finalist in the "Best Analogue Marketing Measure" category with its special BVB range.

Aaron Saßmannshausen's original business idea included other aspects that have been increasingly coming to the attention of the public in recent years. During the production process of biochar from biomass such as wood chips, carbon is actively removed from the atmosphere. The carbon is fixed in the biochar during the pyrolysis process and does not return to the atmosphere as carbon dioxide (CO₂). "We actively remove CO₂ from the atmosphere with the pyrolysis process," emphasises Aaron Saßmannshausen. To be able to measure the CO₂ balance accurately, bionero will be the first company in Germany to be certified as a real carbon sink as early as December 2021. "We know exactly how much more CO₂ we remove from the atmosphere than we emit, down to the kilogram, including logistics and freight." As a result, bionero has established a "carbon removal certificate." The sale of these certificates guarantees that CO₂ has already been removed from the atmosphere; the carbon sink already exists. This is different from potential certificates, which aim to bind CO₂ in the future.

The pyrolysis technique used by bionero has another sustainable effect: at the end of the continuous process, there is excess energy that can be used in almost any form and is permanently available. "Our reactor in Thurnau has well over 8,000 operating hours a year and consumes no energy after reaching operating temperature." The plan is to establish new bionero sites in decentralised locations. Suitable locations for this are those that have a surplus of biomass and are interested in a disposal option or are looking for access to biochar (high-tech agriculture). The second segment concerns locations that want to convert their energy supply from fossil fuels to renewable energy by using waste heat (high-tech industry).

Bionero sees great potential in both segments, which has been emphatically confirmed in a feasibility study for the German state of Bavaria. "In Bavaria alone, a high three-digit number of locations is conceivable," explains Uwe Saßmannshausen. At the Thurnau location, 8,000 tons of CO₂ are currently removed

Black-Yellow

In cooperation with the Bundesliga football club Borussia Dortmund, the entrepreneurial Saßmannshausen family has developed a special range of their climate-friendly Terra Preta products. The joint motto is: "Black Earth in the yellow jersey – make your garden fit for the premier league." Managing Director Aaron Saßmannshausen emphasises: "We are very happy about the cooperation with BVB. A prestigious partner like this makes our brand more well-known and conveys the idea of sustainability that we represent with our products." The small village of Berghausen also plays a role in this cooperation. Managing Director Uwe Saßmannshausen grew up in Berghausen with BVB legend and stadium announcer Norbert "Nobby" Dickel. "We have always stayed in touch," says bionero managing director Uwe Saßmannshausen.



Willi Droste, groundsman at Signal-Iduna-Park, and stadium announcer "Nobby" Dickel (right).

from the atmosphere every year using pyrolysis technology. The business plan envisages increasing this value to approx. 1 million tons of CO₂ per year at a further 100 locations.

One of the first decentralised locations will be built by bionero on EJOT's Herrenwiese premises in Bad Berleburg. Planning is already underway. "With the process heat from the bionero plant, we can significantly reduce our gas consumption at the Herrenwiese site," emphasises Heiko Stötzel, Director of Global Corporate Responsibility at EJOT. According to the current planning status, the plant is scheduled to go into operation in 2026. EJOT CEO Christian Kocherscheidt is pleased about the cooperation with bionero: "Both companies, EJOT and bionero, pursue a clearly defined sustainability strategy."

Uwe Saßmannshausen is particularly pleased about the cooperation with EJOT: He grew up in the small village of Berghausen near Bad Berleburg before moving to Bayreuth 40 years ago to study law. It was also in Berghausen that Adolf Böhl founded the company of the same name in 1922, which was incorporated into the EJOT Group in the 1960s. As a teenager, Uwe Saßmannshausen worked at EJOT during the holidays; his father was a locksmith at EJOT in Berghausen. Uwe Saßmannshausen: "Regardless of the business, this also has a very emotional side for me." E



? WHEN ASKED,



Prof. Dr. habil. rer. nat. Bruno Glaser, Professor of Soil Biogeochemistry at the Martin Luther University Halle-Wittenberg

>> by Andreas Wolf

Prof. Dr. Glaser, could you explain to us what the black soil in the Amazon region is all about?

