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MGG

MÜLLER-GUTTENBRUNN GROUP

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Dear readers!

Finally! Finally, we can get back to normal. After two pandemic years, 2022 can probably best be summarized under the title "return to normality". Although I sometimes ask myself what this much-cited "normality" looks like and what we mean by it.

I think that the end of social distancing in interactions with customers, employees and partners was an important step. Because as efficient as some video calls are, they can never fully replace human factors of communication such as sympathy and empathy in a face-to-face conversation. Many people confirm to me that physical meetings have been missing in their everyday professional lives. Now face-to-face meetings like the IERC Congress are possible again and home office is no longer a necessity, but only an option anymore. Finally!

Speaking of IERC: At this industry meeting in early 2022 (report on page 4-7), the recycling industry's common demand for stable thresholds for brominated flame retardants was a key topic. We at MGG have been campaigning nationally and internationally for many years for sensible legal requirements for the entire industry, and I promise you that we will continue to fight for practical standardization and legislation in the future with a great deal of dedication and heart and soul. After all, a sustainable circular economy can only function in the long term with economically sensible framework conditions!

The past year was again characterized by numerous innovations in the Müller-Guttenbrunn Group. We are proud that we continue to be a technological pioneer with new separation technologies such as the Polyfinder plant at MGG Metran (pages 12/13) or the recycling of filled PP at MGG Polymers (pages 24-27). At this point, we would like to thank the entire MGG team for their daily efforts to further optimize our plants and increase the recycling depth.

In addition to ongoing innovations, the topic of sustainability is also permanently on our agenda. That is why we now produce green energy from photovoltaic systems at all (Austrian) locations of the Müller-Guttenbrunn Group (page 18/19). However, we still have some athletic goals in terms of green energy:
100% CO_2-neutral recycling! That would be something...

I hope you enjoy reading and browsing through this year's issue of Spectrum magazine. This annual review once again contains some exciting and informative insights into our group of companies.

Stay well!

Yours

Mag. Christian Müller-Guttenbrunn
CEO

"As a representative of MGG Polymers and board member of EERA, Chris Slijkhuis has been one of Europe's leading experts when it comes to recycling plastics for decades. His opinion was therefore naturally also sought at IERC 2022."

Recyclers demand stable thresholds for banned brominated flame retardants

The IERC Congress (International Electronics Recycling Congress) took place in Salzburg from 18 to 21 January 2022. After a one-year break due to the pandemic, the electronics recycling industry finally met again, which all participants felt was a good and necessary step in the common cause.

Thanks to the appropriate Corona concept, it was a pandemic-proof hybrid event at the highest level. Around 200 industry insiders – far fewer than in previous years – had accepted the invitation physically, while numerous delegates were on board virtually through the option of online participation. Around 40 suppliers of recycling solutions were represented as exhibitors.

One of the central topics was once again the "never-ending story" of brominated flame retardants (BFRs): "For many years, the plastics industry – and WEEE recyclers in particular – have been preoccupied with this topic", reports EERA board member (European Electronics Recyclers Association) and former MGG Polymers managing director Chris Slijkhuis. "Unfortunately, we keep discussing the recycling of plastics with brominated flame retardants. What is particularly annoying is that we already talking about the relevant threshold values again. As before, there seems to be no long-term, consistent and, above all, uniform line here on the part of the responsible European authorities."

Recently fixed threshold values are put up for discussion again.

What enrages the international recycling companies most is the fact that in recent years the threshold values for persistent organic pollutants (POPs) in plastics have already been fixed several times. Unfortunately, there are 3 different European laws that set all three thresholds for the same substance groups, namely the RoHS Directive and the REACH, and POPs Regulations. In the middle of 2019, the values were corrected downwards by a new POP regulation.
"This was still okay for us recyclers, because if the values remain stable, we can adjust to them and thus take the appropriate steps for the further development of sustainable circular economies in plastics recycling. The fact that the EU is again discussing a further reduction of the limit values at the beginning of 2022, both for waste and for

products, with the declared wish to lower them by the summer brings enormous uncertainty for plastics recyclers. If the legal requirements do not remain constant in the long term, we will not be able to adapt to them and investments by recycling companies for a sustainable recycling economy will make little sense. Also, innovations will come to a halt. What can we rely on?" asks Slijkhuis.

Circular economy does not work if threshold values are constantly changed.

At a workshop organised by the BSEF (Bromine Scientific and Environmental Forum) at the IERC Salzburg Conference, which Chris Slijkhuis attended, the participating plastics recyclers demanded that consistent action finally be taken here. With the concept idea "One Substance – One Assessment", the associations of the entire electronics recycling industry formulated a joint position paper to be submitted to the European Commission. This paper contains detailed and practical recommendations to ensure an ambitious, practicable and, above all, long-term sustainable implementation of the Green Deal for the entire electronics recycling sector throughout Europe. Speaking on behalf of EERA and Austrian plastics recycling pioneer MGG Polymers, Chris Slijkhuis summed up: "We finally need a European solution we can rely on. Security and stability are the order of the day! Because in terms of the plastics recycling economy, it is – figuratively speaking – already five to twelve!"

The background, or: the never-ending story of BFRs

Historically, the European plastics recycling industry is still a "young chick". It was only about 15 years ago that the collection and recycling of old electrical appliances began. This makes stability all the more important for such a young industry. There will be no big investments and innovations if the legal framework is so volatile. And it is clear to all global players that innovations are needed in this young industry.

At the centre of the international discussion for years – as already mentioned – has been the use of some brominated flame retardants in plastics, which have been banned for more than a decade. Electronic and electrical devices require plastic in their production. A distinction must be made between appliances that generate heat (e.g. televisions) and those that do not (e.g. refrigerators). Only those types of appliances that can generate heat (mainly small domestic appliances, display- and IT-equipment) use plastics that contain different flame retardants, including BFRs. This is because it prevents the plastics from catching fire.

Some types of these BFRs are classified as POPs by the European authorities. These are sorted out in special recycling companies like MGG Polymers and sent for proper incineration. Across Europe, around 2.6 million tonnes of WEEE plastics are generated each year. 9 % of these plastics contain brominated flame retardants. But only

CONTINUE ON PAGE 6!

"Christian Müller-Guttenbrunn (left) and Serge Hombroukx welcomed the congress participants at their booth."

“At the "Round Table", Chris Slijkhuis (MGG Polymers and EERA), Sander Kroon (ICL-IP BSEF) and Federico Magalini (Sofies UK) discussed the issue of brominated flame retardants.“

half of them are follow the route of the official collection and recycling channels, the rest disappear into undocumented waste streams where proper processing is not guaranteed.

While a study by the BSEF in 2020 certified that recycling results are not affected by brominated flame retardants, a further reduction of the limits would jeopardise the progress achieved. But not only that: for recycling companies, this reduction could have unforeseeable economic consequences, especially with regard to investments in appropriate recycling facilities.
The fact is that there is no legal stability for this – constantly developing – industry due to the ongoing discussion about threshold values.

Therefore, the capacities for recycling plastics from WEEE are not increasing as fast as they actually could.

So, what can be done? Experience shows that a mix of media campaigns to raise awareness among the population, incentives for proper disposal is the best solution to this challenge. Consumers today are more environmentally conscious and therefore willing to also buy products with recycled plastic.

Therefore, the recycling industry should be supported by clear, simpler and, above all, stable legal framework conditions in order to be able to make further innovations and investments

"The IERC Congress – the annual meeting of the recycling industry – was held in Salzburg in 2022."

Treatment of WEEE plastics containing Brominated Flame Retardants (BFR's)

POP's regulation applies

WEEE PLASTICS

TO CHECK OR NOT TO CHECK THAT IS THE QUESTION

WEEE plastics are deemed to have restricted BFR's if no check is made showing that the WEEE plastics contain > 2.000 ppm Bromine (Br). In that case all WEEE plastics need to be delivered to specialized WEEE plastics recycling plants capable of separating BFR containing plastics.

If WEEE plastics are checked (described in the EN 50625-1 General treatment and depollution standard) and the check shows that the plastics contain less than 2.000 ppm Br, they are free of restricted BFR's.

< 2000 PPM BROMINE

> 2000 PPM BROMINE or not tested

POLYMER SEPARATION

The plastic mix that does not contain restricted BFR's above the threshold values can thus be used in advanced recycling processes. The first step is the separation of the individual polymers.
The processes also have non-recyclable fractions.

NON-RECYCLABLE FRACTIONS

PLASTIC EXTRUSION & COMPOUNDING

The separated polymers from WEEE will then be extruded and if needed compounded. These plastic pellets are checked on conformity with POP legislation. For EEE products this is RoHs and for all other products this is REACH. Product legislation has clearly defined limit values for the presence of any legacy substances such as BFR's.

Plastics recycling saves large amounts of CO_2 emissions and energy compared to virgin plastics.

PLASTICS FREE OF BFR'S

92%

SPECIALIZED RECYCLING FACILITY FOR WEEE PLASTICS

The plastic mix may contain restricted BFR's in which case the mix must be treated by specialized recyclers that separate the plastics containing BFR's from other plastics.
Only 8% of this fraction contains restricted BFR's. After separation 92% of the plastics can undergo further sorting and treatment.

08%

PLASTICS WITH RESTRICTED BFR'S

ELIMINATION OF PLASTICS

WEEE plastics containing restricted BFR's must be incinerated.
Non-recyclable plastics are also incinerated.
Although these substances have not been used in EEE since long, they can still be present in WEEE as legacy substances.

