

RE: THINK

Tackling climate change means thinking big. Across generations, markets, borders and beyond



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Study proves the circular economy has a positive impact on the climate



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MICHAEL SCHNEIDER

A few words upfront

Are you asking yourself what this magazine is that you're holding in your hands? What's happened to the REMONDIS AKTUELL? Surely it's part of the company just like the lorries on the road.

What's happened to the REMONDIS AKTUELL?

Just as REMONDIS no longer stands for waste collections, the printed REMONDIS AKTUELL magazine no longer reflected the company's most recent news nor did it provide a full presentation of our Group's activities. Three times a year, the editorial team had to decide which topics would make it into the next issue. Developments from a whole host of business divisions from all around the world, events from three months ago, three weeks ago, three days ago – they were all competing with each other. By the end of the process, the seemingly most important subjects were summarised on 34 pages.

There were too many events happening in our Group every day. There was too little space to tell all the news. For a while now, this situation has not been able to live up to the demands of good, modern corporate communications.

There is some good news though: REMONDIS AKTUELL has not been completely scrapped. To be able to really live up to its name (the German word 'aktuell' means 'current' or 'up to date'), you can read all about the REMONDIS Group's latest global developments in a dynamic online blog run under the same name: www.remondis-aktuell.de. To ensure that REMONDIS AKTUELL readers never miss out on what's happening at our company in the future, we have set up a push notification service that will send new articles straight to their smartphone or tablet. If you'd prefer to get a monthly overview of our news, then simply sign up to our newsletter.

LENA LANGENKÄMPER

ANNA EPHAN

And what is RE:VIEWS?

There are some topics that need more time and more space. They are particularly important for our industry, our environment and our society. They are too complex for us to read in the five minutes between two meetings. They need our special attention and they need a special stage. We have created this stage with our new printed magazine RE:VIEWS.

Its name says it all. REMONDIS is the sender. It will focus on the people and the trends in our three business divisions: recycling, services and water. As a Group, we turn the spotlight on specific subjects, provide detailed background knowledge and air some opinions. And not just our own - but those on the other side as well. RE:VIEWS enables us to reflect, assess, get things in order. We want to hear other opinions, get people to make guest contributions, enter into a dialogue with them. We discuss topics that affect and motivate the industry - and those that should motivate it more. We discuss subjects with passion and emotion if that's what's required or in a more factual and scientific way so that the readers can form their own opinions. We show you what we are made of and who we are. Why not take a look for yourself?!

O ur company has taken the next step towards sustainable communications with this first issue of our new magazine RE:VIEWS. Its fresh design and interesting content, its quality accounts and first-rate interviews all show in a vivid way what is on our minds and what is driving us forward – both now and in the future. Much has happened over the last years and decades and the world has undergone some profound changes and not just when it comes to the water management and recycling sectors. This is an ongoing process. What it comes down to is making sure that we constantly play an active role in shaping these changes. I am often asked what I think the key to success is.

Our success as a family-run company – which my father Josef founded as a small forwarding business 88 years ago – is essentially based on two factors: cross-generational tenacity and sticking to the principle of leaving the income earned in the company. Such growth would have been impossible if we had not followed this long-term strategy of reinvesting in the business. Let me use a nautical comparison to explain what I mean. We realised very early on that the manoeuvrability of a large, cumbersome tanker would prevent us being able to change direction at short notice if we needed to. Instead of having a huge ship with one captain who decides whether to turn to starboard or to port, we looked from the start to have a fleet of autonomous speedboats that – while sailing under the same flag – could for the most part operate independently. Each boat effectively has its own captain and can react quickly and flexibly to any market changes. At the same time, everyone benefits from a certain collective intelligence. And so, over the decades, a network of subsidiaries and associated companies have come into being, each with their own managing directors working as independent entrepreneurs. That, too, is part of our success.

EU member states have realised that some of the most urgent problems of our time cannot be solved without a well-functioning circular economy. This realisation was officially set out in writing for the first time in the EU's Green Deal when the circular economy was defined as one of the mainstays in the battle against climate change. This step truly was a milestone. Nowadays we know that recycling has an even greater benefit. Recycled raw materials are a local source of materials and strengthen supply chains. The pandemic has certainly shown us just how vulnerable supply chains can be. And, besides reducing CO₂ emissions, recycled raw materials also enable local industry to be less dependent on imports. This secures business locations and jobs and strengthens the country's economy. The impact of the war in Ukraine has also made it clear just how important this all is.

ا 1 "Being a family-run company, we view things on a very long time scale – yes, even one that crosses generations. This means that when we decide to work on a project, to enter new markets or to invest in new technologies then we are in it for the long term."

> **Norbert Rethmann,** Honorary Chairman of the Supervisory Board of the RETHMANN Group

The EU, therefore, would be well advised to continue to pass smart and ambitious legislation and make such legislation obligatory for all member states. For these laws to actually be put into effect, however, countries need to draw up national regulations that reflect the EU's rules and take the exact requirements of their region into account. For the moment, the main problem will continue to be enforcement. There are too few opportunities available to monitor activities and ensure the laws are being systematically implemented. What other explanation is there for the almost one million tonnes of e-waste that are still being illegally exported rather than sent to our modern recycling facilities? There are not enough options to carry out checks here and perhaps a lack of assertiveness as well.

Just occasionally, there are still some countries in the EU that give the impression that transitioning to a circular economy is something of a burden. Which is why I believe one of the most important tasks of the future will be to show that the circular economy is not an expensive luxury but a great opportunity for a resource-friendly, climate-neutral economy and for the future of our community.

Being an international, family-run company, we always lead by example. We need to prove every day that we can run a successful business with recycling and with all its positive side-effects – all the way through to producing renewable energy, such as biogas from biogenic residue. Only then will those countries in the EU that have perhaps not reached this point yet be happy to set up similar systems.

However, to be able to this, we also need a free European single market with open borders. If people finally recognise waste for what it is – namely a sustainable source of raw materials and energy – then there is no reason for closing the border to these materials. We don't close our borders to lithium from Chile or to copper ore from Australia. Raw materials – no matter what form they may take – are a global commodity and the world's economy can only have a secure supply of raw materials if borders are kept open. Especially as recycling will not, of course, be able to cover global demand for raw materials by itself in the foreseeable future.

Furthermore, producer responsibility needs to be extended so that the very most can be made of the raw materials in waste. This is an important instrument for ensuring products are designed sustainably over the long term. Positive incentives are needed to promote ecodesign. The ultimate goal here must be for preferably all products and packaging to be designed so that as many - if not all - of the raw materials used to make them can be recovered, recycled and returned to production cycles. Businesses that choose not to produce according to the principle of sustainability must be held accountable in some way or other. It is up to the policymakers how this should be done, whether it be regulated via tax disadvantages or an increased CO₂ surcharge for example. Whatever happens, what we need are products that are of a better quality and more sustainable.

Looking at EU level, we believe the next important step is to introduce a no-compromise landfill ban across the whole of Europe. We did this in Germany back in 2005 when the so-called TaSi [Technical Directive on the Recycling, Treatment and Disposal of Municipal Waste] came into force. Put simply, this directive stipulates that waste with an organic content of over 5% must be processed before being sent to landfill. This effectively meant an end to household waste being landfilled in Germany. Many protested against this at the beginning saying that this couldn't work because of the huge volumes of materials. Then a large number of thermal treatment facilities were built to handle the vast amounts of waste. It soon became clear, though, that this would lead to many recyclable materials being lost to us forever and so a recycling infrastructure was gradually set up, primarily with funds from the private sector.

