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Without SMEs, no net-zero emissions

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Towards a sustainable future with 3D printing

Exentis has the world's only propriety 3D technology platform that allows large-scale industrial production. Industrialized additive manufacturing is universally applicable for industrial as well as clean-room applications and with a completely free choice of materials, such as metals, ceramics, polymers or pharmaceutical agents. Areas of application include the manufacture of industrial components with improved product properties, for example, for electric motors and fuel cells, bioprinting or pharmaceutical applications such as tablets with freely definable drug delivery profiles. Exentis currently employs 120 people on sites in Switzerland, Germany, and the USA.

By ratifying the Paris Climate Agreement in 2015, Switzerland has committed to reducing its annual greenhouse gas emissions by half by 2030 compared to 1990 and even to achieve "net-zero" emissions by 2050. Achieving these ambitious goals will only be possible with the participation of SMEs. What measures has your company taken with regard to environmental sustainability?
G. Heinemann: First and foremost, we offer a particularly sustainable technology. The cold printing process we use allows for a very energy and material efficient production. And it does so, with maximum material efficiency and no material waste. Hence, there is no need for costly, environmentally harmful waste disposal. In addition, we are constantly implementing sustainability projects in our company. One example: we recently installed a solar system on the roof of our 3D innovation center near Zurich. We want to reduce our CO_2 emissions, which are already very low, by half by the end of 2025 compared to 2022.

Can you tell us more about how you are contributing to a more sustainable world with your 3D printing technology?
G. Heinemann: Exentis has three focus markets: pharmaceuticals, "new energy" and ultra-fine structures. In the new energy sector, we are talking about highly efficient electric motors, for example. Our customers produce stator and rotor laminations for these. These sheets are stacked on top of each other and, as stator or rotor blocks, are the main components of these electric motors. With our 3D printing technology, these sheets can be up to two-thirds thinner than with conventional printing. This makes electric motors significantly smaller and lighter with higher performance and lower energy consumption. This is a major advantage for mobile applications – for example, it increases the range.

What makes 3D printing technology better than traditional manufacturing technologies?
G. Heinemann: Traditional manufacturing technologies often involve milling from solid material, which results in a lot of material waste. The same applies to stamping, which is used, for example, in the conventional production of the stator and rotor sheets already mentioned. Since our 3D printing technology directly produces the desired product, there is no waste and no costly pre and post processing steps. And this is achieved at the same high output rates – we are talking about several million industrial components per year on just one Exentis 3D production system. In addition to low energy consumption, another advantage of our 3D printing technology is that components can be produced "in one piece" instead of first producing several components individually and then painstakingly assembling them. The result is a significant simplification of the manufacturing and recycling process.

Your 3D production systems take a decentralized approach. Can you say something about how this decentralized approach avoids long transport routes and thus the technology offers an ecological advantage?
G. Heinemann: The decentralized use of 3D production systems directly at our customers' sites – we call them our 3D community members – enables them to manufacture on site, completely independent of any delivery problems along the value chain. 3D community members can also tailor their component quantities and geometries precisely to the needs of their own end customers. As a result, our 3D printing technology offers, for the first time, the opportunity to realize a wide range of product variations in a timely, flexible manner and at attractive costs compared to conventional production processes. The bottom line is that this minimizes inventories and storage costs and reduces internal transport routes.

Your 3D printing technology is used by your 3D community members. In this respect, the technology plays a crucial role in scaling material and resource efficient products in order to make them accessible to the broader market. Can you say something about this "enabler" function?
G. Heinemann: We have developed a proprietary 3D technology and protected it very widely with patents. We use these patents to issue licenses and thus grant customers many years of exclusivity. In other words, our customers are given the opportunity to use our innovative 3D technology exclusively, with the Exentis 3D production systems they have acquired. This gives them a significant competitive advantage – not least because it also allows them to produce in a more energy and resource efficient way.

Which hurdles did your company have to overcome in developing or disseminating the innovation?
G. Heinemann: One challenge is that the education systems in Switzerland and the rest of Europe are only tailored to a limited extent to the needs of our company. Since the 3D printing technology is still relatively new, the courses offered at Swiss universities in this area is manageable. This is com-

pounded by the current shortage of skilled workers in Switzerland and Germany. However, if you consider how strongly Exentis has grown in recent years, we still seem to have succeeded in attracting the best talent and getting them interested in our company. Job seekers obviously find it interesting to work in such an innovative environment.

Does environmental sustainability represent a comparative advantage, for example, in employee recruitment?
G. Heinemann: A company's sustainability efforts are a decisive factor for applicants when choosing an employer. Since we offer a very sustainable solution with our 3D printing technology, I see Exentis as having a clear advantage over other companies in attracting highly qualified employees. I am sure that this aspect will be given even more weight by job seekers in the future.

The Exentis Group is evaluated by external agencies according to official ESG criteria. Have these ratings made a difference to you, for example, in your communication with customers or the public?
G. Heinemann: The effort that is involved in such a rating certainly pays off. As far as communication with external stakeholders is concerned, I am convinced that a sustainability rating, by the way with very good results again this year, creates added value for the company.

Are you currently subject to certain regulatory requirements in the ecological field? Do you expect these regulatory requirements to increase in the future?
G. Heinemann: We are currently not very strongly affected by such regulations. However, I assume that this will change in the future and that regulatory requirements will increase. With our environmentally friendly 3D printing technology, however, I am relaxed about this development.

Finally, I would be interested to know what your vision is of environmentally friendly manufacturing technologies.
G. Heinemann: My goal is to establish our unique 3D technology platform as a new industry standard on the market. Not least because it enables us as a company to make a significant contribution to sustainability.

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Dr. Gereon W. Heinemann has many years of international experience in building and managing technology companies and has extensive expertise in the development and commercialization of additive manufacturing technologies and their industrial application. He has been leading the Exentis Group AG as CEO since January 2021. Since he took up his post, the number of employees across the group has more than doubled.