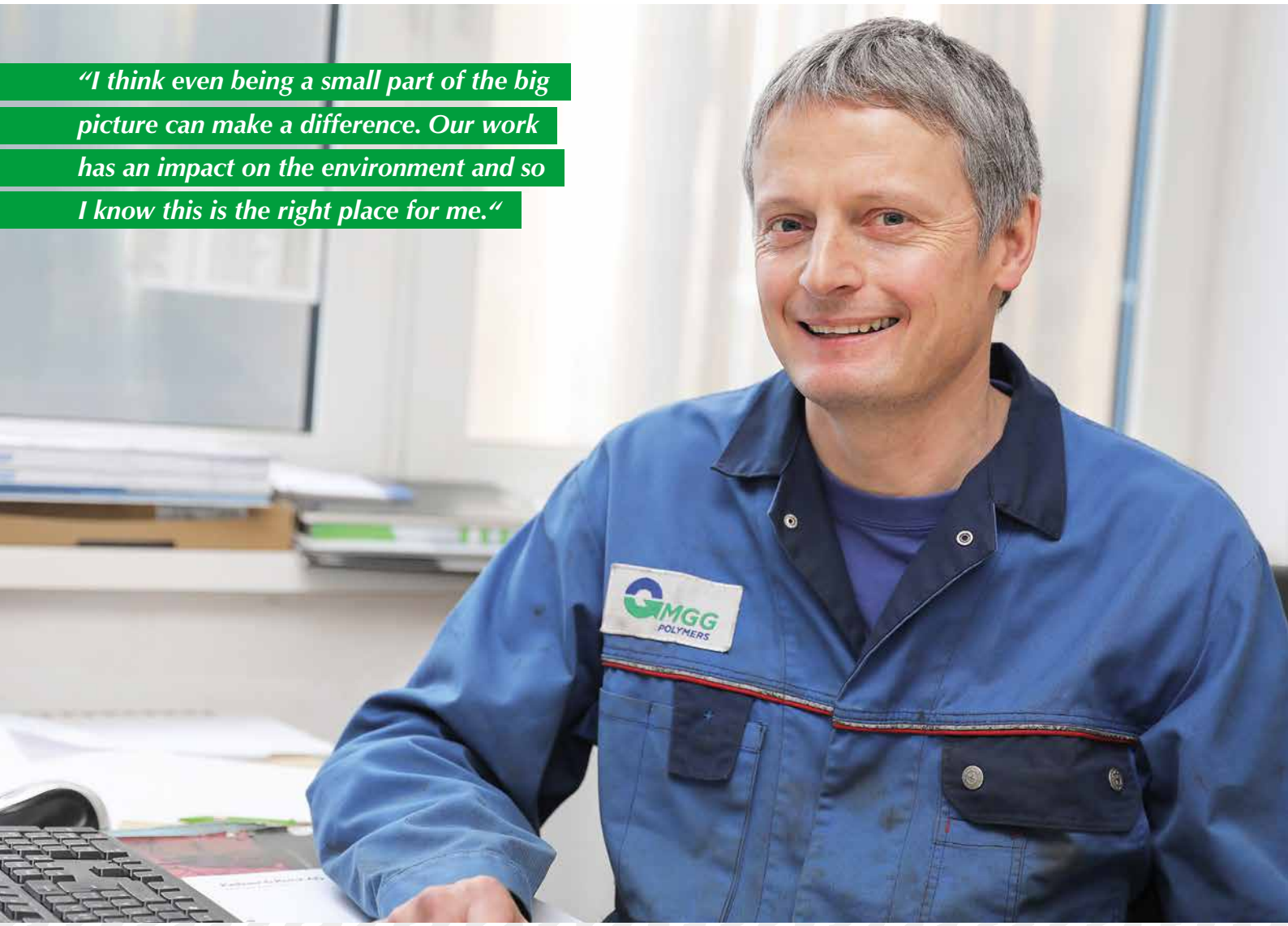
"Recycling is no walk in the park!"

Manfred Jetzinger started his MGG career back in 2006 at MGG Polymers, which was then still called MBA Polymers and had just been founded. Through his interest in technology and his drive to constantly improve operations, he found his way into mechanical maintenance. In our MGG relay interview, he tells us how he experienced the company's rise, what demanding tasks have to be mastered and how he keeps track of things.

Mr. Jetzinger, you joined Polymers on 1 February 2006 as one of the first employees. How did that come about?
MANFRED JETZINGER: I come from a farm near Viehdorf, where I learned to do physical work from an early age. Actually, my father encouraged me to apply because Müller-Guttenbrunn was known as a solid employer in the region. When I started work, the machines were just being put into operation. It was an exciting time, but also not always easy. Initially, I was not sure if I had made the right career choice, but as time went on, it became a better and better fit. Now I've been here for 16 years and I'm happy that everything has developed the way it has. I look forward to continuing to be a part of MGG Polymers.

You are responsible for mechanical maintenance. Has it always been like this?
JETZINGER: At the beginning, I worked in production and operated various machines. This task gave me the opportunity to gain an insight into the respective operational processes, which is very helpful for my current job. Over time, the processes in the company became more and more complex. So it happened that due to my technical interest and my „restless mind" I decided to take the locksmith's examination in the second career path. This additional qualification led me to the newly founded department of mechanical maintenance, which I now head.

What do you mean by maintenance? What are your specific tasks?
JETZINGER: Basically, the main task of my job is to take care of the problems that occur in the operating processes. Together with my team, I try to secure and optimise the internal processes. A fixed component is also to know the respective machines and to try to improve their output. Through these tasks, my team and I can have a direct influence on the success of the company. If you like, you can say that our work left no stone unturned. Although, if I'm honest, the steel



"I think even being a small part of the big picture can make a difference. Our work has an impact on the environment and so I know this is the right place for me."

“Since production at MGG Polymers runs around the clock, we are always on call.“

construction is standing – still …(laughs). It is important to recognise the possibilities and to think: „What else is possible“? Of course, there are also limits, for example if there is a physical impossibility. Nevertheless, the „inventive spirit“ is required and you have to try to get around this with another solution. That is my approach to the job.

What is important to you in your work?
JETZINGER: It is especially important to have foresight. That means not only seeing things as they are at the moment, but much more the potential. My goal is to motivate colleagues to see new possibilities themselves. Of course, there are also situations that are simple and monotonous, for example when you replace a part. But there are also processes that can and must be thought through creatively.

And how can you imagine a typical working day?
JETZINGER: Typical? Relatively little in my job can be planned and is typical. We start the day at six o’clock with a short meeting to clarify which tasks need to be done. Usually there is a list of things that still need to be done or have already been started. Often there are also urgent requests from the shift manager, which we then prioritise. After the meeting, we go to the workshop or to the respective machine that needs to be repaired.
Since we often work with very heavy materials and machine parts, we work in teams of two to minimise the risk of accidents. There are some very challenging tasks involved – Recycling is no walk in the park. Since production at MGG Polymers runs around the clock, we are always on call. For this very reason, it is important to me that everyone in my team knows all the machines so that they can intervene quickly and efficiently in an emergency. So you can say that when the „hat is on fire“, someone from us is there.

We haven’t even talked about the working environment yet. What do you like best about MGG Polymers?
JETZINGER: The familiar, friendly atmosphere in the company is important to me. Our staff is still at a level where people know and appreciate each other personally. In addition, I think that the cooperation within the team works well due to the size of our company and that each employee is appreciated. For example, many tasks also require direct contact with the management, which is a nice change for me and thankfully runs smoothly.

What do you do to balance your varied job?
JETZINGER: I run my parents‘ farm on the side, which is a small organic farm in my hometown of Viehdorf. My primary support is my family, which consists of my wife and my one-year-old son. Through them I manage to switch off at home and enjoy family time.

Finally, one more question. You work for a sustainable company. How important is recycling to you personally?
JETZINGER: It is important to me that my work makes sense. At MGG Polymers, I see myself as someone who can make a difference for the planet and society. I think even being a small part of the big picture can make a difference. Our work has an impact on the environment and so I know this is the right place for me.

Thank you for the interview, we wish you all the best for the future!

“Due to the length of the vehicle of about 19 metres alone, this was no easy task for the MGG Metrec employees.“

24.500 Kilo of reliability

After the scrapping of a freight wagon and two diesel locomotives of Wiener Linien last year, another well-known and popular means of transport has now been sent on its "last journey“ to MGG Metrec in Amstetten – an original Viennese tram set.

The "Bim" – the epitome of Vienna’s public transport system

For many people, the Type E2 tram represents the classic image of the city of Vienna. The tram set travelled tens of thousands of kilometres in the core zone of the federal capital. Now it has started its last journey into the heart of the Mostviertel. The transport was carried out by a suitably equipped lorry from the Felbermayer company, as the wheels of the popular Viennese "Bim“ had already been removed in advance.

The 24.5 ton vehicle had been on the routes of the Wiener Linien for several decades, transporting millions of passengers from A to B. What exciting stories would this "Bim“ tell if it could talk?

Despite its typical appearance and high reliability, progress is also a constant companion in public transport, and so the familiar "Bim“ models are often replaced by newer, barrier-free variants.

For this reason, the scrapping of the vehicle from the E2 series was also a foregone conclusion. Due to the length of the vehicle of about 19 metres alone, this was no easy task for the MGG Metrec employees. But the team at the recycling plant in Amstetten has a lot of experience to offer. "Having handled several of these special orders well in the past, we know exactly how to proceed in order to work efficiently,“ says production manager Hannes Grissenberger. After just a few hours, there is little left to see of the red-and-white painted tram. New raw materials are created from the recycled metal parts, and so the cycle of recyclable materials starts all over again.

A highlight for young and old

Curious now? All those interested in trams have the opportunity to delve deep into the history of Vienna’s public transport and gain an insight into the development of public transport in Vienna. In Vienna’s 3rd district, near the Schlachthausgasse station, you will find the Remise Transport Museum of Wiener Linien. Through various stations consisting of theory but also practical exercises, children as well as adults can immerse themselves in the world of "public transport“.

Major challenges for the recycling sector due to the amendment to the Waste Management Act

By resolution of the National Council, an amendment to the Waste Management Act was passed at the end of 2021. With this, the EU Circular Economy Package and the EU Directive on the reduction of the impact of certain plastic products on the environment (SEA Directive) were implemented in Austria.

The aim of the SEA Directive is primarily to reduce the amount of plastic waste in order to prevent and reduce the impact of plastic waste on the environment, but especially on marine biology. To help achieve this goal, bans on the marketing of certain single-use plastic products as well as products made of oxo-degradable plastics, labelling requirements for single-use plastic products and targets for the separate collection of single-use plastic bottles were anchored in the Waste Management Act.

Further measures concern the import ban on certain wastes for landfilling and compulsory registration for transporters and the reduction of single-use plastic packaging.

New requirements for the transport of plastic waste

In order to keep emissions of air pollutants and climate-relevant gases as low as possible, recycling companies will have to face major challenges in the future. From 1 January 2023, transports of waste with a total weight of more than ten tonnes and a transport distance by road of more than 300 kilometres in Austria must be carried out by rail or another means of transport with equivalent or lower pollutant or greenhouse gas potential! This does not apply if it is proven that the railways cannot provide the corresponding capacities or if the transport distance to be covered by road for the journey to and from the nearest loading point would amount to 25% or more compared to transport exclusively by road. The corresponding evidence must be carried along during transport and presented to the authority upon request.

This amendment to the Waste Management Act makes sense from an ecological point of view. However, the question arises whether these resolutions are also practicable and can be implemented by companies in the recycling sector. For this reason, Christian Müller-Guttenbrunn, CEO of the Müller-Guttenbrunn Group, was asked about this topic:

Mr. Müller-Guttenbrunn, in your view, what are the essential elements and the major challenges that this amendment brings with it?
CHRISTAN MÜLLER-GUTTENBRUNN: The recycling companies are required to cover as few kilometres as possible by truck and to shift as many transports as possible to rail. We don't have a problem with that because the sidings are available at our plants. However, it is much more difficult for suppliers who do not have this possibility. There will certainly be distortions in the market, those companies that have a rail connection have a clear competitive advantage. The importance of the lorry for overland journeys will decline. But ÖBB must also do its homework and create the conditions – i.e. loading facilities – everywhere!

"The recycling companies are required to cover as few kilometres as possible by truck and to shift as many transports as possible to rail."