The TaSi has had an incredibly positive impact. No more methane – a gas so damaging to our climate – being emitted from our landfills, no more filthy mountains of waste at the gates of our cities, households separating their waste so that as few materials as possible have to be incinerated. This single measure has had the biggest and best effect on ensuring there is a secure supply of sustainable and climate-friendly raw materials by increasing recycling.

German policymakers are currently struggling with the idea of global champions and, when in doubt, err on the side of being critical of company growth. This is reflected by the fact that our Federal Cartel Office has added Section 39a to the GWB [Act against Restraints of Competition] that now allows the Office to take a critical look at takeovers that involve a turnover of under €17.5 million and, under certain circumstances, to prevent them. Private sector companies, such as REMONDIS, are being portrayed as having a powerful position in the market for kerbside collections - a position that we simply do not have. It is, in fact, the public sector that has a market share of 50% or even 70% in some of our German states. German antitrust law stipulates that there must be an objective review of the sector and such a review should certainly not ignore the share held by the public sector. For my part, I believe people's concerns that medium-sized businesses may die out to be unfounded. Small and medium-sized service providers will continue to help develop the circular economy - such an important project - at local and regional level. This was how REMONDIS itself began.

At the end of the day, Europe's ambitious project of achieving climate-neutral water management and recycling sectors can only succeed if private and public sector companies of all sizes cooperate with each other at all levels. One fact that must not be forgotten here, however, is that the problems facing us today – climate change, environmental protection, resource conservation, raw material supplies, stable supply chains – are so big that they can only be effectively handled by bodies and businesses that have the size to do this. France picked up on this a long time ago. A merger in the country between two large competitors, both of them considerably bigger than us in their own right beforehand, was expressly called for and supported by the state. In contrast, here in Germany, we have to effectively justify every takeover no matter how small. It is our wish that growth not be impeded but promoted so that that the mutual goal of decarbonising the economy and key services can be achieved. Big challenges can't be solved by thinking small scale nor with hasty operational reactions.

Being a family-run company, we view things on a very long time scale - yes, even one that crosses generations. This means that when we decide to work on a project, to enter new markets or to invest in new technologies then we are in it for the long term. Most of the revenue from these activities is ploughed back into the business to secure the company's long-term growth and, as a result, to secure thousands of jobs. Publicly listed companies do not have this advantage. For the most part, people investing in these businesses want to see a short-term return, be it dividends or a growth in the share price. Investment companies have often already planned their profitable exit strategy when they invest in a business. This is an approach that is quite foreign to us. We see ourselves as being a long-standing, reliable partner for local authorities, commercial businesses and industrial firms. We are always approachable and when we go somewhere, we are there to stay.

With this in mind, I wish you well and very much hope you enjoy reading our RE:VIEWS magazine.

Yours

Norbert Rethmann

RE: VIEWS

his second decade of the 21st Century is proving to be a period of very complex challenges. Firstly, there are the impacts of climate change that are causing extreme weather events, species extinction, land loss and famine.



"Big challenges can't be solved by thinking small scale."

And, as if this was not a big enough problem for the world to face, along came the Covid pandemic, which more or less brought the global economy to a standstill for two years and paralysed whole communities, to say nothing of the loss of human lives. And now there is the war in the Ukraine, a conflict summoning echoes of the past that has shown us just how fragile peace - something we'd taken for granted - really is. The world has reacted with outrage and with sanctions. The war in Eastern Europe has further aggravated the shortage of commodities on the global markets - so much so that it is now impossible to get hold of certain goods or the prices are unacceptably high. Just like under a burnthinks on too small a scale and how Germany can learn from France. An interview with Thomas Conzendorf, a member of REMONDIS' board of directors.

Why the German Federal Cartel Office [Bundeskartellamt]

ing lens, it is possible to observe how the collapse of global supply chains, brought about by the war, has had a negative impact on our own economy and increased procurement pressure.

In this respect, the pandemic, climate change and the war all have something to do with the circular economy as well, be it directly or indirectly. Take climate change as an example: Back in December 2019, the EU named the circular economy in its Green Deal as being one of the key industries for achieving climate neutrality by 2050. The EU's Circular Economy Action Plan states that volumes of municipal waste in the EU must have been halved within a decade if this goal is to be reached. Over the long term, all products and packaging must be designed so they are fully recyclable so that all their raw materials can be recovered and reused. A lot of catching up needs to be done in this particular area, especially when it comes to plastics.

And this is also one of the keys to solving the problem of the growing shortage of raw materials. The energy sector, industry and manufacturers are all highly dependent on supplies of commodities from other countries, some of which are politically unstable.



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"We're always hearing people say: more investments, lower consumer prices and as much competition as possible. That simply cannot work over the long term."

Timotheus Höttges, CEO Telekom

While it can't do it by itself, the circular economy can certainly play a part in solving this problem. By systematically recovering raw materials, it can mitigate supply bottlenecks and not only reduce the economy's dependency on imports but also improve its climate footprint. Renewable energy produced by the circular economy – such as biogas, biodiesel and electricity and heat from thermal treatment – takes the pressure off the energy sector. Recycled raw materials – such as scrap iron and steel, aluminium, copper, non-ferrous metals, plastics, wood, paper, glass, textiles and residual chemical materials – make the country and its European neighbours more independent and more climate neutral.

Looking at local community level, the pandemic has shown that the services provided by councils are essential services. What had been taken for granted in the past has now caught the public's attention: a country cannot function properly without the circular economy. Recycling begins with smart recyclable product designs and continues with the kerbside services provided by the waste management sector. The challenges are very big indeed. And so it is only logical that we must think and act big if we are to overcome them. Governments in other countries have recognised this fact and rather than hampering company growth have taken steps to promote it. Here in Germany, however, a special law regulating monopolies is obstructing growth even at local and regional level - and, in extreme cases, preventing it altogether. In the following interview, REMONDIS board member Thomas Conzendorf explains what's behind Section 39a of the GWB [Act against Restraints of Competition], why the Cartel Office's view of the market falls short and what this all means for the future.

RE:VIEWS: Mr Conzendorf, in a recent podcast, the CEO of Telekom, Timotheus Höttges, criticised the restraints of competition in his industry in Germany. His words were: "We're always hearing people say: more investments, lower consumer prices and as much competition as possible. That simply cannot work over the long term." Do you believe the same is true for the circular economy?

"If we want to solve the urgent problems of our time, then we must allow those businesses looking to do this to grow both within and beyond Germany."

Thomas Conzendorf, REMONDIS Board Member

Thomas Conzendorf: In principle, yes. Mr Höttges's criticism here was aimed at the demands to extend the network, 5G and the high investments that these will involve. There needs to be a certain minimum critical size if these requirements are to be fulfilled. This is not possible if the market is too fragmented. Germany has created yet another catch-22 situation.

RE:VIEWS: So where would you draw a parallel between the telecoms sector and the circular economy?

Thomas Conzendorf: The EU's Green Deal has certainly turned the spotlight on our industry and our services. Having said that, though, the demands on our industry have also increased massively. We should make industry more independent and more climate neutral, contribute towards the energy transition and energy self-sufficiency, recover raw materials on a grand scale and, of course, offer local authorities and all their residents a good, clean and affordable infrastructure and services – even when the pandemic made it almost impossible for us to carry out our business. If we are to live up to and meet all these expectations then we, too, need to make some big investments and have a minimum critical size. Antitrust laws are preventing us from doing this in important sections of the market. The two simply don't fit together.

