

# SUSTAINABILITY

When visions become successes

**IN THE INTERVIEW**

Frank Rettinger

**E-LEARNING**

Preparing for the future

**TRUCK CATALYTIC CONVERTERS**

Current challenges

## EDITORIAL

Dear reader,

In times of uncertainty and unrest, the term sustainability seems to pass somewhat into the background in organisations. This is a shame because sustainability means nothing other than making provisions for our joint future. For this reason we have decided – contrary to current trends – to make sustainability the focus of this issue of our customer magazine HenRy.

Recycling is in itself an important contribution to sustainability. This fact quickly becomes clear if you compare the emissions from the primary extraction of precious metals with those from secondary production. But such a generalised approach would be too short-sighted. There is more to do – even and particularly in recycling so that we first assess and optimise our internal activities: from our facilities and vehicle fleet – here we have converted to hybrid and all-electric drives – to the PV installation. There are many pieces to the puzzle that in the end form the big picture.

It is also important to have an eye on the entire supply chain: from the collection points for the recycled material to the finished precious metal – we can and want to foster sustainability everywhere. There is much to decide and change. We are working intensively on these issues because we are serious: in 2030 we want to be climate-neutral. For this reason, we have decided on as well as partially implemented a series of measures; we are also involved in research programmes and environmental associations.

The current situation of increasing energy prices and volatile markets is not making it any easier, but we are making every effort to act economically, ecologically and socially sustainably. And that always from the viewpoint of optimal precious metal recycling quotas.

We look forward to being your „first choice“ for precious metal recycling also in future.

  
Clemens Hensel

  
Thomas L. Hensel

  
Oliver Krestin

## INTERVIEW WITH FRANK RETTINGER

In this issue of the customer magazine HenRy, Frank Rettinger talks to us about developments on the e-scrap market and the expansion of the laboratory expertise, among other issues.

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## TRUCK CATALYTIC CONVERTERS

The recycling of exhaust aftertreatment systems from trucks is increasing. Older models mostly do not contain any precious metals. How does Hensel Recycling deal with the different types and which payment models are suitable for recycling?

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## PREPARING FOR THE FUTURE WITH E-LEARNING

Mastering the demands of our time and ensuring the long-term success of the company - that is the goal of the e-learning platform at Hensel Recycling.

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## IN THE FOCUS: SUSTAINABILITY

Large and small projects contribute to the topic of sustainability at Hensel Recycling. Read what has already happened and what is still pending.

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# INTERVIEW

## Prof. Dr Kerstin Kuchta, Hamburg Technical University

Prof. Dr Kerstin Kuchta has been a permanent consultant at Hensel Recycling for the topics of quality management and environmental management since 1998. The range of topics has expanded more and more such that she now also provides advice about health and safety management. With her long-standing commitment and her scientific background, she has provided a significant impulse to our development since the founding of the business. In the interview, among other issues we asked her about important trends in recycling and the measures she is recommending to Hensel Recycling.

**Prof. Kuchta, recycling is an important form of waste recovery. For which materials is recycling suitable? For which is it not suitable? What are the alternatives?**

In general the goal of waste management is to keep all materials in circulation. Recycling is suitable for metal, glass, paper, organic waste. These are characterised by low wear in use and ideally they can be broken down into individual components. Of course there are to some extent technical limits: for example aluminium and magnesium alloys can only be separated metallurgically with difficulty. Recycling technology is continuously advancing also here: with innovative approaches, it is increasingly possible to recycle complex plastics.

Even better than recycling is the avoidance of waste,

along with reuse and longer usage. Anyone who uses their mobile phone for several years - instead of for an average 18-24 months - is doing the environment a favour.

**Precious metals from recycling are considered an important source for covering the demand in industrial production. How has the importance of recycling developed in recent years? And how do you estimate its importance in the future?**

That recycling is making an important contribution to the supply of precious metals is now also known to society. Availability in mines is dropping, the mining of precious metals is increasingly costly. At the same time, recycling methods are becoming ever more efficient. Significantly less acid and energy are now

required for separation. Better measuring technology (matrix method) makes the specific recovery of metals possible. Depending on the metal, recycling is around 75–95 % better for the environment than mining. And if political crises occur in mining countries, supply with secondary raw materials is an important stabilising factor for industrial businesses.

At Hensel Recycling alone, compared to mining around 150,000 tonnes of CO<sub>2</sub> are saved per year by recycling platinum group metals. This corresponds to the CO<sub>2</sub> absorbed by 12 million beech trees per year.