Another important issue is the transport of plastics. Here, large volumes with comparatively low weights have to be transported. Is this then still economically viable?
CHRISTAN MÜLLER-GUTTENBRUNN: We will only see in practice how suitable these new specifications actually are. We have painstakingly built up a corresponding market over many years. Even if transport becomes more expensive, we are not shirking our eco-logical responsibility. The demand for recycled plastic is enormous, we would even need much more raw material, which is not easily available at the moment. And that's not even talking about transport…

How do you see the Waste Management Act in European competition?
CHRISTAN MÜLLER-GUTTENBRUNN: The European Union has defined a legal minimum standard, but each member state ultimately sets its own rules. We have the problem that Austria wants to be a model eco-country and has imposed very strict regulations on itself. We see with our companies in Hungary and Romania that there are also other models that have potential.

Finally, a brief change of subject due to current events: The European Union has decided to classify nuclear power and natural gas as green energy. What is your opinion of this decision?
CHRISTAN MÜLLER-GUTTENBRUNN: Nuclear power is the only form of energy that does not produce CO_2 and is available at any time. That's why I think it's a mistake to ignore any progress in this field and to basically close your mind to this issue. That is all I really want to say.

Mr Müller-Guttenbrunn, thank you for the interview!

A milestone of innovation

Last year, about 1.5 million euros were invested in a plant that takes the separation of mixed materials at MGG Metran in Kematen to a new level – the new Polyfinder plant. Innovative technology with a combined analysis process opens up completely new possibilities in the separation of materials.

In December last year, the Polyfinder system was integrated into the day-to-day work at MGG Metran in Kematen after a nine-month construction and test phase. "Corona did not make the installation easy for us, but we are happy to finally be able to use the plant, despite a delay of about four months," says Metran managing director Gunther Panowitz.

What is a Polyfinder separation plant? And: How does it work? The term "poly" comes from the Greek and means "many". So "many" processes – in this case four – are used simultaneously to optimise the separation process of the waste stream. "It's a further development in which you combine various known detection technologies in one system," Panowitz sums it up.

Method 1: Colour sorting

The first technology is the well-tried colour sorting with light and a high-resolution digital camera. This is a process that MGG Metran has been using successfully since 1996. For example, red parts are recognised as copper, yellow as brass or dull grey as zinc. However, due to the diversity of material contents in the waste, this method quickly reaches its limits. For example, when it comes to chromium-plated brass. But there are also many possibilities for confusion. In the past, printed circuit boards were always green, but today they have a wide variety of colours, such as yellow, blue or red, and can therefore no longer be clearly assigned purely on the basis of the colour analysis. And so it can happen that printed circuit boards have the same colour as beer cans, for example. The blue of the beer brand "Puntigamer" is very similar to the blue of a circuit board. This makes it much more difficult to separate them by type.

Method 2: Near-infrared camera

In the second step, the waste pieces, which are about the size of a fingernail, pass through the NIR camera, the near-infrared camera. In this process, heat radiation is used. Using the example of the blue beer can and the blue circuit board, a difference can be "seen" immediately in the infrared range. While the optical digital camera sees two identical shades of blue and detects no difference, the beer can provides no feedback in the infrared spectrum because it is made of metal. The blue circuit board, on the other hand, is recognised as plastic because it provides a certain typical deflection in the infrared spectrum. Thus, the circuit board can be identified as plastic.

Method 3: Laser Object Detection

In the third step, the so-called LOD, Laser Object Detection, is used for analysis. On the 1.80 metre wide conveyor belt, the parts are transported at a speed of about four metres per second. In the third analysis method, LOD, a laser aims at the belt from above. In combination with another low-resolution camera (visible camera – VIS for short), which is located at the side of the conveyor belt, all parts are scanned. The deflected laser now tells us where the parts are on the conveyor belt, how long they are and how high they are. "In this way, a virtual three-dimensional image of each part is drawn, so to speak," Panowitz explains. This also applies to black parts, which could not be analysed with the first two methods. In addition, the system calculates the approximate centre of gravity of the part through the three-dimensional shape and estimates the weight. This is important

at the end of the belt when it comes to „scrap“ and influences how much compressed air is needed to deflect the corresponding part into the correct channel.

Method 4: Electromagnetic camera

The last step involves an electromagnetic camera (EMC for short). Magnetic fields are generated by coils arranged transversely in the last half metre below the conveyor belt. These electromagnetic fields radiate through the conveyor belt and thus hit the parts conveyed above. These parts, in turn, change the frequency and strength of the respective coil in a material-characteristic way. Ferrous materials, for example, change the coil frequency very strongly. In comparison, a copper part influences the frequency less and a plastic or mineral part does not change the electromagnetic field at all. For example, all metals can be sorted out from a waste stream.

By combining these four methods, many different substances can be analysed that would be difficult to detect singly with the individual methods. Would you like an example? A black plastic part could not be properly classified with the first two methods. But with LOD, the part is spatially registered and does not emit an electromagnetic pulse in the fourth step. Thus, it can be clearly determined that it is black plastic.

Now perfection is on the agenda

Because of the different waste fractions, the Polyfinder system can achieve a wide variety of separation results. At the end of each run, this new plant offers the possibility of separating four different material streams. Depending on the composition of the primary waste stream and the separation requirements configured at the plant, a wide variety of separations are carried out.

After commissioning the plant, which was supplied by the German company Tomra and supplemented by the local plant manufacturer IFE in Waidhofen/Ybbs, the next step is fine-tuning, as Panowitz explains: "We learn over time. By perfecting the settings and programming, as well as through cooperation with the manufacturer, we can continuously improve the quality of the results.“ The goal is to become even more effective in the future by means of artificial intelligence: "At the moment, we set the parameters and, depending on how we programme the system, appropriate material streams are sorted out. However, this setting and programming work is very time-consuming and our technicians are learning every day. Hopefully we will manage to have this learning process taken over by the EDP system in the future and the quality improvements will be carried out independently with computer support, so to speak,“ says the MGG Metran managing director, looking to the future with confidence.

Perceiving waste as a raw material

Generally speaking, the requirements in recycling are changing almost daily. "We are moving more and more in the direction of increasing quality, recycling depths and the detection and separation of more and more new materials, as our hard plastic project – keyword Bobby-Car – has also shown us.“ But the Metran boss is also concerned with a socio-political aspect. After all, every Austrian citizen generates around 500 kilogrammes of waste per year. For Panowitz, however, this is not waste, but valuable materials: "We must learn not to underestimate these resources, but to see them as raw materials. In people’s minds, waste must not be „ugh“, but we must be more aware of the value of the processed materials at the end of the respective product life cycle! Today we have the technology to keep materials in the cycle. And with appropriate separation processes like our new Polyfinder plant, this circular economy is getting better every day!“

When a hobby becomes a profession

Gilbert Müller-Guttenbrunn works in the IT department of Müller-Guttenbrunn, his office is located in Amstettner Industriestraße, where the headquarters of the entire Müller-Guttenbrunn Group is located. For almost 15 years, the IT expert has ensured that all IT concerns of the team members are solved quickly and competently. For the MGG relay interview, he leaves his familiar workplace to face some questions.

Mr Müller-Guttenbrunn, as your name suggests, the Müller-Guttenbrunn company has been with you for a long time...
GILBERT MÜLLER-GUTTENBRUNN: Of course, I have known the Müller-Guttenbrunn company since I was a child. I had my first internship here when I was 14 years old. It was exciting to get to know the big machines like the shredder, but I have always been fascinated by the IT sector. The industrial engineering branch at the HTL Waidhofen an der Ybbs therefore offered me a good school. I was able to further deepen my knowledge at the FH Technikum Wien. After graduating, I started my professional life at Bank Austria in the IT department, until I finally returned in 2008, where I was able to get a taste of working life for the first time: Back to Müller-Guttenbrunn.

What areas are you responsible for here?
MÜLLER-GUTTENBRUNN: Quite a few, not to say all IT topics. My tasks range from the entire planning and structure to purchasing, maintenance or the support of MGG employees in all IT matters. In other words, everything to do with servers, PCs, telephones, printers and other IT equipment. However, I am not alone, but work in a great team of three. Each of us has his or her own area of expertise, but at the end of the day, the three of us have to be able to deal with all the requests and challenges.

And who are your colleagues?
MÜLLER-GUTTENBRUNN: On the one hand, there is Armin Blutsch, who, among other things, is well known in the region as a former vice-president of the Austrian Federal Fire Brigade Association. Many years ago, he planned, set up and further developed the basic framework of the MGG EDP in the company. As his retirement is getting closer and closer, we were recently able to recruit another employee for our department. Jürgen Gleiß will basically follow in Armin's footsteps. In addition, he has programming skills that we can use very well for smaller projects.

What programmes do you and your team work with?
MÜLLER-GUTTENBRUNN: We have an operating system that is a perfect alternative to Linux, iOS or Windows for us. On our mainframe, we work with the IBM i Series and use it to handle all our merchandise management and accounting. We don't need any programmes with lots of extras for this area of work. Our utility is limited to the bare essentials and is therefore very reliable and fast. However, should we need new tools for data collection that the standard software does not have, Jürgen Gleiß can programme and implement them for us. However, we do not want to develop our own operating system, as this would be too costly and would require a lot of maintenance.

The large machines and shredders also contain IT-related technology. Do you also cover these machines?
MÜLLER-GUTTENBRUNN: Fortunately only marginally. Of course, there is a lot of electronics, electrical engineering and IT behind it. But if our shredders cause problems, the manufacturing companies have to take care of it. Some of the machines are integrated into our network, but that only concerns remote maintenance. IT-wise, there is no production or planning process that we have to programme in order to control them via our computers.

Have the work areas changed in recent years?
MÜLLER-GUTTENBRUNN: Yes, absolutely. In the past, we also had to look after the entire EDP of our subsidiary companies abroad. If there was a problem in Romania, for example, one of us had to pack our bags and solve it at the respective location. Now we save on business trips for the most part, because the companies either have their own trained staff or there is an external IT service provider on site. Above all, many things can be solved by telephone or remote maintenance.

Data security is an increasingly important issue. How does MGG deal with this?
MÜLLER-GUTTENBRUNN: Our data very rarely gets out. Normally it is not necessary to take work home. In recent years, we have had to offer home office solutions, but a VPN connection has kept us very secure. Our server is physically located here in the building. We also host it ourselves. Otherwise, we are careful about what is downloaded on our company devices. For example, the instant messaging service WhatsApp is strictly forbidden on all our company mobile phones. We have no problem with our colleagues using the company mobile phone privately as well. Thanks to dual-SIM smartphones, the secure separation of customer numbers and private data is very uncomplicated. The direct company mobile phone interface actually only needs access to contacts, calendar and e-mails. Microsoft Office and our management software are the only programmes that can also be used outside of our offices.

"Our three plants have a total of around 90 computers. Maintenance, updates and any kind of support for the employees are among my main tasks."

Have there ever been attacks on the system?
MÜLLER-GUTTENBRUNN: Yes, all the time. That is completely normal. Almost every PC but also mobile phones are affected by permanent automated hack attempts. Of course, we protect our devices with appropriate security programmes. That's why there have been no real targeted attacks so far. However, it is difficult to say whether there is a virus or something similar nested somewhere in our data. The only existing risk, whereby data can fall into the wrong hands, is the user. But this can hardly be prevented – the only thing that helps here is targeted training and an understanding of IT matters by the staff.