RE:VIEWS: So which laws are restricting growth?

Thomas Conzendorf: It can all be put down to Section 39a, which was added retroactively to the amended version of the GWB. This section gives the Cartel Office the power to extend its merger control, purportedly to stop so-called killer acquisitions of individual companies within an economic sector. The Office has got carried away here on both local and regional markets and has bluntly announced its intention to check whether the RETHMANN Group, which it specifically named, must notify them of small takeovers as well in the future. We believe that this cannot be reconciled with the fundamental principle of equality.

RE:VIEWS: Aren't there strict preconditions determining when this section may be applied?

Thomas Conzendorf: There must have been a recent review of the sector before the section can be applied. From a legal point of view, all the Cartel Office has to do here is to initiate a limited survey of the market. As far as REMONDIS is concerned, this is simply not enough. >>

Section 39a GWB

Merger control below the turnover threshold

The 10th amendment of the GWB [Act against Restraints of Competition] came into force on 19 January 2021. This contains a new regulation – set out in Section 39a – that extends the power of the Cartel Office to review mergers. According to these new rules, the Federal Cartel Office can, under certain circumstances, compel a company to notify it if it intends to take over another business in one or several economic sectors even if the turnover threshold set out in Section 35 GWB is not met.

The Cartel Office can compel a company to do this if the company concerned has a combined aggregate worldwide turnover of more than €500 million, if there are "objectively verifiable" indications that future concentrations could "substantially" impede "effective" competition in certain sectors of the economy, if the company concerned supplies or procures at least 15% of the goods or services in the sectors specified in Germany and if the Federal Cartel Office has conducted a review of the sector of the economy concerned.

REMONDIS believes that the preconditions for triggering the proceedings set out in Section 39a GWB have in no way been met and so the decision of the Federal Cartel Office to specifically name the company in its press release and declare it to be the actual objective of its investigation – before the legal prerequisites of Section 39a GWB can be checked by the authorities – is a clear breach of the prohibition of discriminatory practices. As a result, REMONDIS' rights have already been violated.



• This is not the only reason why the conditions for triggering proceedings set out under Section 39a of the GWB are not met. Which is why specifically naming the company in a press release and declaring it to be the actual objective of its investigation – before the legal prerequisites of Section 39a GWB can be checked by the authorities – is all the more astonishing.

RE:VIEWS: So what turnover thresholds are relevant to antitrust laws?

Thomas Conzendorf: The Cartel Office normally takes a look at planned takeovers or mergers that involve a turnover of more than 17.5 million euros. The legislator assumes here that takeovers of firms with a turnover of less than 17.5 million euros will not cause an antitrust problem. All of a sudden they have taken a different view and only when it comes to REMONDIS. This is particularly odd as the Cartel Office had to admit in its own announcement that its review of the market was incomplete.

RE:VIEWS: To what extent?

Thomas Conzendorf: In its last sector investigation back in December 2021, the Federal Cartel Office itself pointed out the risks of local authorities reclaiming services and bringing them back in-house. The antitrust watchdogs have, for the most part, focused on kerbside collections of waste. Depending on the region, around 50% of collections – and in some cases a much bigger share – is carried out by municipal companies that are in direct competition with the private sector. There is no explanation as to why the restrictions should only apply to private sector firms. Obviously REMONDIS has nothing against local authorities running their own businesses. These must be taken into account, however, when the Cartel Office examines the individual markets.

RE:VIEWS: And yet REMONDIS is still being accused of gradually building up a dominant market position in some regions by buying up small firms.

Thomas Conzendorf: The first thing that needs to be done here is to make it very clear which market is actually being referred to. Which is why we believe that the whole structure of the latest sector investigation was wrong as it not only ignores the largest market share – namely the share held by local authorities – it also divides the circular economy market into imaginary submarkets. Prognos AG recently determined that the circular economy in Germany is worth a total 85 billion euros per year. Around 10,000 municipal and private sector companies play some kind of role in this sector. REMONDIS' share here is a mere 2.35%.

RE:VIEWS: That, though, doesn't rebut the accusation that the company has a dominant position on regional markets as a result of buying up specific companies.

Thomas Conzendorf: Across the whole of the RETHMANN Group over the last four years, there have been just 12 acquisitions in the area of kerbside collections that did not have to be registered at the Cartel Office. That is a mere three takeovers a year, each of which had an average annual turnover of 4 million euros. All of the other acquisitions that were registered at the Cartel Office involved commercial waste. Twelve acquisitions over four years with such a low average annual turnover really cannot fall into the category of "objectively verifiable indications that future concentrations could substantially impede effective competition in Germany".

RE:VIEWS: Have you got a concrete example of this imbalance?

Thomas Conzendorf: The current developments in the German state of Saxony-Anhalt are, unfortunately, very typical. Private sector companies have been commissioned to provide kerbside collection services by

just five of the state's 16 district and town councils. 11 councils – which make up the biggest share of the state by far – have their own municipal companies collect residual waste, bulky waste and organic waste from households. The municipal firms there already had a considerable share of the market in 2002, namely 49%. Today, this share has risen to an incredible 72.9%. And this is completely distorting the picture. The gradual increase in the market share of municipal firms is, according to the Cartel Office's method of calculation, also leading to an increase in REMONDIS' market share – without us actually being awarded another contract or adding another business location in Saxony-Anhalt.

RE:VIEWS: Which makes it difficult to understand why the Cartel Office still dedicated a whole paragraph to you.

Thomas Conzendorf: Correct. Especially as the Cartel Office is really chasing an illusion here. At the end of the day, there is not a single company below the €17.5m turnover threshold that could trigger a market-dominant position were it to be taken over. The 150 smaller firms with a turnover of more than 2 million euros that would actually come into question as possible take-over candidates – and which REMONDIS would have to spend much time and money registering thanks to Section 39a of the GWB – have a tiny position on the market even if they were all added together. Even if a company were to purchase all of them at once, there would be no way that they would have a dominant position on the market. The actual problem lies elsewhere.

RE:VIEWS: Namely?

Thomas Conzendorf: It was the Cartel Office itself that changed the frequency of the dual system tenders and reduced the length of the contracts from 10 to 3 years. And we're talking about a significant market here where the private sector still has the edge. And this is the reason why there are only a handful of small and medium-sized firms left that can or wish to invest in collecting, sorting and recycling these materials. If I run the risk that the council will want to do the work itself sooner or later or that I will lose my contract after just 36 months – pulling the rug from under my business before the initial capital investments have been paid back – then it's only natural to stay well clear of it. And we're talking here of investments involving seven or eight figure sums for expanding business locations as well as for special vehicles, staff and ongoing modernisations. If the length of the contracts are then officially shortened by such an extent, you can't, of course, then be surprised afterwards that so few companies apply to do the work.

RE:VIEWS: How do you believe things could be done better?