The black soil in the Amazon region, also known as Terra Preta, is an exceptionally fertile soil that has been created over centuries by the indigenous peoples of the Amazon. What makes this soil so special is its high content of biochar, mixed with organic waste such as bones, ash, dung, and food scraps. In contrast to the surrounding soils, which are often nutrient-poor and infertile, Terra Preta can remain fertile for centuries. A fascinating aspect is that the biochar contained in Terra Preta binds nutrients and stores water, which promotes plant growth. The biochar does not decompose but remains stable and provides long-term improvement in soil quality and carbon storage in the soil. Terra Preta is therefore a remarkable example of sustainable land use and could still offer many answers to the challenges of modern agriculture today, especially when it comes to sustainable soil improvement and CO₂ removal.

What is the effect of this special soil?

The effects of Terra Preta are impressive and diverse, especially because they go far beyond what would be expected from normal soils. Here are some of the most important ones: High fertility: Terra Preta is extremely rich in nutrients, which promote plant growth. This is mainly due to the biochar, which stores nutrients such as phosphorus, nitrogen, and potassium and releases them slowly to the plants. This ensures permanently fertile soils, unlike many other tropical soils, which are quickly depleted. Water storage: The biochar has a porous structure that can absorb and store large amounts of water. This ensures that plants remain well supplied even during drier periods, making the soil more resilient to drought. Soil structure: Terra Preta improves the structure of the soil by making it looser and more permeable.

This facilitates root growth and improves soil aeration. Microorganisms and soil animals such as earthworms thrive in this environment, which in turn promotes soil health. Carbon storage: A major advantage of Terra Preta, which is particularly interesting today, is its ability to store carbon in the soil over the long term. The biochar does not decompose like organic matter but remains stable in the soil for centuries. This is how Terra Preta can make an important contribution to climate protection, as carbon is removed from the atmosphere and fixed in the soil. Reduction of nutrient losses: In typical tropical soils, nutrients are often washed out by heavy rainfall. In Terra Preta, however, the nutrients remain in the soil longer because the biochar acts like a sponge. As a result, fewer nutrients are lost, and the plants can be supplied more efficiently. In summary, this means that Terra Preta improves soil fertility, stores water and nutrients, protects the soil from erosion and leaching, and even helps to bind CO₂. These effects make Terra Preta particularly interesting for modern, sustainable agricultural practices.

How did the contact with the start-up bionero come about?

The contact with bionero came about in a rather interesting and personal way. Even before the company was officially founded, the Saßmannshausen family approached me and

asked me if I would like to be a member of the scientific advisory board for the start-up. Of course, I found this exciting because they deal with biochar and sustainable agriculture – topics that are very close to my heart. The funny thing is that it turned out that I live in the neighbouring village. So, it wasn't just a perfect professional match but also a very practical connection geographically.

How are you using your scientific expertise to support bionero in the production of Terra Preta?

I support bionero in a number of ways with my scientific expertise. An important part of my work is helping to develop recipes for Terra Preta soils. I contribute my knowledge of the optimal composition of biochar and organic materials to create a soil that is as fertile and sustainable as possible. In addition, I supervise test plantings to ensure that the soils developed achieve the desired effects in practice, i.e., promote plant growth and improve the soil in the long term. I also use my scientific network to help bionero gain access to relevant research results and potential partners. This way, we can work together to further optimise the production of Terra Preta and promote its use in modern agriculture.

How do you rate the young company's potential?