How many computers do you look after altogether?
MÜLLER-GUTTENBRUNN: Actually not that many. In our three plants Metrec, Metran and Polymers there are about 90 computers in total. Nevertheless, it's not boring, because if a printer doesn't print here or a mobile phone doesn't work there, we try to solve these problems. Maintenance, updates and all kinds of support for the staff are among my main tasks.

What qualifications do you need for this job?
MÜLLER-GUTTENBRUNN: I can only speak about our company. We don't have high standards as far as upstream training is concerned. You don't necessarily have to have studied to be able to work here. What is important is an interest in technology and the willingness to continuously develop oneself through learning-by-doing.

Does this work involve a lot of stress?
MÜLLER-GUTTENBRUNN: It depends. But if there are serious problems, of course we have to act quickly. However, our devices, systems and servers are so well equipped that we can identify and eliminate many sources of error in advance. Emergency power generators provide further security of supply. However, we often have to work at night or on weekends – especially when updates have to be installed or certain maintenance work has to be carried out during which no one else is allowed to be online.

Finally, we would like to ask you a few personal questions. Who is Gilbert Müller-Guttenbrunn in private?
MÜLLER-GUTTENBRUNN: I am the father of a 16-year-old daughter with whom I enjoy spending a lot of time. Since my divorce, I run our joint household and cook very often, for example. I wouldn't say I'm passionate about confectionery or chef de cuisine, but we get by quite well (laughs).

When you're not in the kitchen, are you still drawn to the PC in your private life?
MÜLLER-GUTTENBRUNN: No. I do have a computer at home, but I rarely use it. I catch myself only from time to time with the cell phone in the hand. I think many people feel that way nowadays. Otherwise, you can often find me above the clouds. For many years I have been a member of a flying club and a motorised flight instructor. Accordingly, I also like to fly a round myself – mainly in Austria.

Thank you very much for the interview. We wish you much more enjoyment with your exciting hobby – and of course continued success in your profession.

Finally networking again!

After a break of more than two years due to the pandemic, it was time to intensify the personal relations between the Müller-Guttenbrunn Group and institutions and schools again.

The EAK – Elektroaltgeräte Koordinierungsstelle Austria GmbH – visited the companies MGG Metran and MGG Polymers in Kematen in the course of the 10th Waste Consultants Workshop at the end of April 2022. After short words of welcome by Elisabeth Giehser, Managing Director of EAK, Chris Slijkhuis guided one of the two groups through the premises of MGG Polymers and gave an insight into the working field and the fascinating technology of the company as well as its problem areas and market opportunities. The process from plastic waste to recycled granulate could thus be very well understood by the waste consultants.

At MGG Metran, the plant tour of the second group was taken over by Innovation Manager Daniel Forstner. During the tour, the crushing and sorting plants were shown and explained. It was also possible to get a good impression of the unprocessed and the already separated materials as well as the throughput quantities.

On day two of the workshop, former Polymers managing director Chris Slijkhuis gave another presentation for all participants. "It's just good to get back into direct and personal contact with other companies. Networking always brings everyone involved a step forward. You can learn from each other and, of course, the relaxed and friendly atmosphere is not neglected at the Müller-Guttenbrunn premises. We hope we won't have to miss events like this again", says Slijkhuis.

However, the return to normality is not only evident in the company visits, but also in the trade fair sector. For example, MGG Polymers was represented at the PRSE (Plastics Recycling Show Europe) in Amsterdam at the end of June 2022, and the lively interest of the visitors was clearly noticeable. Full of anticipation, the company looked ahead to Germany, where from October 19 to 26, the plastics trade fair "K" took place in Düsseldorf. Two further highlights, which already took place in April, were completely in the sign of the future and the new generation at MGG.

In search of the researchers of tomorrow!

Shortly before the Easter vacations, Barbara Moser and Christian Neumann paid a visit to the Secondary School for Environment and Economy in Yspertal as part of the "Entrepreneur Day". Thereby the MGG Polymers representatives were welcomed with open arms. At the beginning of the event, each company present introduced itself on a stage. Afterwards, there were personal discussions with more than 140 students. Satisfied, Barbara Moser summed up: "We clearly felt the curiosity of the young adults. On the five-year path to the matricu-

"It's good to get back into direct and personal contact with other companies. Networking always brings everyone involved a step forward."

lation and diploma examinations, many essential topics and specializations are taught here at the school in the fields of environment and economics or water and municipal management. Thus, the HLUW trainees acquire an enormous amount of specialized knowledge in both theory and practice. The young people spend a large part of their time in the in-house laboratory. Research is carried out in the subjects of chemistry, physics, biology and microbiology. Our discussions were at a high level, and we were able to tell the interested young people a great deal about our company and our mission, leaving no questions unanswered at the end of the day." After the lively exchange, the school still allowed a tour of the premises of the educational institution. This gave both parties the opportunity to get to know each other a little better.

In mid-May the return visit took place and a group of students from HLUW Yspertal visited the plants of the Müller-Guttenbrunn Group in Mostviertel.

Not only with the HLUW Yspertal, but also with the HTL Waidhofen an der Ybbs MGG maintains a close relationship due to the historical development of the company. On April 7, the Mostviertel recyclers presented themselves with their information booth to the students of the HTL. Altogether, about 300 young people of the last two years were able to inform themselves at all exhibiting companies and thus to filter out potential partners for the entry into professional life.

At the information booth of MGG Polymers, the students were shown how new products, for example coffee machines or W-Lan routers, are manufactured from waste electrical equipment. The presentation of various material samples gave the young people a "tangible" insight into the world of recycling. Christian Neumann from MGG Polymers was available to answer questions from the bright students. "The students of the HTL Waidhofen are always welcome at our company. Be it for a holiday internship, as part of a diploma thesis or as an employee at our company. So far, we have only had positive experiences", reports MGG Polymers representative Christian Neumann.

"All Müller-Guttenbrunn Group locations have photovoltaic systems."

Green Energy in MGG's sights

Photovoltaics. Anyone who has sustainability and a circular economy anchored in their DNA – whether a private individual or a company – must rely on this technology in the 21st century! This is also the case with the Müller-Guttenbrunn Group.

The Müller-Guttenbrunn Group has photovoltaic systems at all its Austrian locations. The latest PV system at MGG Metrec in Amstettner Industriestraße produces an additional 250 kWp (kilo-watt peak). At MGG Metran in Kematen, around 600 kWp are generated on four roof surfaces by over 2200 panels, and MGG Polymers provides 800 kWp of its own electricity. In total, the group in Mostviertel has PV systems with a capacity of around 1.650 kWp.

Metran Managing Director Gunther Panowitz sums up why MGG places so much emphasis on the expansion of photovoltaics: "PV is good for the environment. We can use existing roof surfaces and do not have to build anything new. We use most of the electricity generated in our own plants. Company vehicles such as electric forklifts or company cars get the energy they need from the sun and, last but not least, it simply makes economic sense! Photovoltaics simply pays off for us!"

Produced above the roof – consumed under the roof!

The majority of the electricity generated by the sun is therefore consumed directly in the factories. So to speak, the electricity is produced on the roof and immediately used in the hall below by the machines or for the light supply or for heating. In the summer months, up to 60% of Metran's own electricity supply is covered in this way. Due to the operating hours from 5 a.m. to 11 p.m. on weekdays, the full potential of energy production is utilised and can thus be used directly. Up to 99 % of the electricity produced is consumed immediately. Only at weekends or on public holidays is the surplus electricity fed back into the grid.

So how much is 1.650 kWp? "Our PV systems in Mostviertel could theoretically supply around 700 households with sustainable energy", reports Metran Managing Director Gunther Panowitz. However, in order to achieve this kilo-watt peak – i.e. the electricity peak – many factors have to interact. In addition to the necessary solar radiation, the right (steep) angle of incidence is crucial. In the summer months, almost 80 % of Metran's total electricity consumption is generated at peak times, putting it well on the way to CO_2-neutral recycling. When it rains, clouds or in winter, the percentage drops accordingly, of course. Calculated over the year, MGG generates an average of about 20 % of its annual electricity needs at its three locations with photovoltaics.

A major goal at Müller-Guttenbrunn is to become completely energy self-sufficient in the future. "Unfortunately, we are still very dependent on gas and fossil fuels."

Is 100 % CO_2-neutral recycling possible?

When asked where the journey can go and whether recycling can actually function in a CO_2-neutral way in a few years, Panowitz has a clear answer: "Yes, it is possible, but a few points are crucial for this. Our buildings used for PV systems so far and those to come in the future can bear the weight of PV panels and are favourably disposed to solar radiation. The second factor, however, is not in our hands, but in

the further development of photovoltaic and memory technology. 25 years ago, PV panels had an output of around 180 Wp (watt peak) per panel. Modern panels like the ones we have now installed at Metrec already manage 410 Wp. However, the upper limit is set by the sun, which radiates a maximum of 1.400 watts per square metre onto our earth. And who knows what else will be technically possible in the next few years. Perhaps we will manage - after appropriate further development – to exploit up to 1.350 watts per square metre one day."

Hardly any alternatives to photovoltaics

Are there sustainable alternatives to electricity production with the sun? Of course, wind and water are interesting possibilities as electricity producers, but they are associated with some hurdles, as Gunther Panowitz points out: "At Metran, we have thought about generating electricity with wind power. Unfortunately, this is not possible on our company premises. Wind turbines have to be a correspondingly prescribed distance from people or roads due to ice fall in winter, and this would have prevented the power plants from being located on the company premises. A list of complex requirements would also have had to be met."

And these regulations are sometimes very specific, according to Metran's managing director. "For example, we would have had to do a study that looked at the birds that might be killed by the rotor blades. It has been proven that domestic cats alone have 100,000 times more birds on their conscience than wind power in Austria." For Panowitz, hydropower would be an extremely sensible option for generating electricity. However, this is of course dependent on the geographical possibilities and society's commitment to this form of electricity generation.

Truck e-mobility is a topic, but not yet quite suitable for everyday use.

When you talk about alternative power generation and sustainability, you also have to shed light on the aspect of e-mobility. That is why, at the beginning of June 2022, decision-makers from the Müller-Guttenbrunn Group found out about the current state of development of electric trucks at IFAT in Munich, the world's leading trade fair for water, sewage, waste and raw materials management. "Around 20 manufacturers were represented with concrete concept vehicles. Currently, these vehicles have a range of about 250 kilometres. The big disadvantage is the batteries, which weigh six to eight tonnes per vehicle", reports Panowitz. However, due to the further development of battery technologies, ranges of around 500 kilometres will soon be realistic. If the issues of charging times and the e-filling station infrastructure are also solved, it is quite conceivable that electric trucks will also be used at MGG. Some of MGG's wheel loaders, cranes and forklifts are already electrically powered.
For Panowitz, however, hydrogen-powered vehicles are also a possible future opportunity, "if the hydrogen is not produced by methane gas but by electrolysis from water. Realistically, however, that will still take a few years. Until then, we will continue to rely on rail as a central transport option. 65 tonnes, which is about as much as three full lorries, can fit in one wagon. The connections of the MGG companies to the rail network are top-notch, so we get thousands of truckloads off the road every year."