**From your point of view, which sustainability milestones has Hensel Recycling reached in recent years? Which measures contributed to the goal of sustainability?**

In my conversations with Hensel Recycling and looking at the measures implemented, time and again I find that the business is very serious about environmental management, quality management and safety management. The signs of the times were detected at an early stage. Recycling methods are already being developed for fuel cells with the business's participation in the research project BEST4Hy. In this way the company is also safeguarding jobs over the long term,

because the business related to automotive catalytic converters will peter out in the coming decades or, as a minimum, reduce significantly. The commitment to the Bavarian Environmental Pact and the Cluster of Environmental Technologies Bavaria demonstrates that the company's ecological consciousness is integrated deep in the company's DNA. And the new standard for occupational health and safety (ISO 45001) completes the pattern: here the focus is on the safety of employees.

**Which trends are currently dominating the recycling economy? From your point of view, which challenges must Hensel Recycling master in the coming years? Keywords: German law related to due diligence in supply chains and ESG directives.**

New directives and laws primarily demand transparency from large organisations. However, this demand is often passed on from the „big players“ to the „small players“. This has always been the case and is no different for the German law related to due diligence in supply chains. The aspiration at Hensel Recycling to make delivery chains and processes transparent for employees, customers and the public has always existed. As such the company is well-positioned here. Best example: last year a code of conduct – based on



*Compelled to transparency in the supply chain: this means, among other aspects, not tolerating child labour and respecting the right to education and proper child development.*



the German association for precious metals, Fachvereinigung Edelmetalle – was introduced.

#### What do you value in the collaboration with Hensel Recycling?

The exchange of ideas with Hensel Recycling is personally important for me. Of course, I can cast an expert eye at the company from the exterior, raise awareness, identify blinkered attitudes and provide suggestions for improvements. In this way Hensel Recycling can scrutinise its processes and set a benchmark compared to other businesses. At the same time, I can synchronise the work in science with the practice at Hensel Recycling. The knowledge transfer therefore occurs in both directions.

#### Based on your many years as a consultant with a scientific background – what advice would you give Hensel Recycling along the way?

I am very pleased that the goal of climate neutrality has now been formulated. An important contribution can be made here with the project for the photovoltaic installations. Moreover, I would like to encourage further investment in automation, sensors and artificial intelligence. In this way processes can be improved, the quality of the recycled material obtained evaluated more quickly and more reliably, and material flows optimised.



Thank you Prof. Dr Kuchta for the frank conversation and we wish you every success.

## ABOUT THE PERSON

- Since 2019: Vice president for teaching at the Technical University, Hamburg
- Since 2011: Professor for waste resource management at the Technical University, Hamburg
- 2002 – 2011: Professor for energy and environmental management at the University of Applied Sciences, Hamburg

# BEST4HY: HALFWAY POINT IN THE RESEARCH PROJECT

## Development of trendsetting recycling solutions for hydrogen fuel cells

Reliable, efficient recycling solutions for fuel cells, that is the goal of the international research project BEST4Hy. In this way, along with precious metals, also other strategic materials such as rare earths are to be recovered from end-of-life fuel cells so that industrial demand can continue to be covered.

The project, which has a duration of three years, is now at the halfway point. A good occasion to take a look at the initial results. One thing in advance: only very few fuel cells are currently recycled. This means that the research is based on a laboratory-scale recycling method that is intended to provide initial information about recycling on an industrial scale.

The task of the work package for Hensel Recycling is initially to dismantle the fuel cells of type Polymer Electrolyte Membrane Fuel Cell (PEMFC) – only these fuel cells contain precious metals – into their individual parts. And that as environment-friendly and quickly as possible so that an ecologically and economically sustainable recycling method is developed. Current testing is based on fuel cells from research partner EKPO Fuel Cell Technologies.



Bipolar Plate BPP



Rubber Sealant



Catalyst Coated Membrane - CCM



Gas Diffusion Layer

A fuel cell dismantled into its individual parts: bipolar plates, rubber sealants, gas diffusion layers and the Catalyst-Coated Membranes (CCM)



The precious metals are inside the fuel cell on the membranes, however other components of the fuel cell are made of high-quality materials that are worth recycling. During dismantling, the challenge is to replace manual dismantling processes with other methods without losing or contaminating materials. A hybrid method with a combination of manual and mechanical steps appears very promising for separating the bipolar plates, the rubber sealant, gas diffusion layers and the Catalyst-Coated Membranes (CCM).

The dismantling and exposure of the parts of the fuel cell containing precious metals is one element. The other, however, is the evaluation: how much precious metal do the membranes actually contain? How can it be released? This is where our laboratory IDO-Lab comes into play. Samples from the membrane-electron unit are analysed in the laboratory. In the first series of tests, IDO-Lab dissolved the sample in aqua regia and precipitated the platinum concentrate with ammonium chloride. In this way it was possible to recover successfully platinum salt that can flow directly back into the production of fuel cells.