Thomas Conzendorf: The government in France was expressly in favour of the big merger between Veolia and Suez. Indeed, they even supported it. We would like to see our own legislator providing such targeted support of potential opportunities to achieve environmentally necessary economic growth inside and outside the country. The problems of the world can no longer be solved with economic regionalism and exclusive consumer protection. European and global champions should be encouraged instead of preventing growth beyond the border of a local parish. The Dutch are also doing a good job and they are in a similar situation to us. Their industry is also shaped by strong local authorities and small and medium-sized family-run companies. Some of these firms don't have a successor and are looking for a high performance partner who can give their business a long-term future and secure the jobs of their staff. The Dutch government has also recognised that big challenges can't be solved by thinking small scale. Which is why no one in the Netherlands would dream of adding a special paragraph to the law to prevent mergers taking place in the waste management sector that involve a turnover of below €30 million, which is the threshold there. Such paragraphs can only be found in Germany. If we want to solve the urgent problems of our time, then we must allow those businesses looking to do this to grow both within and beyond Germany. Otherwise we won't have the investments needed to develop and realise innovative solutions to conserve natural resources and curb climate change. And such a situation is in no one's interest.

RE:VIEWS: Mr Conzendorf, many thanks for taking the time to talk to us.



Science

STUDY PROVES THE CIRCULAR ECONOMY HAS A POSITIVE IMPACT ON THE CLIMATE

A study published at the beginning of this year has examined how the waste management sector can contribute towards Europe becoming climate neutral. And the results are astounding: if waste is handled correctly, then hundreds of millions of tonnes of CO_2 can potentially be avoided every year by 2035. Dr Bärbel Birnstengel and Richard Simpson, the study's authors, discussed the most important findings in a recent interview and explained what needs to be done to make the very most of the promising options.

RE: VIEWS



ABOUT THE STUDY

The study, "CO₂ reduction potential in European waste management", was published in January 2022 and examines how the waste management sector can potentially help the EU to achieve its goal of becoming carbon neutral as set out in its Green Deal. Taking a 20-year horizon, the researchers developed two scenarios using 2018 as their reference year. It includes the 27 member states of the European Union and the United Kingdom. The study was compiled by the Prognos and CE Delft research institutes on behalf of four European waste management associations: the European Waste Management Association (FEAD), the Confederation of European Waste-to-Energy Plants (CEWEP), the RDF Industry Group and the Dutch Waste Management Association (DWMA).

The study (English) can be found on Prognos' website in the 'Studies & Projects' chapter where it can also be downloaded as a PDF

Μ

With a baseline CO_2 net burden of 13 Mt CO_2 eq, the waste management sector is already as good as climate neutral.

CO₂**e**q

RE:VIEWS: Dr Birnstengel and Mr Simpson, perhaps we could take a look at the status quo before turning our attention to the future. What is the European waste management sector doing today to cut CO_2 emissions?

Prognos: By providing industry with recycled raw materials and by generating energy from non-recyclable waste, virgin raw materials are able to be substituted and primary fuels replaced, both of which avoid greenhouse gases. Our study, which takes around 19% of the total volumes of waste into account – and these are materials that have a particularly high savings potential – shows that the circular economy is already helping to cut CO_2 eq by 122 million tonnes. This figure is not shown in full, however, as some of these reduced greenhouse gas emissions have been attributed to the

individual industrial sectors. We decided to take a look at a 20-year period for this study. Based on this time horizon, the net emission burden of the waste management sector lies at 13 Mt CO_2 eq. As far as the waste streams selected are concerned, therefore, the sector is already as good as climate neutral. These numbers clearly show the great potential of the waste management sector as part of a circular economy.

RE:VIEWS: You included two projections in your study in order to explore potential future CO_2 reductions – a more cautious and a more ambitious option. If we could start with the ambitious scenario: what is the very best outcome and what conditions must be met for this to be achieved? Prognos: Based on the current 13 Mt CO₂eq burden, the ambitious scenario sees a net avoidance of -283 Mt CO₂eq by 2035 or 296 Mt CO₂eq compared to 2018. When we calculated the figures for this particular model, we kept waste volumes constant at 2018 levels, extended the valid recycling rate for municipal waste set out in the EU's current Waste Framework Directive to include industrial and commercial waste and then further increased this recycling rate. What's more, we assumed that landfilling will be phased out. We are, though, well aware that landfills will continue to play a part in waste treatment as there will always be some kinds of waste that must be sent to landfill and so we reduced these volumes to an absolute minimum. As far as the waste types considered by us are concerned, all residual materials that could be thermally treated were assigned to thermal treatment.

RE:VIEWS: A potential reduction of 296 Mt CO₂eq – from a purely arithmetical point of view that is the total annual volume of CO₂ emissions of Belgium and the Netherlands¹ put together. Were you surprised by this result?

Prognos: Not by some aspects. It is already a well-known fact that recycling waste and substituting virgin raw materials, such as ferrous metals and aluminium, can cut CO₂ emissions by a huge amount. What was surprising though was just how high the CO₂ burden caused by landfilling organic waste - such as paper or biowaste - actually was. Methane gas may be shortlived but it has a very big impact, which meant it played a particularly significant role over the 20-year period.

RE:VIEWS: The somewhat less ambitious scenario assumes that the laws and targets that apply in the European Union today are simply implemented. This means a recycling rate of 65% and a maximum 10% of municipal waste being sent to landfill. What can be achieved under these conditions?

Prognos: Existing EU legislation is just one part of this scenario. We went a little bit further here as we transferred the recycling goals to industrial and commercial waste as well.

¹ UBA [Federal Environment Agency], Treibhausgas-Emissionen in der Europäischen Union, [Greenhouse Gas Emissions in the European Union] 13.09.21 https://www.umweltbundesamt.de/daten/ klima/treibhausgas-emissionen-in-der-europaeischen-union#hauptverursacher

96 Mt

CO₂eq

96 Mt CO, eq are already being avoided today thanks to the sustainable way paper, glass, plastics, ferrous metals, aluminium, wood, textiles, old tyres and biowaste are being handled.

In this scenario, CO_2 eq emissions can be significantly reduced by 150 million tonnes to a net burden of -137 Mt CO_2 eq, primarily brought about by the low volumes of landfilled paper and organic waste. In addition, there would be less residual waste – and it is this material that contributes to a higher CO_2 burden – thanks to the increased recycling rates and more material being sent for thermal treatment.

RE:VIEWS: Looking at the study as a whole, is there one particular factor that can be seen as being the biggest driver of success?

Prognos: Yes, it is clearly the move to phase out landfilling wherever possible – in particular the landfilling of organic waste. The maximum reduction in landfilled organic waste has the highest potential to reduce CO₂.

RE:VIEWS: What impact does substituting virgin raw materials with recycled raw materials have?

Prognos: Recycling and the substitution of virgin raw materials resulting from this play a major role in reducing CO_2 emissions. Together, for example, ferrous metals and aluminium are estimated to reduce CO_2 eq emissions by around 180 million tonnes. This puts ferrous metals and aluminium at the very top of the list of net emission savings brought about by recycling. Having said that, though, this area is already very successful today. Recycling rates of these metals are already very high which means their potential to reduce additional emissions in the future is low.