"PV is good for the environment. We can use existing roof surfaces and do not have to build anything new."

Challenges in **recycling e-cars**

"You can't simply dismantle e-cars with pliers, the tool must be specially coated and, above all, the employees must be trained to do so!"

Nowadays, even car manufacturers can no longer ignore the principle of recycling. Due to the increasing number of electric cars sold, many companies are concerned about the ecological challenges of disposing of or recycling electric cars and their batteries. This is also a challenge for the recycling industry, which is why we asked MGG CEO Christian Müller-Guttenbrunn for an interview.

Mr Müller-Guttenbrunn, the purchase of an electric car is becoming increasingly popular among Austrians. In the previous year, more electric cars were registered than diesel vehicles. Have e-cars already been scrapped at the Metrec site in Amstetten?
CHRISTIAN MÜLLER-GUTTENBRUNN: Yes, but these were mainly accident cars. After some initial perplexity, however, we found ways to overcome these challenges. At the moment, however, the disposal of electric vehicles is still a negligible issue. However, if the development continues like this, there could be major challenges in a few years. Above all, the handling of batteries is the issue: batteries contain more or less residual energy that must not ignite or explode.
That's why most car manufacturers have already started thinking about how to manage the recovery of the car battery in their own company. I understand that, too, because there is a lot of money at stake for the companies! The batteries are the most valuable part of the electric car. In principle, they have a long service life, but their efficiency decreases over time. A good alternative is therefore not to replace the entire battery, but only individual cells of the batteries, in order to regain a higher efficiency of the battery.
But this issue also has a monetary component. Imagine that the batteries in an electric car are worth 10.000 euros. Even if the efficiency is halved, there is still a lot of energy inside that is also valuable – in this concrete example, roughly speaking, 5.000 euros. So these old batteries still contain a lot of financial potential, which the car manufacturers will not miss in the long run. The question will be how to get the full power out of these low-power batteries again or whether there are alternative areas of application – for example as storage for private photovoltaic systems.

What are the risks of disposing of an electric car?
MÜLLER-GUTTENBRUNN: Disposing of a petrol or diesel-powered vehicle is relatively simple. We at MGG Metrec have had a great deal of experience in this area for decades. With an electric car, there are numerous power lines distributed throughout the car, and that makes the whole thing more special. You can't just dismantle electric cars

with pliers, the tools have to be specially coated and, above all, the employees have to be trained for this. But something can always happen. After all, there may still be voltage in the vehicle to be disposed of, and if not handled properly, such a battery can burst into flames! That is the worst case scenario, so to speak.

Have you taken precautions for such a case?
MÜLLER-GUTTENBRUNN: We are currently taking a closer look at possible solutions. At the moment we are examining whether structural measures, for example boxes that can be flooded with water, are a possibility. A burning electric car would be immersed in these basins and allowed to burn out. One disadvantage of this "immersion variant" is that the water used in the box is contaminated after the fire and has to be disposed of specially.

We therefore tend to rely on new extinguishing technologies that can be used to control a battery fire without water. In Holland, there are already special extinguishers that can nip a battery fire in the bud in just a few seconds! We'll see what the future brings.

You yourself also drive an electric car. How does that feel for you?
MÜLLER-GUTTENBRUNN: In terms of driving comfort, it's a great experience. Have you ever driven in the Prater Autodrom? You step on the accelerator and the power is transmitted without delay. It's really fun! In the meantime, it's also more financially lucrative than it was a few years ago due to government subsidies. I think that e-cars will have a decisive impact on our future mobility.

Mr Müller-Guttenbrunn, thank you for the interview!

Recycling cooperation with Fronius

In terms of a sustainable circular economy, it has always been a major goal of the Müller-Guttenbrunn Group that manufacturing companies think about the recycling process as early as the manufacturing stage of their products. After all, if used equipment can be recycled easily, the recycling depth increases and the recovery of pure materials from the recycling process is simplified and thus more efficient.

In Fronius, the Müller-Guttenbrunn Group has a cooperation partner for whom the topic of sustainable recycling management is just as important as a producer. For three years now, the research departments of the two companies have therefore been working closely together and exchanging information on an ongoing basis. Fronius is known as a premium manufacturer of inverters for photovoltaic systems. These are used to convert direct current into alternating current. The internationally active manufacturer is known not least for the high quality of its products.

In order to guarantee the desired quality on the one hand, but also to produce as sustainably as possible, the employees of the Fronius research and development department give a great deal of thought to the materials from which, for example, an inverter should be composed so that it is as easy as possible to recycle in the end.
The main components of an inverter include aluminium, engineering plastics, coils, galvanised steel and circuit boards. Since this inverter has to withstand all kinds of weather, great importance is attached to protecting the components. As a result, a minimum service life of 20 years can be expected.

Technical discussions with Fronius R&D staff

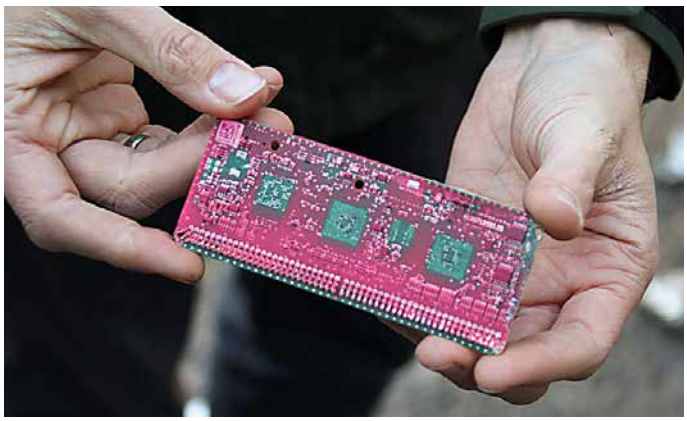
To get a feel for how inverters are best recycled, an eight-strong team from Fronius, the manufacturer, was invited to visit the recycling facilities. The team included developers, sustainability management and an external consultant who supports Fronius in the field of life cycle analysis.

First, a few components of an inverter were shredded at MGG-Metrec – in the EVA shredder. These were sprayed pink in advance so that they could then be recognised in the material pile. The inverter parts represent a small amount of material for the large and massive shredder. The bright colour, however, made it easy to find the parts.
Innovation manager Daniel Forstner reports on the initial findings: "The circuit boards themselves are easy to recycle. The challenge is that the potting comes off the board easily and quickly. In addition, you gain valuable copper coils in the course of this process. Recycling the cables built into the inverters also works perfectly."

Durability or 100 % recyclable?

The only thing that failed in the shredding attempts was the coating of the inverters. The potting compound has resin components and is therefore not a classic plastic such as ABS (acrylonitrile butadiene styrene) or PS (polystyrene). The only recycling method for the synthetic product is therefore the incineration fraction.
This potting compound is used to protect the metallic and electronic components from wind and weather. It would be possible to do without this coating, but the quality of the product and its longevity would suffer. Daniel Forstner therefore recommended to the Fronius

"In the end, it is better to invest in a long life of the product. If you focus on high quality, the waste masses remain manageable."



team from an economic point of view: "In the end, it is better to invest in a long product life. It is better to work on making the individual components even more durable in order to increase the life expectancy of the inverters by a few more years. If one were to focus on recyclability, a single, non-sealed inverter would be cheaper to produce and for the consumer, but the customer would need two of these devices compared to a product with potting compound. This means that twice as much material would be needed, and that is not efficient. Besides, Fronius is not a low-cost supplier, but the premium manufacturer par excellence. And at the end of the day, both moulded and non-moulded scrap parts of the inverters end up in the EVA shredder anyway. If you go for high quality, the waste masses remain manageable." Fronius is very positive about this recommendation.

Results of the life cycle analysis

Through one of Fronius' guiding principles – "Design for Recycling" – the company has set as one of its top goals to reduce the ecological footprint of its products. The current status of this endeavour and corresponding progress can be determined by life cycle analysis (LCA). In collaboration with external LCA partner Harald Pilz of to4to (together for tomorrow), Fronius conducted a life cycle analysis for the GEN24 Plus inverter in 2020, and this spring completed the LCA for the Tauro Eco 100 commercial inverter. Using the "cradle-to-grave approach", this inverter was closely examined on the basis of the ISO 14040/44 standards. The following life cycle phases, linked by transport, were considered in the LCA.

- the procurement of raw materials,
- the production phase at the Fronius locations,
- the use phase and
- the end-of-life phase (EOL).

After evaluating all the important data, Fronius comes up with some very pleasing results. Looking at the payback period - the time it takes to offset all CO_2 emissions caused by production and transport - the Tauro ECO 100 inverter performs very well. From this point on, the inverter produces "extra energy" which, depending on the scenario, is up to 62 times higher than the energy required for the entire life cycle of the device.

In total, the transport of materials and components to Fronius, production and transport to the customer account for only a few percent of the environmental impact of the inverters in the entire product life cycle. On the one hand, this is due to the fact that Fronius relies primarily on rail, sea and truck freight, and on the other hand covers 100 % of its own energy requirements from green electricity. And when it comes to waste management, the Müller-Guttenbrunn Group is the right partner for the end-of-life devices.
Fronius and MGG comply with all the relevant WEEE directives, and the recycling process means that raw materials and energy sources can be substituted, reducing the inverter's carbon footprint. So Fronius is on the right track, and through intensive research and the best cooperation partners it will certainly become even more efficient in terms of environmental protection in the future.

Further information regarding the two LCAs, is available for download via whitepaper at www.fronius.com.

New product family at MGG Polymers:
PP with fillers from large domestic appliances!

MGG Polymers launches its activities in the recycling of plastics from large domestic appliances with the recovery of filled polypropylenes. Intensive research and application development in recent years have once again made the pioneers from Kematen an der Ybbs the technology leader in Europe. A further step has been taken to meet the growing demand for recycled plastics.

The starting position

In December 2019, the EU presented the "Green Deal", a strategy to make the European economy more sustainable and also to reduce the root causes and effects of climate change. Within this, the "circular economy" approach plays a key role, especially when it comes to plastics. About one year ago MGG Polymers Managing Director Günther Höggerl reported in this context about the so-called "Plastics Strategy of the EU". This contains declarations of intent (“Pledges”) from more than 100 companies/plastics users in Europe to reuse a huge volume of up to 10 million tons of recycled plastics per year in new products from 2025 onwards.

The problem

At the moment the European plastics recycling industry is far away from being able to meet this demand. Current production capacities in the EU are around 4 million tons per year. This is far too little to achieve the ambitious goal mentioned above in this short period of time.

A solution

Since 2019, MGG Polymers has been discussing the question of how to meet the expected increase in demand in the long term. A detailed approach was found soon: Namely, to align research and application development in a direction enabling the company to recycle plastics from large household appliances in addition to those from small electrical appliances. A strategic move that is obvious to MGG Polymers Managing Director Günther Höggerl: "We have a good reputation in the recycling of plastics from small electrical appliances over the past 15 years. However, we need to be more innovative in order to achieve the European targets. In our view, recovering plastics from large household appliances – the "white goods" - is a logical next step."