A further technology is undergoing trials. Here two substances, the platinum ink and the ionomer, are to be separated in a solution method using alcohol. This is a method that has not yet been researched. Hensel Recycling and IDO-Lab are finding it an interesting approach because the ionomer could also be used for new fuel cells.

You can find out more about the project in the newsletter from the consortium (Subscribe to the newsletter free of charge here) or on LinkedIn.



You can see the complete dismantling process in the video.



## THE PARTNERS

- Environment Park, Turin, Italy
- Universität Ljubljana, Slovenia
- CEA – Commissariat für Atomenergie und alternative Energien, Paris, France
- Elcogen, Vantaa, Finland
- Polytechnische Hochschule Turin, Italy
- RINA, Turin, Italy
- EKPO Fuel Cell Technologies, Dettingen, Germany
- Hensel Recycling, Aschaffenburg, Germany



## THE FUNDING

The BEST4Hy project has received funding from Clean Hydrogen Partnership (previously Fuel Cells and Hydrogen 2 Joint Undertaking) under grant agreement No 101007216. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation Program, Hydrogen Europe and Hydrogen Europe Research."



# RESI-NORM – RECYCLING PV MODULES

Co-operative research: holistic approach for recycling solar modules

How can the recycling of PV modules be improved? Today various more or less efficient methods and concepts are in use for recycling waste PV modules. However, there is a lack of standardisation of recycling processes for PV modules for the assessment of these methods so that the full potential of the recycling can be utilised.

This is the goal of the »Standardisation of recycling processes for silicon solar modules – ReSi-Norm« project which has a duration of two years and started in April 2021.

The key challenge during the recycling of PV modules is the separation of the functional materials contained in the laminate. Pure separation requires a large amount of energy and process-related effort. This is not always an appropriate approach either ecologically or eco-

nomically. If the material is too heavily contaminated after separation, it cannot be reused for new PV modules. As such it is one of the project's goals to determine an ecologically and also economically appropriate recycling quota.



Manually dismantled crystalline PV module



Currently, three different recycling approaches are used:

**Mechanical treatment:** relatively simple technology, but low recycling depth

**Thermal treatment:** functional materials can be separated, but a large amount of energy and process-related effort is required

**Chemical treatment:** usage of substances harmful to the environment necessary, but high recycling yield possible

A combination of these approaches is necessary to obtain optimal results from an ecological and economic perspective.

#### Closed cycle as the goal

As part of the project, Hensel Recycling is also involved with the issue of the material cycle. How are used modules from building roofs sent to the recycling organisation and who sends them? Who is interested in the recycled material and for which applications? Questions that play a crucial role particularly in closing the recycling cycle.

#### Background

Solar energy is playing a major role in the renewable energy mix for Germany, and also world-wide. By 2030 the International Renewable Energy Agency IRENA

expects up to 2,840 gigawatts of installed solar energy capacity. According to a study by the Fraunhofer ISE, there were already approximately 54 gigawatts of solar capacity installed in Germany at the end of 2020 – that corresponds to two million installations.

Even though the service life of solar modules is very long and they remain in operation for up to 30 years, at some point they must be disposed of and, in the best situation, recycled.