Net emissions in Mt CO₂eq acc. to material stream

	Baseline (2018)	Projection 1 (2035)	Projection 2 (2035)
Paper	+76.1	+17.9	-3.7
Glass	-3.5	-4.5	-4.5
Plastics	+1.1	-19.3	-22.7
Metal	-120.8	-131.5	-134.8
Aluminium	-58.9	-68.3	-70.2
Wood	-22.9	-20.9	-10.3
Textiles	-1.3	-10.2	-11.8
Biowaste	+37.1	+5.3	-3.6
Old tyres	3-3.0	-3.0	-5.7
Residual waste/WDF*	+182.1	+119.5	-51.6

The baseline year 2018 without as yet unknown treatment routes, with GWP values (global warming potential) for a 20-year time horizon; Source: Prognos & CE Delft, $\rm CO_2$ reduction potential in European waste management, January 2022

*incl. overlap with material waste streams

RE:VIEWS: You take a look at nine waste streams in your study. Besides the ferrous metals and aluminium, these include paper, glass, plastics, wood, textiles, old tyres and organic waste. Looking to the future, which of these materials have a particularly high potential?

Prognos: The biggest additional potential can be found among organic wastes, such as paper and biowaste, as well as residual waste or rather refuse derived fuels. As far as paper and biowaste are concerned, this can be achieved by increasing rates of recycling and composting and anaerobic digestion respectively and reducing the volumes being sent to landfill. It was not possible to look at all the different types of waste in this study.



2019, with GWP values (global warming potential) for a 100-year time horizon Source: UBA [Federal Environment Agency], September 2021 Other kinds of refuse, of course, also have the potential to reduce emissions including the largest material stream generated, namely mineral construction waste. Not least because it has already been shown that hazardous waste, such as solvents and old oil, can be processed and reused.

RE:VIEWS: Looking at a product's life cycle, the waste management sector is just one station, so to speak, of many. What interaction is required to achieve the highest potential reduction?

Prognos: Much greater efforts will be required from all stakeholders along the whole of the chain if this potential is to be realised. A coordinated approach is needed here and we must adopt a circular business model, starting with sustainable product designs and a lowwaste or zero-waste production of long-lasting and reparable goods. We, the authors, are well aware that these potential CO_2 savings cannot be realised by the activities of the waste management and recycling sector alone. It would be wrong to make the waste management sector solely responsible for this.

RE:VIEWS: How big an impact can networking with upstream sectors have, for example on creating the best possible recyclable product designs?

Prognos: That is an important point. Both product design and production methods determine how recyclable a product is when it reaches the end of its useful life. One of the biggest challenges posed here is the composite materials used in packaging. To make recycling easier, the design should preferably use just one type of material rather than a mixture. The colours used are not unimportant either. Digitisation along the supply chain could also bring about considerable momentum if data can be recorded and supplied from all the different sectors. Digital twins – i.e. a virtual representation of products – can provide really useful information about the composition of a product. This,

in turn, would enable the operations that are used to recover the valuable raw materials to become more comprehensive, more efficient and of a higher quality.

RE:VIEWS: We also have consumers between the producers and the waste management sector. How significant is their role in all of this?

Prognos: They have a really important role. Consumers who accept products made of recycled raw materials and then ensure these products are sent for recycling when they are no longer needed play a key role here. The circular economy relies on the correct segregation of waste products and on the performance of the sorting plants to be able to produce high quality recycled materials and transform non-recyclable materials into energy. In theory, each individual person helps to increase the potential to reduce CO₂ emissions by separating their waste because only high quality recycled raw materials can be returned to production cycles. If the materials get contaminated by being thrown into the wrong bin then we have effectively also taken away a little bit of this potential. Companies building plants and machinery also make an important contribution. Modern sorting and recycling technologies are able to recover more materials from the waste streams, helping to reduce the volumes of sorting and processing residue.

RE:VIEWS: The waste management sector, though, needs the support of relevant legislation. Should the regulations we have be made tougher or be extended to cover other areas?

Prognos: Rules and regulations are certainly necessary but we've also seen that they can fail to achieve their objectives because they're not systematically enforced. We may be able to achieve a lot with rules and bans but there's no way we'll be able to accomplish everything that's possible with them alone. We'll only succeed if we are able to convince every stakeholder of the bene-



By implementing current waste legislation and extending the goals for municipal waste to include industrial and commercial waste, annual emissions can potentially be reduced by 150 Mt CO_2 eq by 2035.



By driving forward the circular use of materials and ensuring materials that are currently being landfilled are recycled for reuse or thermally treated, annual emissions in Europe can potentially be reduced by 296 Mt CO,eq by 2035.

fits and bring about a genuine value change. This won't be an easy path to take but it is doable.

RE:VIEWS: Today's recycling systems are continuously being further developed, for example the chemical recycling of plastics. Could these new systems increase the potential CO_2 savings you calculated even further?

Prognos: Yes, the circular economy will continue to need an innovative environment so that it can collect, sort and recycle waste more efficiently and in a more segregated way. In this context, the chemical recycling of plastics represents one of many promising, innovative technologies.

RE:VIEWS: The intention of the study is to support the efforts being made to achieve European climate neutrality and to provide decision-makers with useful facts. What are your recommendations as we head into the future?

Prognos: The answer to this question is effectively a summary of everything we've just discussed: if the more ambitious forecasts are to be reached, then the targets for municipal waste must be extended to include industrial and commercial waste streams as well. Waste that can be recycled or used for energy recovery or thermal treatment should be diverted from landfills and sent to such facilities. What's more all of the stakeholders along the whole of the supply chain must work together more closely to ensure that there is as little waste as possible and that as many materials as possible can be recovered for reuse. Both the goals and the measures in the narrower field of waste management must be integrated into the whole of the economic system and be supported with goals and measures in the upstream areas of the supply chain.

RE:VIEWS: A memorable conclusion. Dr Birnstengel, Mr Simpson, many thanks for taking the time to speak to us.



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Richard Simpson is an expert at Prognos AG in Düsseldorf. He studied a number of subjects including economics at the University of Sao Paulo where he took a detailed look at the benefits of the climate change measures taken in Brazil. His work at Prognos focuses primarily on modelling and statistical data analyses, including relevant indicators for the green economy and the circular economy.

TO MAKE

G ermany's A59 motorway has an elevated stretch of road that takes the drivers right through the middle of Duisburg, past many districts rich in industrial history. A glance westwards from this section of the motorway and you'll see Europe's largest inland harbour, or at least part of it, and it is obvious that many of the buildings there have been used for decades. And that the jobs carried out by the employees at Duisburg Harbour are not easy.

The drivers, however, are not only able to see the past and the present but the future as well. It is being built on a large area of land, a site that has always been an eye-catcher because of the huge mountains of old metal: the so-called 'Schrottinsel' [scrap island]. Nowadays, this is a vast recycling centre called the "Circular Island". They may be white goods or end-of-life vehicles that have been sent here after their hazardous contents have been removed. This is where discarded products containing large amounts of metal – primarily iron – end up. The potential to recycle these goods is big as steel can be recycled again and again. And this scrap island run by the steel and metal recycler TSR is big as well: covering around 130,000m², it is one of the largest scrap metal yards in Europe. It is seven times bigger than the grounds of the Office of the Federal Chancellor. At the end of the day, innovations need space.

The task: to cut CO, emissions

It is here that they are working on a farreaching innovation for the steel industry – something they call an evolution. Others have even described it as a revolution. Working together with Thyssenkrupp Steel Europe and Hüttenwerke Krupp Mannesmann (HKM), TSR initiated the REDERS project – the basis for a novel development.

Dr Arnd Köfler, Chief Technology Officer at Thyssenkrupp Steel, summarised the goal of this collaboration: "We have to make rapid progress as far as cutting CO_2 emissions is concerned. Which is why tkSE makes the very most of every opportunity available to it to avoid CO_2 – also when it involves its traditional production processes. Using high quality, scrap-based recycled material in our furnaces is an innovative step."