Innovation

White goods mainly use polypropylenes with different fillers such as talc (PP-T), calcium carbonate (PP-K) or glass fiber (PP-GF). This means that in the sorting process, it is not enough to recognize and separate the PP as a polymer only, it is even necessary to be able to look “deeper” into the material. Of course, many steps were necessary from the first tests since 2019 to the current production status, as Innovation Manager Daniel Forstner knows best. He played a key role in developing the "filled PP" research project and leading it to implementation. "The technological difficulty is primarily in separating the mixed raw material – a wild mixture of plastics, which also contains

“The plastic parts are sorted with the aid of sensors. This makes the Müller-Guttenbrunn Group once again a pioneer!“

"The technological difficulty lay primarily in separating the mixed raw material – i.e. a wild mixture of plastics, which also contains the polypropylene with its various fillers – by type."

the polypropylene with its various fillers – by type. Our colleague Cornelia Wieser carried out intensive basic research in the MGG Metran laboratory and examined a huge number of samples in order to define the distinguishing features of PP-K, PP-T and PP-GF. After completing her work, she was even able to identify the material differences by the sound of the plastic."
These analyzed sample pieces were an important part of the entire project, as they allowed the MGG team to decide whether existing equipment in the Müller Guttenbrunn Group would be suitable for separating the materials. Or, whether equipment needed to be reworked or it was necessary to contact machine manufacturers to develop completely new sorting solutions. The main challenge turned out to establish a proper sorting by those pieces of filled PP that contain only 10 % filler or less and are also usually very dirty.
However, Höggerl and Forstner do not want to reveal how MGG Polymers has now managed to actually separate the individual fractions in detail: "What we can say is: The plastic parts must ultimately be sorted with the aid of sensors based machinery. This makes the Müller-Guttenbrunn Group a pioneer once again, and we can be proud of that!"

The origin of the material

In view of the raw material quantities available in Europ, the question arises where the necessary source material comes from. "The amount of large household appliances collected in Austria will not be sufficient in the medium and long term. In addition, the white goods are usually recycled together with other waste streams, e.g. end-of-life vehicles – but this makes subsequent plastic recycling uneconomical. Therefore, we source waste fractions from large household appliances from all over Europe. Waste management cannot be seen on a national basis only, but must be seen on a pan-european and cross-border basis" explains Günther Höggerl.
The amount of waste from large household appliances generated in Europe each year is a bit more than 3 million tons and thus at a similar level to that of small electrical appliances. Although the proportion of plastic in large appliances is lower than in small appliances, it can still be assumed to be around 400.000 tons per year.
While plastic recycling from small electrical appliances is now fairly established, the situation is still different for large household appliances. Throughout Europe, recycling activities for plastics from white goods are mostly limited to the removal of individual parts – e.g. the control panel of a washing machine - during manual dismantling. Many of the valuable plastics still end up in landfills, as this option for disposal is unfortunately still permitted in many EU countries.

The products

In addition to the existing product family of unfilled polypropylenes (PP), MGG Polymers now offers another family of PP with different fillers with the new sorting process. Of particular note are a polypropylene reinforced with approx. 30 % talc and a polypropylene reinforced with approx. 35 % calcium carbonate. The range is supplemented by

CONTINUE ON PAGE 26! ▸

a mineral-filled PP with a high glass fiber content. As with all other product families, the grades can be offered with different shades of gray. Endurance tests carried out at well-known customers have already proven the suitability of the materials to be used in new large electrical appliances.
Another strong feature of the new product family is the outstanding "post consumer" content, which is between 95 % and 100 %. The sorting process separates those polypropylenes that already contain the various fillers, so no separate addition of "new" talc, calcium carbonate or glass fiber is necessary.

The future

The next item on MGG-Polymers' agenda is to bring the market ready products into series use. The company has been working on corresponding projects together with well-known manufacturers of large household appliances since many months. "Of course, we also took advantage of the recent world's largest plastics trade fair in Düsseldorf to report on our innovation. We had decided to place only a small information – still, the interest was already very high during the fair. So it's good to know that we already have larger quantities of the new PP products in stock and are able to deliver immediately after clarification," Günther Höggerl proudly reports.

And where will the journey go? The managing director makes a clear statement on this: "MGG Polymers has always committed to offering its customers high-quality recycled plastics – and will continue doing this. The key for the usability of our products in new electrical appliances is their properties and not so much from which waste stream we gathered them. In the coming years, we will therefore place investments in all areas of the company so that we can obtain our products from different waste streams. This sounds easier than it is, but I´m positively looking forward to this task together with the entire team of the Müller Guttenbrunn Group. In any case, the preliminary work for the coming years is very encouraging."

“Of course, we also took advantage of the recent world's largest plastics trade fair in Düsseldorf to report on our innovation.“

„The decisive factor for the usability of our products in new electrical appliances, etc., is therefore their properties and not so much the waste stream from which they were obtained.“

Small domestic appliances versus large domestic appliances

Small electrical appliances are usually defined as electrical appliances up to a size of 50 x 50 x 50 cm – such as cell phones, printers, coffee machines or vacuum cleaners. Corresponding to that, larger appliances are categorized as large household appliances – e.g. washing machines, dryers, dishwashers. The main differences are mainly in the type of plastics being used. In small appliances, ABS (acrylonitrile-butadiene-styrene copolymer), PS (polystyrene) and PP (polypropylene) plastics are found predominantly, while PP with various fillers is mainly used in large household appliances.

Recycling targets are defined across Europe for different waste streams. The WEEE (Waste of electrical and electronical equipment) directive specifies a recycling rate of 55 % for small electrical appliances, while for large electrical appliances this is 80 %. In order to achieve this target, the recovery of plastics from large electrical appliances is essential.

MGG Polymers at the **largest plastics trade fair**

From 19 to 26 October 2022, "K", the leading international trade fair for the plastics and rubber industry, took place for the 70th time. In the middle of it instead of just being there: the plastics recycling experts from MGG Polymers from Kematen an der Ybbs, who presented the new recycling product "filled PP" for the first time at the fair with complete success.

"The last time we were represented was in 2019, so we were already very excited about this year's edition, because the "K" only takes place every three years and thus only opened its doors again this October. I would like to particularly emphasize the high quality of discussions. The visitors to our booth showed particular interest and the conversations with other company representatives were also at a high level. In total, we held more than 300 conversations at our booth, which made us aware once again of how much demand there is for sustainable plastics," summed up the managing director of MGG Polymers, Günther Höggerl. The high demand for recycled plastics now extends as far as the Middle East, North Africa and South America. The topic of greenwashing is also becoming more and more present and many companies nowadays adorn themselves with "green feathers".

The flawless organization, the many conversations, people and topics, gave the MGG team an exciting week in the capital of North Rhine-Westphalia. "This trade fair really suits MGG Polymers perfectly and this year's hot topics also harmonized with our philosophy," reports the MGG Polymers managing director.

Central topics: circular economy, digitalization & climate protection

The core topics of the trade show were circular economy, digitalization and climate protection. According to Polymers CEO Günther Höggerl, the term "circular economy" in particular is a big issue: "We can only emphasize it again and again: For a functioning circular economy, we in the recycling industry in particular have to pull firmly together and work on expanding the recycling depth in order to thus get the full potential out of the materials. A long and intense journey for sure, but one that will be worthwhile for all of us." But the topic of "digitalization" was also on everyone's lips at "K." Here, the industry still has a massive amount of catching up to do – especially as far as recycling plant manufacturers are concerned. This is because proper updates for the respective plant operating system often mean that

age-old PCs have to be used, which limit and complicate the programming of the machines. "Otherwise, we are positive about the digital future and its possibilities, which can support our employees, but by no means replace them. I think we can look forward to many exciting innovations in the area of administration and research", says Höggerl, who particularly emphasizes climate protection as a central concern of the Müller-Guttenbrunn Group: "Photovoltaic systems allow us to produce part of our own energy supply and, in addition, we transport many goods by rail instead of by truck. In order to visibly delay climate change, it takes the commitment of every individual!"

Trade fair novelty: Filled PP as causes a sensation!

Polymers Managing Director Günther Höggerl, Sales Team Darko Huskic and José Barraca, Logistics Manager Peter Stiftinger and three other representatives of MGG Polymers were more than satisfied with the trade fair appearance and the numerous discussions according to Darko Huskic: "Partly our guests queued up to talk to us at our 20 m² booth! As usual, our topics were PCR plastics from WEEE, but also our new products – filled polypropylenes (filled PP). Due to the excellent conversations as well as the good feedback, we got the impression that the CO_2 footprint will play a more and more important role in the future. And our product innovation – the filled PP – caused amazement in a positive sense."
Günther Höggerl puts the feedback from trade show visitors in concrete terms: "Yes, we caused a stir! The positive feedback was a confirmation of our intention, however, we still have to market this plastic much more openly and intensively in order to get to suitable customers."

The future of our planet

Entering the halls of the "K", it immediately becomes clear that the future of our planet, which in the best case will be worth living, is the big meta-headline above everything. The basis for this is the circular economy, which extends from the manufacturer through the consumer to the recycler. In the polymers (EEE = electrical and electronic equipment) industry, sustainability thinking and awareness is developing rapidly, even without political intervention. Energy efficiency, short transport distances and the materials used (PCR plastics) are the most important factors. In the case of recycled plastics, much will depend on the development of the entire recycling industry. There is a need for coordinated strategies in the interests of sustainability, as well as more professional players who do not just follow familiar paths through traditional and short-sighted courses of action. Politicians will also have to continue to create favorable framework conditions, and this across borders. After all, the circular economy is a multinational issue and does not end at national borders. "If we achieve a mindset change at all levels of society, in which we replace the narrative of "low-grade waste" with that of "valuable resources", then we will also achieve a comprehensive and pervasive circular economy", says Darko Huskic.

Video clip

A video from our performance at the K can be found at:
https://mgg-polymers.com/news/blog/mgg-polymers-at-the-largest-plastics-trade-fair

You can also simply scan this QR code to open the video:

The K trade fair

At the end of October 2022, more than 3.000 exhibitors from around 60 nations presented their operations, their own products and a wealth of innovations in the categories in Düsseldorf as part of the 70th edition of the "K" trade fair: Raw & Auxiliary Materials, Plastic Goods and Processing, Machinery & Equipment and the Service for the Plastics and Rubber Industry.
These topics not only covered the entire industry, but also attracted 176.000 trade visitors to the Düsseldorf exhibition center, because nowhere else can you get such a comprehensive and international insight into the entire industry. This year's highlights included the 70th anniversary and the many innovations from the major machine manufacturers. In this trade fair week, everything also revolved around the following three "hot topics": circular economy, digitalization and climate protection. Topics that are on the agenda for MGG Polymers and thus this trade fair is a fixture in the recycling company's calendar.

"Here in Hall 1, we keep order at the REDWAVE X-ray fluorescence unit – also called XRF."

Schartmüller and Baciu – the duo from Hall 1

It is no secret that the Müller-Guttenbrunn Group has a shift work model. But what is behind it? How do the employees deal with the different working hours and does the much-cited work-life balance still work? Just in time for the shift change, we asked Gerhard Schartmüller and his colleague Claudiu Baciu for an interview to talk a bit about the situation.