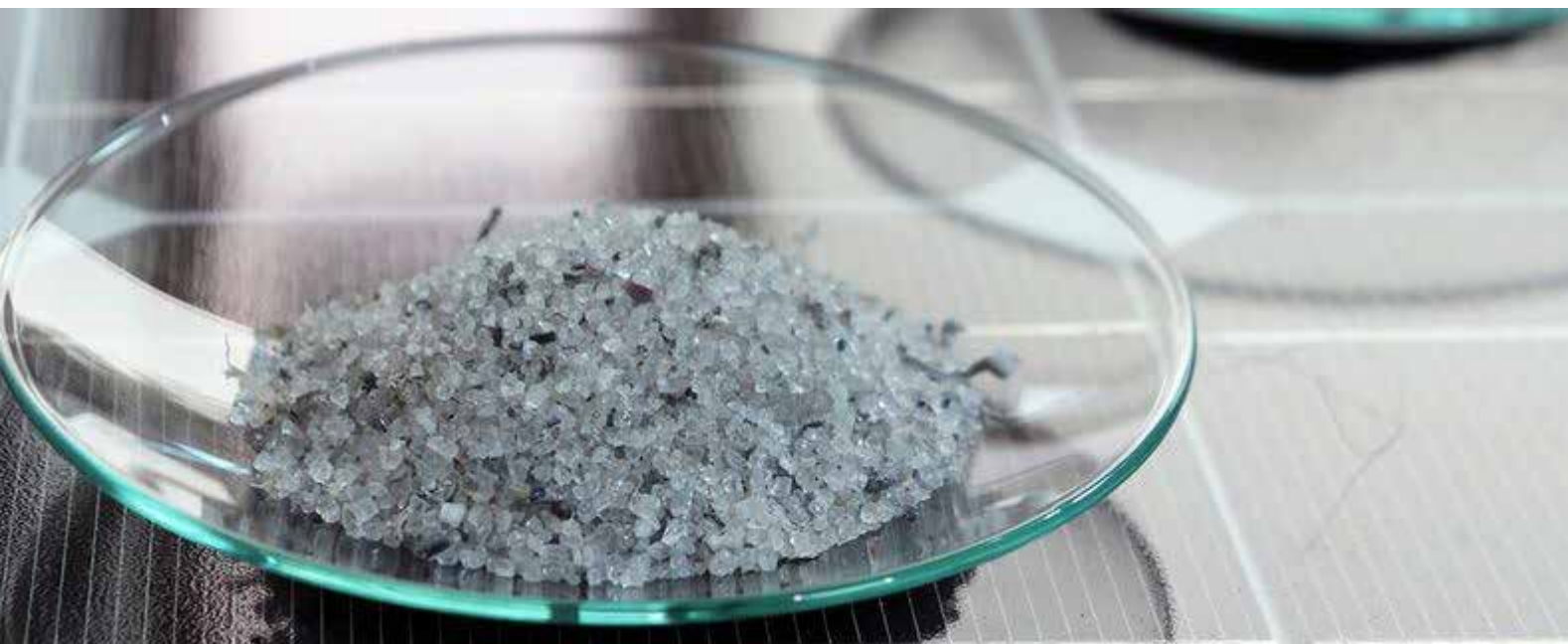
## THE PARTNERS

- Fraunhofer-Einrichtung für Wertstoffkreisläufe und Ressourcenstrategie IWKS, Alzenau/Hanau
- VDE Renewables GmbH, Alzenau
- DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik, Offenbach
- Hensel Recycling, Aschaffenburg

## THE FUNDING

The ReSi-Norm project is funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWi) as part of the „WIPANO“ programme (Knowledge and Technology Transfer via Patents and Standards).

*Glass, foil and silicon fractions*



# FURTHER PROJECTS IN THE AREA OF SUSTAINABILITY

Sustainability on a large and a small scale. There are many starting points for organisations and their employees. Here we describe the different areas in which Hensel Recycling has been involved for the good of the environment and society in recent years and months.

## Membership of the Cluster of Environmental Technologies Bavaria

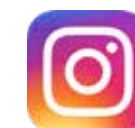
Over the years Hensel Recycling has built up a broad network in a wide variety of sectors and is a partner in prominent associations and research projects.

Since 2022, Hensel Recycling has also been a member of the Cluster of Environmental Technologies Bavaria – a network in the Bavarian environmental economy. Here politics, research, science and commerce work together closely with the goal of strengthening medium-sized Bavarian businesses and establishing a network between businesses and research institutes. The expertise available in the network is varied and covers a wide range of areas such as waste & recycling, resource efficiency & material flow management, water & waste water, air pollution control and also alternative power generation as well as soil & site remediation.

„We are pleased to be part of the Cluster of Environmental Technologies Bavaria. As a medium-sized recycling business, we always aim for advanced, environmentally sound recovery solutions for materials containing precious metals. It is our goal, together with a strong network of partners in industry and research, to implement sustainable, forward-looking projects in the recycling economy“, says Oliver Krestin, Managing Director of Hensel Recycling.



[www.umweltcluster.net](http://www.umweltcluster.net)



## Founding member of the climate protection enterprise network

For organisations on the route to climate-aware commerce, the Association of German Chambers of Industry and Commerce (DIHK) has set up a platform and is recruiting organisations to participate actively. The core of the project is a digital platform used for networking and knowledge sharing between members.



On the platform there is a varied range of specific, practical aids, events and qualifications in the area of industrial climate protection. Hensel Recycling is a founding member. The platform became operational in May 2022.

[www.unternehmensnetzwerk-klimaschutz.de](http://www.unternehmensnetzwerk-klimaschutz.de)



## Utilising the power of the sun

The engineering team undertook a major project with the solar installation at Hensel Recycling. The planning phase started over a year ago. In summer 2022, 558 modules will be installed on the roof of the logistics building in the first phase. But this is not all: „Gradually other building roofs will be equipped with solar modules, up to a total of 1268 modules“, emphasises sustainability officer Sascha Ziese. „In this way we are setting an important cornerstone in the direction of climate neutrality“.

However there is more to the project than just the modules. Inverters and transformer stations are required for the installation to function. These act as the connecting elements between solar modules and the electrical power supply network and convert the direct current into alternating current. „The crux for commissioning is here: the transformer stations required are only expected to be delivered in October because they are affected by current world-wide delivery shortages in the electronics industry“, explains Oleksandr Braun, Director Engineering at Hensel Recycling.