Bionero's potential is very promising, especially with its combination of pyrolysis of biomass for CO₂ removal and the production of Terra Preta. This sustainable soil, which consists of biochar and organic materials, offers an excellent opportunity to improve soils in the long term while permanently storing carbon. Furthermore, the market for environmentally friendly soils that do not use peat is extremely important. Many companies and gardeners are urgently seeking alternatives to peat, as its extraction is harmful to the environment. Bionero offers a solution here that not only protects the environment but also contributes to energy production, thus deriving a dual benefit from biomass. Overall, bionero is well positioned to play a leading role in this growing market for sustainable products and to help combat climate change.

The New CAPITOL Cultural centre in Bad Berleburg

The concept is a success. The combination of cinema, restaurant and hotel under one roof is attracting more and more guests to the New CAPITOL in Bad Berleburg. There is probably no other comparable establishment in Germany offering such a standard of service. The Kocherscheidt family, who are investors, acquired the cinema, which closed in 2020, and spent several years in renovating and expanding it.

>>Text: Andreas Wolf

The architecture of the new building, designed by the architectural firm "pwpMAS Architekten PartG mbB" (Darmstadt), with its beautiful forecourt, is an important urban development enrichment for the cityscape of Bad Berleburg. The citizens of the region can once again regularly go to the cinema or enjoy a wide variety of food and drinks in the restaurant – this too is an enrichment for the region. People from outside the area appreciate the special ambience of the hotel.

One year after the opening of the restaurant, hotel and cinema, the New CAPITOL is increasingly becoming a cultural centre in

the region. Grabbing a bite to eat before going to the cinema or having a drink after the show. If you reserve the restaurant for a party, you can also rent the cinema to show a film or turn the large hall into a dance floor. The seating can be flexibly removed.

In the restaurant, head chef Norman Pontzen has already created the fourth completely new menu this year with the autumn menu. Organic meat, game from the Wittgenstein forests, seasonal vegetables, light and refined – and of course with offers for vegetarians and vegans. The culinary calendar, which lists special events in the restaurant, enriches the culinary offering:

from pub nights to truffle days in autumn and goose dinners on St. Martin's Day. The new edition of the culinary calendar will be published at the beginning of next year.

A varied film guide

Cinema fans are delighted with the interesting and varied film programme that Kai Winterhoff has on offer. "For a small town like Bad Berleburg, the variety is fantastic," says one connoisseur. Not only the blockbusters, but also films from the "arthouse series", which are not necessarily among the bestsellers but are all the more valuable for it. When asked whether cinema is even worth it in times of streaming services, Winterhoff has a clear answer: "Cinema offers a completely different experience."

You can fully immerse yourself in the film and enjoy the outstanding sound and the big screen – something that Netflix simply can't offer," says Winterhoff, who also runs the Residenz cinema in neighbouring Bad Laasphe. Kai Winterhoff finds films with outstanding stories or based on true events



Seasonal cuisine, artfully prepared, a small work of art on a plate

particularly moving. "I like it when you can feel that a film does something to you." He always watches the latest national releases and makes sure that there are always interesting films showing in the cinemas in Wittgenstein.

The first cultural events in the cinema's theatre hall, which is equipped with modern lighting and sound technology, have also been a success. The hall was sold out for the children's concert of the 51st International Music Festival Week, the guest performance by the Zucchini Sistaz, who delighted the audience with their lush 1920s swing, the reading with best-selling author Anne Stern and the performance by the brass quintet of the Philharmonie Südwestfalen. The next event is the reading with Horst Lichter, TV chef, cabaret artist, author and presenter, on Thursday, 12th December. Horst Lichter will be presenting his new book "Zeit für Freundschaft?!".

Accessibility plays an important role in the overall concept. All areas of the New CAPITOL are easily accessible for people with disabilities. This also applies to the car park, which is located directly behind the building.

The car park also has charging stations for electric vehicles. And anyone who needs to recharge their batteries after a bike ride with an e-bike can "fill up" their bike at a charging station in front of the building.



The Brass Quintet of the Philharmonie Südwestfalen

The new book by Horst Lichter



Further information about the Neues CAPITOL is available at www.capitol-blb.de



Trainees maintain the EJOT company forest

On this October morning, the last wafts of mist rise from the valley towards Albrechtsplatz. It is mild and windy. The ground is relatively dry. These are the best conditions for a work assignment in the 3.2-hectare reforestation area.