Just like all manufacturers around the world, both these TSR customers are working on overcoming the unavoidable and at the same time massive challenges caused by climate change. They have to decarbonise their production activities and processes as far as they can. They want to and should do this as this will play an important role in helping to curb global warming in the foreseeable future. A truly tough task for the steel industry – and certainly the key future project 200 years after industrialisation first began.

TSR

The scrap island run by the steel and metal recycler TSR is big as well: covering around 130,000m², it is one of the largest scrap metal yards in Europe.

Just like all manufacturers around the world, both these TSR customers are working on overcoming the unavoidable and at the same time massive challenges caused by climate change. It is also a big challenge for TSR, which processes and supplies the raw materials. It was Christian Blackert, manager of TSR's Rhine-Ruhr region, who effectively set the REDERS project in motion back in the spring of 2019. Ever since he returned to the REMONDIS Group in 2015, he had repeatedly looked at climate change regulations and the possible ways of achieving decarbonisation. "We see ourselves as being a partner for industrial businesses and wish to work with the steel industry to facilitate decarbonisation," was the now 41-year-old's intention back then.

His idea for Thyssenkrupp and HKM – both partners in the REDERS project and TSR customers that produce 14.8 million tonnes of raw steel at their plants in the German state of North Rhine-Westphalia alone – was as follows: to produce scrap metal from metal waste that is so pure and of such a high quality that the companies could produce the same consistently high grade of steel in their furnaces while cutting their CO₂ emissions. Which is why the project was correctly given the name REDERS, a German acronym for 'reducing CO₂ emissions by increasing the rate of recycled materials in steel production'.

The project: REDERS

Working together, Thyssenkrupp Steel, HKM and TSR wish to further intensify iron and steel recycling and reduce CO_2 emissions at their Duisburg plants. To achieve this, TSR has developed a new processing facility. Basing their work on the recycled product TSR40, this joint research project aims to further develop the quality of this product.

The share of scrap metal able to be used to produce high quality virgin steel has been very limited to date, primarily because of the heterogeneous composition of today's standard grades of scrap. >>

We have to make vapid progress as far as cutting CO_2 emissions is concerned.

Dr Arnd Köfler, Chief Technology Officer Thyssenkrupp Steel

At present, oxygen has to be removed from the iron ore at a high temperature in the furnaces to manufacture raw iron and, further along the process, steel. A so-called reducing agent is required to do this and most manufacturers use coke and pulverised coal here. For the first time, TSR's new product should enable an almost fully recycled metal raw material to be used in the furnace. Reducing agents are not needed for this material; the virgin raw materials can be substituted and CO_2 emissions cut.

TSR40 can offset the annual emissions caused by 325,000 commuters.

Christian Blackert

was born in Werne in the Münsterland region in 1980. He is one of the many 'home-grown' RETHMANN employees: after leaving school with his high school leaving certificate, he joined REMONDIS to do a higher apprenticeship that also saw him studying economics. Having worked in the Group for a number of years, he then moved to an automotive supplier in the north of the Münsterland region to take up the position of sales manager.

In 2015, he 'returned to his family' as he puts it. Working first as a key account manager and authorised signatory, he has been managing TSR's Rhine-Ruhr region since 2017. Here, he is in charge of ten business locations in North Rhine Westphalia that process several hundred thousand tonnes of old metal every year. Blackert is married, has two children and lives with his family near Düsseldorf.

The solution: TSR40

TSR's facility in Duisburg is setting new recycling standards with its state-of-theart technologies – some of which are being used for the very first time. The product has an extremely high iron content of over 98%, which means that a completely new recycled product has been made from scrap iron. Its name: TSR40. This scrap is so pure that it is no longer classified as waste but as a certified product.

By using the recycled product TSR40 in their furnaces, the steel manufacturers will cut the volumes of reducing agents they need. Thanks to the product's high purity level, much greater volumes of it will be able to be used both in the furnace and the converter than previous grades of material. All in all, less iron ore will be required to manufacture steel which automatically means less pulverised coal and less coke.

The goal of the REDERS project has been reached, therefore, with its TSR40 product: namely to lower CO_2 emissions and increase the volumes of recycled materials used to manufacture steel. CO_2 will be cut by around 1.4 tonnes every time a tonne of recycled material is used in the furnace to make one tonne of steel. The amount of CO_2 saved in the converter is even higher, namely 1.7 tonnes. If the amount of recycled material were increased by ten percent here, CO_2 emissions could be cut by around 488,000 tonnes.

Here a comparison: the average commute in North Rhine-Westphalia is 40km to and from the office which generates around 1.5 tonnes of CO_2 equivalents every year. The recycling rate that can be expected from this project, therefore, will offset the emissions caused by 325,000 commuters.

On your marks!

That is the theory. Since 2020, the partners have been working on putting the hundreds of hours spent modelling, planning and calculating this project into practice. The number of employees participating in the project has grown considerably: REDERS had good prospects of transitioning from the realms of research to being a practicable activity able to be used in the field.

The Ruhr region has a local saying "Wichtig is' auf'm Platz". Directly translated this means 'what's important is out on the pitch', effectively 'action speaks louder than words'. And this applies not just to football, something that is very important to the region just like the steel industry. TSR's large recycling centre in Duisburg Harbour now had to turn those trials and calculations into hard facts. And to use new processing technologies to further increase the quality of their already high quality recycled raw materials.

And they have succeeded in doing this: "We have carried out large-scale trials using our current processing line and produced suitable test materials that can be used in the furnaces. Which means we know it works," commented Aron Brümmer, the branch manager in Duisburg responsible for the project. He, technician Steffen Adam and regional manager Christian Blackert have been TSR's core project team since the REDERS project began back in 2019.

Blackert is also convinced that this recycled raw material will help make steel production more climate friendly: "Our product will take the recycling industry to the next level." The volumes of new scrap will continue to fall over the coming years while the demand for high quality recycled raw materials will continue to rise. "We must and can close this gap with TSR40."

What's more, this product will enable the steel industry to be a bit less dependent on the unstable supply chains and on the virgin raw materials that come from crisis-ridden countries. Recycled materials do not have to be transported over huge distances. They are generated in the country itself and in the EU every day thanks to the efficient, well-established collection and sorting schemes and modern recycling technologies.

A new facility...

Prof. Andreas Pinkwart, Minister for Economic Affairs of North Rhine-Westphalia, obviously agrees as well. In 2021, he handed over notification of a grant amounting to 6.4 million euros for this project as part of the 'Programme for the efficient use of energy, renewable energies and the saving of energy', known simply as 'progres.nrw'. More than half of this sum is for the new facility – a significant contribution towards the more than 36 million euros that the whole project will cost.

"Transforming today's industry into the futureproof, climate-friendly industry of tomorrow is a task that requires effort from everyone. Thanks to our IN4climate.NRW initiative, we have been collaborating with many innovative industrial businesses in our state and have been supporting them with targeted measures. Growing efficiency levels has a direct impact on our climate, especially when it involves our local energy-intensive industries. I am convinced that this project will be a game changer for the whole of the sector," Pinkwart stressed at the time. His ministry is certainly also supporting the product and the cooperation so that industry and climate action become even more closely intertwined and have a strong future. >> One year later, in April 2022, the minister took part in the ground breaking ceremony with the REDERS project members to signal the start of the construction of the new processing line on the 'Schrottinsel'. TSR is currently setting up its new recycling facility with its extensive infrastructure.