## GOOD REASONS FOR A SOLAR INSTALLATION

A good site: with 1074 kWh per square metre, the annual total global solar radiation is around 100 kWh per square metre higher in Aschaffenburg than the average in Germany.

The investment will pay for itself in an estimated 7 years – assuming a 3 % increase in the price of electricity per year. With a service life of 20 years we will – stated simply – have free electricity for 13 years.

With a PV installation of the size we have planned, there is a saving of almost 1.7 million tonnes of CO<sub>2</sub>.

Self-sufficiency makes us more independent: in the expansion stage we expect a level of self-sufficiency of around 40 % and therefore a significant reduction in our ecological footprint.



Here solar energy can be harvested in future: the logistics building with PV modules (from a model)

## Sustainability premium

Hensel Recycling is linking the incentive for environmentally sound behaviour to care for personal health by means of the sustainability premium for employees. Just how closely these two are related is shown by the example of a change in the way we commute: an employee who comes to work by bicycle or on foot, instead of by car, saves CO<sub>2</sub> and is also doing something good for their well-being and health.

However, the sustainability premium also takes into account regular units of sport. This commitment is honoured with a points-based system and rewarded with a credit note at the end of the year. Whether a massage, annual pass for the swimming pool, shopping voucher for the organic market or the bicycle shop, anyone who takes part has a free choice here.

## Social sustainability

Donating and personal commitment for people who are less fortunate - the activities at Hensel Recycling are varied and undertaken eagerly by the workforce. Whether assistance for people with disability, illness or people threatened by crises – the willingness to help is enormous. The donations come from the heart and are not just limited to monetary and material donations: labour is also provided to give assistance. Hensel Recycling and its employees are involved with the following organisations, among others:

- DU MUSST KÄMPFEN (You have to fight) – a foundation for children with cancer
- Förderverein der Kinderklinik Aschaffenburg – a fundraising group for the Aschaffenburg children's clinic
- Initiatives to provide help for Ukraine
- Blinden- und Sehbehinderteninstitut, Aschaffenburg – an institute for blind and partially sighted people in Aschaffenburg



Hard at work collecting and donating: Hensel Recycling and its employees making an effort for Ukraine



## CITY CYCLING - we are taking part again

We took part in the national CITY CYCLING campaign for the sixth time. CITY CYCLING is a 21-day competition during which as many everyday journeys as possible are to be made in a climate-friendly manner using a bicycle.

### Background

According to the German Ministry for Transport, Building and Urban Affairs, around 7.5 million tonnes of CO<sub>2</sub> could be saved in Germany alone if approximately 30 % of short, inner city journeys were made using a bicycle instead of a car.

### Promoting the attractiveness of cycling

The campaign is linked to the citizen participation platform RADar to make cycling even more attractive for a larger portion of the population. There cyclists can report problems such as potholes and confusing junctions directly to their local authority.



### Our contribution

This year the campaign was from the 16th May to the 5th June. A total of 15 employees from Hensel Recycling participated and diligently pedalled miles for the sake of the climate.

### Impressive figures

While at the time of going to press, the figures for 2022 were not yet available, last year a total of 1038 people from our region took part and saved 30 tonnes of CO<sub>2</sub> with around 200,000 kilometres.

### And the rest of the year?

A three week campaign is all well and good. Hensel Recycling makes it possible for all employees to lease a company bicycle on favourable terms and in this way contribute to improving our climate footprint the whole year round.



# INTERVIEW

## with Frank Rettinger



Frank Rettinger has been with Hensel Recycling since 2007. From 2013 to 2017 he was summoned to Great Britain where he built up the local subsidiary and worked as Sales Director and Managing Director, among other tasks. He is currently a board member for the English subsidiary and in the last four years since his return to Germany he has been involved in the establishment of the e-scrap recycling department in Aschaffenburg. Since October 2021 he has also been a Prokurist for IDO-Lab. In this issue of the customer magazine HenRy Insight, he talks to us about developments on the e-scrap market and the expansion of the laboratory expertise.

### Which developments are currently characterising the situation on the electronic scrap market?

More and more products contain electronic parts. Electrification is reaching more and more areas of life. As such, it can be assumed, in principle, that there will be growth in electronic scrap recycling. However, in general the precious metal content of electronic components is dropping. More and more products with internal rechargeable batteries (e.g. smartphones and tablets) are being sent for recycling. This means the batteries must be removed before further processing. Growth can be expected in this material flow in the coming years. The portion of mobile phones is increasing more and more.

### Electronic devices currently have significantly longer delivery times, prices are increasing. Will this situation affect the recycling market?