>>Text: Andreas Wolf

EJOT founded the TREEATHLON® project for its 100th anniversary in 2022. On a fenced area of 3.2 hectares, employees had planted approx. 6,000 seedlings. Plant varieties such as red oak, sycamore maple, European larch, coastal grand fir and Douglas fir for a mixed forest that is as climate-resistant as possible. The project partner is the Wittgenstein Berleburg'sche Rentkammer, which is responsible for the technical supervision of the project with its forestry experts.

Trainees and trainers from EJOT and the Berleburg'sche Rentkammer will also meet this autumn to check on the plants. Equipped with forestry tools, the logo area in the northern part of the site is being "tidied up". In the summer of 2022, around 600 red oaks were planted in this area, which is approximately 60 x 30 metres in size and marked out in the shape of the

EJOT logo. "In about two to three years, the red oaks will be established enough to make the logo recognisable from the air," says master forester Achim Fischer, who is in charge of the work assignment. The red oaks are in a good state of development, Fischer continues. Using a heppebillhook, a forestry tool with a sickle-shaped curved blade, the trainees cut away the vegetation around the red oaks. These are usually rampant blackberry bushes or wavy hair grass, a wild grass. The area is mowed with a high grass mower.

Another group is taking care of the route along the fence. Here, willow and hazel shrubs are proliferating at the edge of the planting and pushing against the fence. Covered with snow, the weight could become too much for the fence in winter. So, with a cordless chainsaw, he and Heppe billhook are cutting a path of about 40 centimetres along the fence is being cut.



A path along the fence is cleared using a cordless hedge trimmer and a billhook.

Speaking of the fence: it will protect the young plants from deer for a few years yet. "Without the fence, the deer would have eaten everything by now," Fischer emphasises. Areas where tree species have been changed tend to attract wild animals.

The exception is wild boars, which have already roamed the afforestation area at Albrechtsplatz, as the tracks clearly show. "In some places they have entered the brambleslain down in the blackberry bushes," reports Achim Fischer. In some places, the wild boars have lifted the wire mesh fence and worked their way through at the bottom. "At these points, we will seal the fence to prevent further damage and to make it more difficult for red deer to pass through. Instead, two boar gates will be installed so that wild boars can get in and out unhindered. The wild boars leave the plants alone," says Achim Fischer.

The Douglas firs, coastal pinesgrand fir and larches, which have already grown into small trees after two and a half years, are also in good condition. The same applies to the dog roses that were planted at the northern "forest edge" of the area. Numerous insect species live on the dog rose, and they serve as a nesting place for birds.

"The good condition is initially due to the high-quality plant material," emphasises Achim Fischer. So-called container plants were planted with a root ball. These are well protected against drought, especially in the initial period after planting. "I still remember that the soil was very dry in September 2022 when the plants were being planted," recalls Achim Fischer. In addition, there is a basic rule: "The plant must be well placed in the soil, then it will stay."

The natural regeneration can be clearly observed in the area: the mountain ash, whose leaves supply the soil with humus, and which also provides shade in summer; as does the birch in some places. These were previously unwanted plants in the spruce monoculture and were removed. "Today it's different," says Fischer. A few spruces have also reseeded



Trainees maintain the EJOT company forest

themselves. "As long as they don't crowd out other plants, we leave them." The sessile oak is also growing over the area through natural regeneration. "The jay brought them to us," says Achim Fischer. The clever forest bird hides the acorns in the ground. And it doesn't always find some of them again, allowing oaks to grow. Hazel bushes and small beech seedlings are also spreading throughout the area.

The favourable weather conditions for the forest, which could already be observed in 2023, continued this year. "We had a summer with normal rainfall," says Achim Fischer. Although the bark beetle is still active, the rainfall enables the trees to produce resin and repel the beetles.n. **E**

recarb



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