By recycling 8.5 million tonnes of ferrous and non-ferrous metals, TSR produces high quality recycled raw materials that can be returned to production cycles. As a result, it acts as an important link within the circular economy and sustainably helps to conserve natural resources and protect the environment.

How TSR Recycling protects the environment around the world (based on data from 2021):

5.23 MILLION TONNES OF CO,

Using recycled raw materials instead of producing metals from primary resources dramatically reduces emissions.

5.7 MILLION GIGAWATT HOURS OF ENERGY

The amount of energy saved by our recycling activities each year covers the requirements of 1.4 million three-person households.

6.4 MILLION TONNES OF IRON ORE

The more steel and iron that is recycled, the less ore needs to be mined; this not only conserves natural resources, it is also good for our environment and our climate.

3.3 MILLION TONNES OF COAL

The majority of the energy needed to produce metals comes from coal; this means that systematic recycling reduces the amount of coal that needs to be mined. Further volumes of TSR40 will be produced from May 2022 onwards so that further tests can be carried out in the furnaces. The target here is to generate a maximum rate of use. Plans are to produce more than 300,000 tonnes per year. A significant amount, especially considering the fact that the first idea and initial project discussions took place just three years ago.

Between then and now: a whole number of meetings and agreements with the two steelworks, a seemingly never-ending amount of tests and trials carried out by engineers at TSR and specialist external firms, a successful grant application and countless cups of coffee. As Christian Blackert says, though, "It's all been worth it."

...and so much more

He is already thinking about the next stages: "Electric arc furnaces will play a bigger role in the production of steel in the future. Thanks to the high quality of TSR40, it can also be used in such facilities. This means that the demand for high purity recycled raw materials will grow considerably. Our TSR40 will be a real game changer because it can be used by steel producers immediately and sustainably. We will need more facilities like the one in Duisburg."

Anyone interested in taking a closer look at how this all works should take the A59 motorway to Duisburg. They should then take the 'Ruhrort' exit and head towards the 'Schrottinsel' where they can have TSR explain how its team managed to prove in just three years that innovation and structural change can happen really quickly in the Ruhr region as well.

THREE QUESTIONS FOR

Bernd Fleschenberg, Chief Operating Officer TSR

What role does TSR play in curbing climate change?

A big one and one that's getting bigger and bigger. Our work saves significant volumes of virgin raw materials, energy and CO₂. It should be noted here - particularly when it comes to ferrous and non-ferrous metals that manufacturing products using virgin raw materials consumes far more energy and generates far more CO₂ emissions than using recycled raw materials. Which is why we, a recycling business, make a major contribution towards curbing climate change and conserving natural resources. Our iron activities alone help to conserve around 6.4 million tonnes of iron ore a year, i.e. this iron ore doesn't need to be extracted from the ground. And, of course, we are also helping to achieve the goals of the European Green Deal.

How important is TSR40 for your company?

It is an important component of our sustainability-oriented strategy. Our new TSR40 product will enable us to cover a considerable amount of the European industry's future demand for raw materials over the medium to long term. The goal of this joint project was and is to produce a high quality, certified product from standard input material. We have succeeded in taking the huge step here from waste to product.

What does the TSR40 innovation mean for your business location and for the market?

We have laid a cornerstone in Duisburg that will have an impact far beyond the boundaries of this particular business location. Why? Because we intend to invest in this technology at other sites in Europe as well and work with our partners to set up processing facilities like the one in Duisburg. The demand is there. We mustn't forget that waste is a source of raw materials - and these materials are of immeasurable value for us here in Germany, in the EU, today and in the future. The amount of new scrap being produced on our own market is getting smaller and smaller. This means we must keep the material that we do have here in the country, process it better and by doing so provide industry with a secure and sustainable supply of raw materials. Europe has no alternative but to recycle - especially in light of the world's ever growing economies and population and the disrupted supply chains and bottlenecks caused by the many crises. This is exactly what we are doing with TSR40.

Besides its positive impact on the climate, high quality recycling is essential for us to become less dependent on virgin raw materials and on the countries supplying them. And we can see how good partnerships here in Europe can excel both for the companies and for climate action and environmental protection. Policymakers in Germany and the EU should take a closer look at this.

Plastics recycling is a classic. And ye just a tiny proportion of the plastic waste generated around the world is recycled. What's the reason for this? What could be done better? And what might the future look like for the chemical recycling of plastic. or decades now, global production of plastics has been spiralling upwards. 367 million tonnes of plastic were manufactured around the world in 2020. This is almost four times the amount of plastic pro-

duced at the beginning of the 1990s. Experts have forecast that this dynamic market growth will continue into the future – driven on by new uses for this versatile material and the increasing demand coming from emerging economies.

A large share of the plastic produced today is used to manufacture packaging. The share of the packaging sector in Europe, for example, lies at a good 40%. Packaging, however, is used for a particularly short period of time. It is discarded as waste much faster than other products – moving quickly into the segment where handling plastic becomes a challenge.

Conversio, a market research company, took a detailed look into what happens to plastic after it is no longer needed. The findings of their analysis of global plastics flow in 2018 are sobering. Almost one-third of global plastic waste is not collected, which means it is not sent for professional treatment. Just under one third is collected but is sent to managed landfills. A mere 40% of old plastics, therefore, is collected and processed, with half of these materials being sent on for recycling and half for energy recovery. If the share sent for materials recycling is isolated from the rest, then a mere 20% of global plastic waste is actually recycled for reuse. \gg Sources: The Compelling Facts About Plastics, Plastics Europe, 2008 | Plastics – the Facts 2021, Plastics Europe, 2021

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Just 20% of plastic waste generated around the world is recycled

As can be expected, the situation in Europe is more positive. Having said that, though, large volumes of discarded plastics are not being sent for recycling here either. In 2020, around 35% of post-consumer plastic waste was recycled for reuse in the European Union plus Norway, the UK and Switzerland. The remaining 65% was sent either for energy recovery or to landfill – two routes that mean that any possible reusable materials are lost to us forever. European – and, in particular, global – waste plastic streams show that there is still much room for improvement despite the successes achieved in plastics recycling to date. To be able to tap into this potential and develop a circular economy, storage, collection and recycling structures need to be set up in those areas where they are lacking or partially lacking. If the recyclable materials contained in the plastics are to be systematically recovered for reuse, then landfilling must be phased out at a faster rate. At the same time, plastic materials being sent for energy recovery should, wherever possible, be diverted to recycling facilities.

Tried & tested: mechanical recycling

There are big differences within Europe itself. In Germany, for example, more than 99% of plastic waste was processed in 2019 with around 47% of this material being sent for recycling and almost 53%

for energy recovery. It is not only the goals of the individual European countries that impact on recycling rates but their rules and regulations as well, such as the German Packaging Law. Alongside this, there are the efforts being made to reduce the volumes of plastic waste being generated in the first place, especially at industrial and commercial businesses.

If plastics are recycled today, then they undergo mechanical recycling processes. These systems have been tried and tested and are well established on the market. Being one of the pioneers in this sector, REMONDIS has been recycling plastics for over 50 years - using certified production methods to produce a whole range of recycled plastics, so-called recyclate, on an industrial scale. During this multi-stage procedure, the plastics are first separated strictly according to type before undergoing a combination of mechanical-physical processes including sizing, washing, contaminant removal and extrusion.