Yes, there are shortages in the electronics market. The Corona pandemic and the energy crisis in China have caused some upheavals on the market. The delivery problems with processors are on everyone's lips and causing delays in otherwise stable delivery chains. As such the demand for reusable processors and other components is currently very high.

### Electronic scrap recycling does not always have the best reputation. There are stories of child labour at illegal tips in Africa. How is Hensel Recycling positioned in this context?

There are indeed shocking images. We at Hensel Recycling monitor our supply chains, document them and are very strict in relation to these issues. We do

not accept any material that appears suspect to us. This year we will introduce an updated „due diligence questionnaire“. Many of our business partners and customers are currently increasing the severity of their legitimization criteria, undertaking audits and keeping an eye on delivery chains. Along with the statutory provisions, we are also subject to the „Responsible Sourcing Guidelines“ issued by the LPPM (London Platinum & Palladium Market) and the LBMA (London Bullion Market Association) and have signed the code of conduct of the German association for precious metals, Fachvereinigung Edelmetalle. The issue here is the observance of ethical principles, conformity with the law and sustainability.

### About the everyday situation in electronic scrap recycling at Hensel Recycling: what is the current situation in processing?

By moving the recycling facility to a different building, we were able to improve the workflows because the distances between acceptance, storage and processing are now significantly shorter. This change means shorter throughput times and fewer queues. There is also currently no capacity bottleneck at the refineries such that everything is running smoothly.

### For years there has been a catalytic converters app for customers with which they can evaluate their stock locally. Is there anything comparable for e-scrap?

Currently we inform our customers about price changes by means of price lists and catalogues sent by e-mail. However, we are also developing an app for electronic scrap similar to that for the catalytic converters.





# FRANK RETTINGER

## DATE OF BIRTH

18.03.1980

## TRAINING

- Industrial commercial manager
- Business administrator

## POSITIONS AT HENSEL RECYCLING

- Head of department, e-scrap recycling
- Authorised Officer IDO-Lab GmbH
- Director Hensel Recycling (UK) Ltd.



## MY STRENGTHS

Loyalty, discretion, good listener

## MY MOTTO

The journey is the goal (but you should know roughly where you are going)

## WHAT REALLY ANNOYS ME

Ignorance

## WHAT I REALLY LIKE

Good music, the mountains

## WHAT RELAXES ME

Our dog, creativity

## WHAT IS TYPICAL FOR ME

I need a coffee first thing in the morning

## WHAT I WOULD LIKE

A little more respect in this world

## WHAT I LIKE TO HEAR

Soul, funk, Motown, rock, indie,... but I am not rigid about my music choices!

## WHAT I LIKE TO READ

Main-Echo, a good book while on holiday

## WHAT I LIKE TO WATCH

Tatort (German crime series), Dexter, The House of Paper

## I AM A FAN OF

Banksy



Further interviews with Frank Rettinger on YouTube:

Here our customers will then have access to the latest daily data sets at any time.

Since autumn 2021 you have been a Prokurist (company officer with statutory authority) for IDO-Lab. What is your task there?

I am responsible for all administrative tasks (for example related to the personnel) and act as the interface to the senior management of Hensel Recycling. I am also trying to build a bridge between Karlstein and Obernau. In addition, IDO Lab wants to expand its expertise in the field of e-scrap analysis and I am a good sparring partner for the head of the laboratory with my knowledge of electronic scrap.



The previously ashed raw sample (circuit boards) is enriched with copper and remelted so that a copper ingot is produced at the end.

On what new topics is IDO-Lab currently working?

On the one hand, of course, on the development of recycling solutions for fuel cells in the context of BEST4Hy. Furthermore, we also want to simplify and at the same time improve the analysis with a new method. A further analysis method will be available soon with the aid of the recently procured spark OES machine.

To what extent will the laboratory play a central role in the business model of Hensel Recycling in coming years?

The laboratory is important to us for various reasons: because the compositions of catalytic converters, electronic scrap, fuel cells, etc. vary significantly from manufacturer to manufacturer and from model to model, it is important to know which precious metals they contain and in which quantities. It is also necessary to know which other materials they contain, on the one hand to send them for recycling and, on the other hand, to comply with the recipes stipulated by the refiners. For example think about the SiC content: SiC is only accepted by the refiners within certain bands. Furthermore, the laboratory is also a supplier of data for the catalytic converter and e-scrap library and therefore for the apps our customers use.

Mr Rettinger, many thanks for the frank conversation and we wish you continued success at Hensel Recycling.