It's nice that you both found the time. To begin with, we would like to ask you to introduce yourselves for our readers...
CLAUDIU BACIU: My name is Claudiu Baciu and I am 31 years old. I am originally from Arad in Romania, but I have been living in Amstetten for quite some time with my wife and our four-year-old child. I have been working at Metran for three years and I take care of the X-ray fluorescence system in Hall 1. My tasks include checking the material and maintaining the system.
GERHARD SCHARTMÜLLER: And I am Gerhard Schartmüller from Öhling and have been working for Metran since 2006. For 30 years I was employed by a construction company and paved roads, but my knees suffered a lot from this activity. As a result, one knee had to be surgically replaced and for me it was time to find a new job that was reasonable for my body. Coincidentally, my neighbor worked for the Müller-Guttenbrunn Group and he said at the time "Come on, introduce yourself. What could go wrong?" No sooner said than done, and so I spent my first two MGG years at the COMBISENSE plant. As time went on, new areas of responsibility were added and as a result, so now I know five different machines inside out. In addition, I work in Hall 8, and it doesn't take long on a workday for my smartwatch to tell me that I've completed my daily goal of steps. Fortunately, all the movement doesn't harm my knees, quite the opposite. I have to say that my joints are noticeably better. And here in Hall 1, I'm keeping things tidy at the REDWAVE X-ray fluorescence facility – also known as XRF – with my colleague Claudiu.

Mr. Schartmüller, your colleague's shift is over now and you are continuing to work on the plant following the interview. Is there a shift change meeting, and what do you exchange information about?
SCHARTMÜLLER: The top priority is, of course, to find out what material is being processed, so we know what needs to be done. Today, for example, precious metals are being sorted, which is why we have to monitor the plant and help sort by hand. It is also very important to exchange information about the performance of the machine. Did everything go according to plan, were there any malfunctions, or do various problems still need to be fixed? Some things we can fix on our own, such as general maintenance, clamping new rubber belts or

lubricating the joints. In the case of electronic malfunctions, we call the electrician and if something needs to be rewelded, our in-house locksmith takes care of it.

There are various models of shift work, can you explain your model?
BACIU: We work what we call two shifts, so in the morning from 5:00 am to 1:00 pm and the afternoon shift starts at 1:00 pm and ends at 11:00 pm. The advantage with the afternoon shift is that we have Friday off, as this shift is two hours longer than the one in the morning. I think this model is really good, because you can either look forward to a long weekend or you can already get home for lunch, so you can still experience a lot during the day.
SCHARTMÜLLER: I see it the same way, but I prefer the morning shift because a 10-hour workday at my age can be very exhausting from time to time, bearing in mind that I'm about to retire. But I can easily manage the remaining two and a half years.

Does shift work make it more difficult to organize your free time and your private life? And is a healthy sleep pattern still possible?
BACIU: I manage really well and don't feel restricted. Of course, it can be different with more intensive shift models, but we don't have those systems here at the company. Most people with a 9-to-5 job probably don't go to bed before midnight either, so it hardly makes a difference. And since you can do quite a bit after work on the morning shift, getting up early isn't a problem either.
SCHARTMÜLLER: You also get used to it. Being able to sleep in every now and then also has its charms.

You mentioned you both work with the X-ray fluorescence facility. Can you describe this equipment in a little more detail? And when is it used?
BACIU: The X-ray fluorescence system is used more at the end of our recycling chain. In advance, plastic and aluminum are separated in the float-sink system, industrial metals such as zinc, brass, copper, stainless steel (also called NiRoSta) and lead then end up in the chute of the XRF. The plant manages to sort an average of three tons per hour.

SCHARTMÜLLER: We can have the XRF search for a specific element in the periodic table, which is separated from the other metals by compressed air. The system can detect the element through fluorescence radiation, because when this beam hits a material, the following happens in the atomic nucleus: The electrons detach from the atomic shells and are repopulated by the outer shells, but energy is lost in the process and a flash of energy is produced. This flash, in turn, can be measured by a frequency and the energy quantum, which is recorded in kiloelectronvolts (keV). Depending on the range of the results, we can assign the substances.

So the precious metals are analyzed by X-rays and separated by air blast. Do you need any special protective clothing for this?
SCHARTMÜLLER: No. No radiation escapes from the X-ray fluorescence system. This system is equipped with many sensors and if you open the door, for example, to release a jammed part, these sensors notice this immediately and switch off the radiation and the entire system. For safety reasons, of course, we also have a radiation protection officer who regularly carries out a functional check on our system and checks the effectiveness of the protective devices. In this way, we are guaranteed safe handling of the machine.
BACIU: In addition, this radiation is also nowhere near as strong as, for example, an X-ray machine in a hospital, where you are given a lead apron for protection. This is because we only want to analyze the surface of the metals with our system. In hospitals, on the other hand, the entire body is x-rayed, which requires much stronger radiation.

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"I don't have a normal assembly line job, but I am proud to be a recycler."

How reliable is this machine? Do you still have to do a lot of manual work yourself?
BACIU: Our X-ray fluorescence system is a real jackpot for the company. Lately, we hardly have to re-sort at all, because we are constantly improving the whole process. After all, in our hall there is not only the X-ray fluorescence machine, but also the COMBISENSE and our latest achievement, the Polyfinder machine. This means that good preliminary work is carried out and the material is already pre-sorted into the appropriate fractions. Manual re-sorting only takes place about one week per month. Outside the summer months we have additional helpers for this. In the first instance, we only sort by hand when we separate precious metals, as very valuable pieces have to be treated in a special way.
SCHARTMÜLLER: In general, the machine is really very reliable. Of course, there are small malfunctions from time to time, but these are quickly remedied. Above all, the machine takes a lot of work off our hands, because we also run it at night from Monday to Thursday. Shortly before the end of the afternoon shift, the plant's vibrator is filled again and we set a timer for the respective sorting time. If there are no disturbances until the next morning, we are faced with tons of finished separated material the next day. On Fridays, the XRF plant is cleaned with a light blower for about one hour starting at 12:00.

Mr. Baciu, since you just mentioned it, are there valuable metal parts on a regular basis?
BACIU: It happens from time to time that a silver spoon or jewelry particle lands on the assembly line. In the case of very valuable precious metals, a light goes on immediately. No matter how small or large the high-value metal treasures are, we immediately deliver them to a safe place. Since we sort precious metals in our department and even small quantities can have a high value, the entire facility is very well secured.
SCHARTMÜLLER: But I have to add that we hardly need this lamp at all, because we can see with the naked eye which metal it is by its color, even from a few meters away.

Finally, allow us to ask you a few personal questions. Mr. Schartmüller, you will soon be retiring. What would you do differently in your professional career if you could?
SCHARTMÜLLER: Nothing at all. My first job as a paving contractor was exhausting, but now I can design my garden the way I want. And I really like it here at the Müller-Guttenbrunn Group, otherwise I wouldn't have been here for 17 years by now. I also find it exciting what sometimes ends up in the containers. It gives me a completely anonymous and scattered insight into the lives of thousands of un-

known people. In addition, I don't have a normal assembly line job, but I am proud to be a recycler. This is where you first become aware of how important a functioning circular economy is and that there is actually no waste, just a lot of raw materials. Looking back, it was the best decision for me to go to MGG.

That's good to hear! How do the two of you spend your free time?
BACIU: Since I quit soccer, I've been taking it a little easier. My new passion is fishing and I practice it at the most beautiful fishing spots in Germany, but also in Romania, the Czech Republic or Hungary. My absolute highlight was a 26-kilo carp, which I hooked for three quarters of an hour before I was able to pull it out of the water.
SCHARTMÜLLER: Claudiu, "taking it easy" is probably a matter of opinion. My free time is really very relaxed, you can usually find me in the garden. My wife and I have a lot of shrubs that need to be tended, and of course there are other gardening tasks like mowing the lawn. However, since I have paved a large part of our garden very respectable, the mowing but remained very manageable. I just recently completed our raised bed project and the anticipation of growing our own vegetables is already very high.

Thank you so much for taking the time for our interview. We wish you both all the best for the future.

“It is here that one first becomes aware of how important a functioning circular economy is and that there is actually no waste, but only many raw materials.“

Pioneers in PV recycling

In view of the current energy price development, photovoltaic systems are becoming more and more attractive and lucrative for private individuals as well as for companies. Generating one's own electricity and thus using sustainable energy is an imperative of our time, and not only for financial reasons. But what to do when the product life of photovoltaic systems has come to an end? What are the challenges involved in recycling PV modules? And: Which processes make economic and environmental sense?

Filling up the sun for 100 years

The 19-year-old Alexandre Edmond Becquerel discovered the photoelectric effect by chance, which was physically explained by Albert Einstein in 1921. This laid the foundation for photovoltaic technology. This technology was used for the first time – after long research – in 1958, when a satellite equipped with solar cells was sent into space. In the 80s, photovoltaics came back to earth and was further developed for private power generation.

In the course of time, the prices for photovoltaic systems became more and more affordable, among other things due to corresponding subsidies from the public sector. In Lower Austria alone, more than 600 MWp (mega watt peak) can currently be achieved. This value must increase to 3000 MWp by 2030 due to climate protection goals of #mission2030. The goal of the Austrian federal government is to obtain 100 % of the national electricity consumption from renewable energies.

So far so good. However, photovoltaic systems also have an "expiration date". As is so often the case, the developers of a new technology have given little thought to the recycling of defective or no longer efficient PV modules. But PV systems also have a limited product life. The logical consequence is growing mountains of PV scrap in European waste collection centers. This is a problem that the Müller-Guttenbrunn Group has taken on and developed a number of recycling ideas for in recent years. So when it comes to discarded PV panels, MGG is once again a technology pioneer in Austria.

How can PV systems break down?

A photovoltaic system is basically built to be robust, as it has to withstand temperature fluctuations from -20°C to +90°C. Only a few events can destroy the modules, such as large hailstones damaging the glass. However, the main reason why PV panels end up in the trash is mostly due to efficiency issues, as old panels that are still in good working order are increasingly being replaced by new and more powerful panels. In addition, the performance of a PV module is only about 80 % after 20 years. Therefore, more powerful systems – currently at over 400 watts peak – make more sense for consumers.
The first challenge in disposing of PV systems is to dismantle them. Even defective panels can, in many cases, continue to produce voltage and emit electricity – if the wires still work. While the majority of panels have a non-conductive aluminum frame, caution is still required. To transport the panels safely, they must be darkened and wrapped. Furthermore, they are placed in additional cover troughs so that they are no longer exposed to solar radiation until the direct recycling process.
The PV panels are shredded at MGG Metran. The scrap is transported to the pre-shredder by excavator. In two interlocking rollers, the panels rattle through the shredder and are torn apart into palm-sized pieces. Once the PV system has been torn apart by the shredder, no more electricity flows and thus there is no danger in processing the material further.
A thoroughly complex process up to this point. Metran Managing Director Gunther Panowitz is therefore already thinking about new alternatives: "We are considering recycling directly on site at the collection points. This would save us the long darkening phases. For this to be profitable, however, we need even larger quantities of PV waste."