With the help of the ARL iSpark (spark OES), the surface of the copper bars is "sparked" and the light emitted is measured. This enables determination of the copper, silver, gold and palladium content in the bar



# RECYCLING TRUCK CATALYTIC CONVERTERS

## Current challenges

The market for recycling truck catalytic converters is growing. On the one hand, this is due to the active replacement by the manufacturers of Euro VI standard exhaust aftertreatment systems during recalls. On the other hand, more and more Euro IV and V exhaust aftertreatment systems are arriving in scrap yards due to the truck scrapping premium. As a rule, these systems do not contain a precious metal coating. Nevertheless, in the wake of the scarcity of raw materials they should be recycled in an environmentally sound manner. Newer Euro VI systems, in use since 2014, are coated with precious metals such as platinum or palladium.

### Complete systems or only the individual components?

In most cases, several catalytic converters and filters of varying type are installed in exhaust aftertreatment systems. Those catalytic converters – or their components – that contain precious metals are of primary interest for Hensel Recycling. For the manufacturers, taking back diesel particulate filters is important as, after cleaning and regeneration, these filters can be installed in new systems. They are carefully removed by Hensel Recycling during the dismantling of

the systems and returned after a visual inspection. Alternatively, there are companies on the market who dismantle the truck exhaust aftertreatment systems themselves and only send the parts containing precious metals to Hensel Recycling for the recovery of the precious metals.

„For these customers we offer the proven purchasing and fast settlement model“, says Stefan Popp, head of national sales. Payment for the purchase is based on the precious metal content determined for the



We receive different truck exhaust aftertreatment systems in the recycling process

specific model, the quick settlement is made based on an XRF analysis. For manufacturers of trucks with high quantities the processing model, supplemented with a series of additional services, is particularly interesting.

### Complex logistic and dismantling method

One truck exhaust aftertreatment system weighs between 80 kg - 220 kg and mostly takes up a whole Euro pallet. In comparison, it is possible to transport and store around 100 automotive catalytic converters in the same space. Hensel Recycling takes over the administrative tasks in relation to transport: the planning, correct customs clearance and compliance with waste management legislation. The Hensel Recycling team also takes care of the return of load carriers.

Due to the high weight, handling in recycling is also cumbersome: two people are necessary to load the new dismantling station at Hensel Recycling, and two more for opening the systems using the plasma cutter. With the new station we can dismantle around 1200 systems per month. That is an increase of more than 100 % compared to the previous dismantling station.

„Nevertheless, capacity is scarce“, explains Henning

Huth, product manager for truck catalytic converters „because manufacturers have a large quantity of used systems in stock due to the replacement campaign.“ In addition, systems are coming in smaller quantities from scrapyards and recyclers.

### Truck catalytic converter library

In the area of automotive catalytic converters, an on-line database that registered customers can access has proven beneficial. Based on this example, there is also a library for truck exhaust aftertreatment systems at Hensel Recycling. The complete systems are added to the library with numerous images as well as detailed descriptions. The latest daily prices are calculated from the precious metal content determined.

„Dismantling and the laboratory work very well together on continually expanding the library with new models“, emphasises Henning Huth. The library already lists 150 systems and more are added every month.

[Download the brochure here](#)  
„Raw material recovery from truck catalytic converters“



After dismantling, you can see what was really installed in the exhaust aftertreatment system





# PREPARING FOR THE FUTURE WITH E-LEARNING

## Personnel development 2.0

Online applications have had a significant boost, particularly due to the Corona pandemic. Many events and also training courses were offered in digital form.

Hensel Recycling has also held internal training courses, for example related to the organisational management system, in digital form. This change was very well received by the employees. For this reason, it has been decided to further expand digital learning and we have implemented our own e-learning tool. The „Hensel Recycling Academy“ provides an ideal platform for employees to further develop, to improve their qualifications and to optimise processes. What are the advantages of such a tool?

Most important is the high degree of flexibility. Every employee can access the academy at any time, from anywhere, using their personal login – whether from their mobile phone or PC, at home or in the office. An individual study plan makes possible targeted further training – to suit the area of activity. A differentiation is made between mandatory courses, those which must be undertaken at a certain interval, and voluntary training you can put together yourself.

With the platform it is also possible to take a short knowledge quiz about the contents learnt at the end of a training course to record and track the related learning progress. In this way employees can check

whether the contents have been understood and the results are then saved in the system.

The courses are offered in various formats – whether as a training video or as a presentation – always with the premise of depicting the course contents in an interesting, informative and entertaining manner. Learning is not just intended to convey knowledge, it is also intended to be fun and increase motivation. As a result the inquisitiveness and initiative of the employees is encouraged and personal further development intensified.

Because all learning materials are saved in one place, they form a complete, comprehensive knowledge database that provides a transparent overview at any time.

„E-learning is an important way for Hensel Recycling to master the requirements of our times, and to secure corporate success over the long term“, says Managing Director Oliver Krestin.

# NEWS FROM AROUND THE WORLD

## Women in PGMs

The intention of the Women in PGMs network is to encourage the exchange of information between women who work in the precious metals sector. For this purpose committed, professional women in the complete chain – logistics, mining, market research, recycling, disposal, etc. – are brought together. The network makes it possible for them to exchange opinions and experiences. A mentoring programme is intended to promote female talent. The intention is to increase the potential of women in the rather male-dominated precious metals world and prepare companies for the future with more diversity.

The network is divided into three chapters: the American Chapter, the Asian Chapter and the European Chapter. Hensel Recycling is represented in the European Chapter by the business development manager, Anna Marchisio, who is a member of the governing body there. Among other events, she jointly organised the „Shaping the future of the PGM Industry“ event held in London in May this year.



„I am pleased to work for Hensel Recycling in this network and that women can learn and profit from one another“, says Anna Marchisio.

Women in PGMs on LinkedIn



## New Cross Flow Shredder in the USA



A Cross Flow Shredder, CFS for short, is used in the recycling of metal catalytic converters. It is used to separate the washcoat containing precious metal from the metal carrier. This machine is to be replaced at Hensel Recycling North America in September 2022.

With the new model, the maintenance team will profit from the easier removal and installation of the plates inside the CFS.

These plates are no longer welded, but bolted in place instead. The CFS in Obernau was replaced similarly in May 2021 and it has been possible to reduce down-times due to maintenance.



## Sampling system for Australia

On the Victoria site in Australia, a so-called MQSS has been put into service. Employees from the engineering department in Aschaffenburg were on-site during installation and commissioning.

MQSS stands for „Medium Quantity Sampling System“. Similar to the small quantity sampling system in Aschaffenburg, it is possible to offer quick settlement based on an XRF analysis using the MQSS. With the MQSS, the site in Australia can attend to its customers more quickly because the analysis result is available promptly.

The MQSS can work through around 400 kg of pre-crushed monolith per hour. It is filled using Big Bags; the contents of the Big Bags are transferred to a vibrating channel with the aid of a crane station. From the channel, the material is conveyed into the grinder.

If foreign objects such as steel residue can be seen, these are removed manually before they enter the grinder. After grinding, the material passes through the sample divider where a representative sample is taken and then analysed in the laboratory.



After installation and commissioning in Victoria: satisfied faces on the engineering team



## Stardust - A Processing system for SiC Material with high carbon content

While rare on Earth, silicon carbide (SiC) is remarkably common in space. It is a common form of stardust found around carbon-rich stars, and examples of this stardust have been found in pristine condition in primitive (unaltered) meteorites.

The silicon carbide found in space and in meteorites is almost exclusively the beta-polymorph. Analysis of SiC grains found in the Murchison meteorite, a carbonaceous chondrite meteorite, has revealed anomalous isotopic ratios of carbon and silicon, indicating that these grains originated outside the solar system.\*

Hensel Recycling and Arc Metals have formed a project-partnership to process SiC material from diesel particulate filters (DPFs). Arc Metal will bring its metallurgical expertise for smelting complex material like auto catalyst and precious metals containing slag to the project. Hensel Recycling will source the material through its global network and is in charge of sampling and precious metals management.

In the past years multiple trials took place in a pilot plant in Hofors, Sweden with very good performance result. From the experience with the pilot plant the Arc Metals team scaled the process up to a 2.500 t/y reactor that is currently commissioned and will be ready to process material starting Q3/2022.



*Diesel particulate filters with a high SiC content have been increasingly entering the recycling cycle for several years*

„With the new process Hensel Recycling can offer a dedicated smelting and refining process for auto catalyst material with high carbon content that is usually not easy to process“, says Managing Director Oliver Krestin.

\* Kelly, Jim. „The Astrophysical Nature of Silicon Carbide“. University College London. Archived from the original on May 4, 2017. Retrieved 2009-06-06.





Global Recycling Day



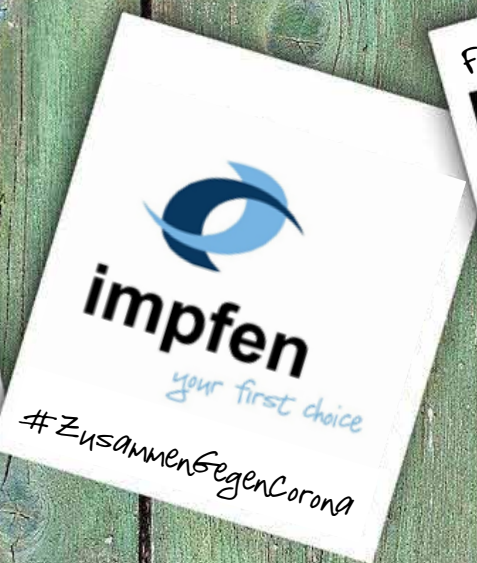
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## IMPRESSUM

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