Two technologies – one middle ground

Basically, a PV module consists of about 75 % glass with silicon, 10 % aluminum and 15 % other parts such as carrier materials or soft plastic that compensates for the expansion of temperature fluctuations. The plastic particles – also known as "non-target plastics" – can only be thermally recycled.
For Metran, however, the focus at the end of the day is also on corresponding economic efficiency. Photovoltaic panels have a large volume but little mass. That's why Metran's separators first recover all the large pieces of metal, such as aluminum.
Besides aluminum, the really interesting elements that can be scooped out of the glass include copper, tin, lead and silver, which are embedded in the glass in the form of small wires.
Currently, Müller-Guttenbrunn uses two different technologies to extract these valuable substances from the shredded material:
On the one hand, the hand-sized glass pieces are further crushed into glass crumbs, from which foam glass, glass beads or flat glass can be produced. In this method, the focus is not on the wires integrated in

the glass and thus silicon and metal residues remain in the transparent solid. This shredded glass is not 100 % pure and therefore the stability suffers and no first class glass can be recovered in further processing. However, it is sufficient for the production of low-grade glass products. In order to increase the recycling depth, the PV glass is further crushed and ground into powder form using a hammer mill. Subsequently, the raw materials can be screened out. The focus here is on extracting the precious and semi-precious metals such as copper and silver, as well as the other wires – mainly lead and tin. In principle, the glass can still be melted, but there are few buyers on the secondary market for this end product.
"We started testing these two technologies a little over a year ago with small quantities. In doing so, we asked ourselves which method would suit us best and which end product we wanted to focus on. Although the batches of recyclable photovoltaic modules supplied are steadily increasing, the PV issue is only a marginal topic for us due to the small quantities – currently over 3000 tons per year. However, we expect that in the future there will be an increase in the number of discarded modules. Then we will also be prepared to invest further and recycle this special waste fraction," reports Panowitz.

Pioneers don't have it easy!

Throughout Austria, the Müller-Guttenbrunn Group has once again taken on a pioneering role in the PV module recycling process. "On the one hand, this is good because we are making a name for ourselves with this, but we are only making slow progress in developing the technologies. Also, there is little exchange with photovoltaic manufacturers as they are mainly from China and we face not only a language barrier.

Innovation manager Daniel Forstner adds happily: "We are currently in the process of certifying our recycling process. As soon as we receive the Cenelec certificate [note: a certification from the European Committee for Electronic Standardization], we will be able to prove our technological standard to our customers in black and white. This step makes marketing easier for us and the customer knows that we can guarantee him the quality he wants and that we will meet his requirements. In addition to the application areas of large and small electrical appliances and flat panel displays, this would be our fourth Cenelec certificate."

The bottom line is that Müller-Guttenbrunn is ready for the expected increase in photovoltaic scrap. Assuming an average product life of 20 years, more and more modules will crash through the METRAN shredder in the coming years. Above all, however, it would be important for PV producers to incorporate the topic of recycling more intensively into their product development. Because at the end of the day, that's the only way a proper and sustainable circular economy can work.

30 years Mü-Gu Kft. Hungary!

The Hungarian recycling company Mü-Gu Kft. celebrated its 30th anniversary at the beginning of October. During one of the regular visits to Amstetten, former Managing Director József Máthé and his successor Nándor Hoffmann reported on the beginnings of the company, revisited the history, talked about the current challenges and provided a little insight into the festivities on the occasion of the 30th anniversary.

How it all began

In 2023, the Hungarian company Mü-Gu Kft. can look back on quite an eventful history. József Máthé is one of those who has been in the thick of things from the very beginning and not just part of it, and he tells us about the founding period: "Herbert Müller-Guttenbrunn traveled to Hungary as early as the 1980s to purchase material for his operations in the Mostviertel region. At the beginning of 1990, we met by chance and started talking. At that time, Herbert said he was looking for a technician."

At that time, Máthé was working as a technical draftsman and his technical know-how made him the ideal man for the owner family. Without further ado, Máthé decided to come along to Austria for a week to get to know the company. However, Máthé found the already planned expansion to Hungary so exciting that, despite a heavy heart, he parted with his Hungarian family and stayed in Austria for a whole year to prepare the planned set-up of the new company. His expertise as a technical draftsman was in demand because, in addition to the search for a suitable site, the first step involved planning the entire plant infrastructure. In 1992, the factory site was put into operation and József Máthé was appointed Managing Director of Mü-Gu Kft. "Our acquired company site was a former slag heap, accordingly there was no infrastructure. We built a rail connection, an office building with a spacious break room for the employees and got an old shear from the then Schrott Mü-Gu GmbH, which formed a good basis. From another company we bought an old mill, but unfortunately it burned down in 1994. Against the background of the opening of the East, this period was not easy for the young company."
In addition, there were major challenges in purchasing materials. Hungarian collection systems were not well structured in the early 1990s, so Mü-Gu Kft. had to process material streams that contained little valuable raw material. Economically, this was not always easy – in addition, there was an active black market, which made legally correct material procurement difficult. Although Mü-Gu Kft. had a shredder in operation as early as 1998, success was a long time coming. Incidentally, to date there are only three shredders in Hungary – one of which is still operated by Müller-Guttenbrunn.

In addition to the major economic challenges, personal fates also moved the company's history, as Máthé reports: "The tip of the iceberg

"MGG Mü-Gu Kft. is today a modern industrial company specializing in the processing of iron and metal waste."

"However, I will always keep my cell phone close at hand, maybe the team of the Mü-Gu Kft. needs some advice from me."

was my heart attack in 2003. Thankfully, I received generous support from the parent company and was given a stay for medical treatment at an Austrian rehabilitation center. For the sake of my health, I had to draw a line, cut back and vacated my office. Until 2011, I supported the team of the trading division, after which I became a consultant mainly in the area of investments and expansions."
However, all challenges were well mastered over time, allowing the company to develop positively, both economically and in terms of personnel. While there were around 50 employees in the early years, the current managing director Nándor Hoffmann has been able to increase the number of employees to 110 since 2013. However, Hungarian environmental regulations have also become stricter, which has resulted in the quality of the input material increasing over time and the company also improving economically. MGG Mü-Gu Kft. is now a modern industrial company specializing in the processing of iron and metal waste. A 1,250 HP shredder, a hydraulic shear and other devices for separating ferrous and non-ferrous metals can be found on the approximately 40.000 m^2 area.

Nándor Hoffmann – the new managing director!

Nándor Hoffmann was appointed Managing Director of the company in 2012, which meant a quite challenging takeover for him: "Mü-Gu Kft. was already very well known in our region, so the bar was quite high for me as the new Managing Director. I admit that it wasn't easy at first, because there is no evening class or course of study in which you can learn in the shortest possible time what the tasks of a good managing director are, not to mention the fact that I wasn't given a recipe for success on how to become even more successful. So I had to teach myself this business and, along the way, review many contracts and integrate a future-oriented structure into the company. The first three years, during which we reorganized ourselves as a company, were a real nightmare for me. But the many sleepless nights were fortunately worth it in the end." In the meantime, Nándor Hoffmann has the company excellently under control and it is standing on stable legs. Nevertheless, Mü-Gu Kft. is also confronted with current challenges. "Electricity prices are shooting through the roof for us as well right now; we are currently paying 13 times as much for energy supply as we were a year ago. In addition, the waste management system in Hungary will change a lot next year, as recycling licenses have been awarded to a large company. However, we at Mü-Gu Kft. know one thing: global uncertainties have never thrown us off course, as we have always been able to react quickly and well up to now," Hoffmann emphasizes.
In spite of everything, the managing director sets the goals for the next few years very high in the usual MGG manner: "We want to acquire more machines. Of course, increasing the recycling depth is always our top priority. Through the good and close cooperation with the other MGG branches, we naturally also benefit in the areas of technology and innovation."

A retiree retires

Since his official retirement, József Máthé has been working as a consultant for Mü-Gu Kft. and is thus retired only on paper, so to speak. In September 2022, he already celebrated his 75th birthday, but his age does not show, because the former managing director was still bubbling over with ideas and visions for "his" company. But at the end of 2022, the time had actually come and Máthé also retired as a consultant. When asked what he will do with his future free time, he goes into silence for a moment and then reveals: "Since I never had a hobby, or rather Mü-Gu Kft. was my only passion, I will try to make Budapest's museums palatable to me. So far I have only seen two of the many galleries and exhibitions. It would be a nice goal to visit all the museums of the Hungarian capital. I'll always keep my cell phone close at hand, though, so maybe the Mü-Gu Kft. team needs some advice from me."

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When asked for a concluding statement, the man who shaped and played a major role in developing Mü-Gu Kft. says, "Herbert Müller-Guttenbrunn's trust has always touched me deeply. The time at MGG has made me very happy and I say it like it is, I loved my job! My colleagues won't be getting rid of me so quickly, though, because I'm sure I'll be dropping in for a coffee a few more times. I wish Nándor Hoffmann a lot of strength, energy and strong nerves, because he will need them to successfully master the current difficulties, such as the new waste system or inflation. I am firmly convinced that he will master these challenges and make the right decisions."

Cheers to Mü-Gu Kft.

Away from the personnel changes, the festivities on the occasion of the company's 30th anniversary were on the agenda at the beginning of October. "We celebrated our 30th birthday in a big tent with a stage and an extensive supporting program. A total of 200 guests from Austria, the Czech Republic and Romania came to this festive event – including some customers, suppliers and business partners as well as our mayor," reports Managing Director Hofmann. During the speeches, the successes of the past years as well as the investments were highlighted. All speakers emphasized that the name "Mü-Gu Kft." stands for qualitative recycling in Hungary and that the work is appreciated by the population. "If I can make a wish for our company's birthday, it is that the next 30 years will be as wonderful as the past five have been," Hoffmann hopes.

A decade of MGG Remat Frumuseni

By the way: Mü-Gu Kft. is not the only company in the Müller-Guttenbrunn Group to celebrate a milestone birthday in 2022. Ten years ago, one of MGG Remat's three operating areas was opened in Romania.

“The name "Mü-Gu Kft." stands for qualitative recycling in Hungary and our work is valued appreciated by the population!“

MGG Remat is one of the largest operators of recycling plants in Romania. In addition to its own three recycling plants, the company manages a large number of collection points throughout Romania. Its main activities are the collection, treatment and trading of scrap metal, non-ferrous metals and paper. With the opening of the recycling park in Frumuseni (near Arad) in October 2012, considerable processing capacity was created for the recycling of cable, electrical and electronic scrap. As a result, MGG Remat became one of the largest recyclers of electronic waste. MGG Remat not only ensures proper recycling of end-of-life vehicles, electrical and electronic scrap, iron and non-ferrous metals. With the collection and recycling of paper and plastic waste, Romania-based MGG Remat makes a major contribution to relieving the burden on the environment in Romania.
On this way, we wish both companies a happy birthday and continued success.

„If I can make a wish for our company's birthday, it is that the next 30 years will be as wonderful as the past five have been.“

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