At the end of the process, the company has produced pellets, compounds, agglomerates and ground products with defined uniform properties that have a consistently high quality and can be used to substitute virgin plastics. There is a steady demand for these recycled products. Around 12% of the raw materials used by all segments of the plastics processing industry in Germany is recyclate. This figure lies at 9% in the packaging sector.

The better the input material has been separated before it reaches the recycling facilities, the higher the quality of the recyclate produced by the mechanical processes – and, consequently, the more applications it can be used for. A recycling rate of over 90% is possible with the relatively homogenous volumes of waste generated by plastics processing businesses and plastics producers. In contrast, the recycling rates of the mixed fractions from private households and commercial end users lie below 50%. What is left over is mixed plastics, sorting residue and fractions of plastics that are unable to be recycled either from a technical and/or business point of view. Further developments in sorting and processing technology will further reduce the volumes of non-recyclable materials. Investments are already being made in such technology across the EU.

The ideal way to grow plastics recycling rates is to have a combination of high performance mechanical recycling and chemical recycling, a technology that is currently being developed.

A complementary system: chemical recycling

Besides mechanical recycling, the spotlight is also being gradually turned on chemical recycling technologies. Chemical recycling transforms plastic waste into chemicals that can then be used as raw materials in chemical processes. A variety of technical procedures can be deployed to bring about such a transformation, such as pyrolysis. By adjusting pressure and temperature, the plastics are broken down into a gas and then condensed into pyrolysis oil. Plastics manufacturers could replace virgin fossil raw materials with this oil and use it to produce new plastics. One of the key advantages of chemical recycling is that the pyrolysis plants can handle mixed fractions of plastic waste. The chemical recycling route can, therefore, be used for materials that are less suitable or indeed unsuitable for mechanical recycling.

The input material sent for chemical recycling also determines the quality of the recycled products. At the moment, focus is being put on mixed plastic waste, around three-quarters of which comprises polyolefins, i.e. polypropylene or polyethylene. The remaining 25% can be made up of other types of plastics, such as PET or polystyrene, and contain foreign particles, e.g. particles of metal and paper. As far as the mixtures of material are concerned, however, it should be noted here that the chemical recycling of plastics is still in its infancy. Looking ahead into the future, more complex mixtures of plastic waste will be able to be treated as technological advances are made. Strategic partnerships between the recycling sector, the chemicals industry and providers of such technology will be one of the main drivers of such progress.

As chemical recycling uses mixed fractions, this system has, theoretically, great potential. If all of the post-consumer plastic waste in Europe that is currently being sent for energy recovery were to be chemically recycled, then - in purely mathematical terms - more than 12 million tonnes could be sent for higher quality recycling assuming that these materials are not suitable for mechanical recycling. Additional options would be generated by further phasing out landfills and diverting these materials to recycling facilities instead.

No matter whether it be mechanical or chemical recycling: there is great interest in plastic-based recycled raw materials. Besides the positive impact this has on tackling climate change and conserving natural resources, there is also a growing need to ensure there is a secure supply of raw materials. At the end of the day, producing petroleum-based plastic is highly dependent on imports and developments on the global market. The latest developments have highlighted just how uncertain this environment can be. Supply chain disruptions led to 35% of the VCI member companies [German Chemical Industry Association] scaling back their production activities in Germany in 2021; a further 10% were forced to temporarily shut down their production altogether. A situation that has been further aggravated by the war in Ukraine and its ramifications.

The European Union is also providing momentum in this area, stating in its Green Deal that 55% of all plastic waste should be sent for recycling by 2030. What's more, it is planning to set minimum recycled content requirements for new plastic products. As far as the packaging sector is concerned, the amount of plastic recyclate currently being used in new products could – purely from point of view of technology and with a few moderate limitations to the properties - already be more than doubled today and achieve the targets set.

One factor holding back chemical recycling is that this process has not been officially recognised as a form of materials recycling. The Ministry for the Environment in Germany considers chemical recycling activities to be raw material recycling, which means it falls under the definition of recycling as set out in the German Circular Economy Law [KrWG]. In contrast, the German Packaging Act [VerpackG] states that materials recycling exists when the recycled material substitutes the same virgin material. Pyrolysis oil does not meet this requirement. According to the Ministry, therefore, the amount of chemically recycled materials may

RE: VIEWS

	MECHANICAL RECYCLING	CHEMICAL RECYCLING
Input material	Plastics separated, for the most part,	Plastics separated according to type,
	according to type	mixed plastics, sorting residue
Products	Pellets, compounds, agglomerates,	Pyrolysis oil
	ground products	
Product status	Finished product that can be directly	An input material for molecules
	used to manufacture plastic products	that are used to produce plastic
	(circular plastic)	
Customers	Plastics processing firms	Plastics manufacturers

STRENGTHS THAT COMPLEMENT EACH OTHER PERFECTLY

not be added to the recycling rates achieved by the packaging sector.

As to how far chemical recycling actually makes sense will also be determined by how much the pyrolysis oil will be able to be reused. Industry can use the oil as a feedstock in cracking plants and break it down into molecules that can then be used as a raw material for new products. It has not yet really been resolved, however, which products these might be. Relevant industrial feasibility studies and pilot projects are currently being carried out but - just like chemical recycling itself - they are still in their infancy. Furthermore, it must also be considered that pyrolysis oil

starts at an early stage of the production chain. Unlike recyclate, extensive steps are required to create a polymer. What's more, the amount of elements in the pyrolysis oil that can actually be used to produce plastics is low.

Last but by no means least, it will depend on whether it makes long-term financial sense to invest in chemical recycling plants and this, in turn, depends on future market developments. What will be key here will be whether mechanical and chemical recycling systems can be established as complementary processes, with each being able to make the very most of their advantages.

What must not happen is that they end up competing for input materials. Material fractions that have been separated according to type must continue to be sent for mechanical recycling as the recyclate can be used in a later processing stage of the plastics production chain, thus reducing the energy consumption of the upstream production activities.

When it comes to plastics recycling, REMONDIS remains open to future findings and is helping to drive both systems forward. It continues, as always, to focus on carrying out mechanical recycling on a grand scale. Alongside these activities, REMONDIS has also set up partnerships with industrial businesses to further develop the various approaches to chemical recycling. The reason behind this is simple: in order to achieve the ambitious sustainability goals and the greatest possible levels of supply security, it is essential to develop every possible recycling activity that is technically and economically viable.

AGGREGATE FROM THE FIRE

Processed correctly, the ash from waste-to-energy plants – known as IBA or incinerator bottom ash – is high quality and valuable aggregate. The conditions for this to happen, however, are still not in place in Germany.

The asphalt is still piping hot when Mike drives his steamroller over the surface of the new road one last time. There is a strong smell of bitumen in the air – that viscous mixture of hydrocarbons that is obtained from petroleum and moulds the small grains of stone in the tar into a smooth, uniform carpet, over which heavy lorries will transport their goods, people will commute to work and bikers will welcome the sun's first rays in spring over the coming years.

Mike is a road worker at one of the many road construction firms somewhere in Germany and, like so many in his industry, he only uses virgin aggregate to complete his projects.

Mike has driven over the same stretch of road too many times to count. Every single layer has to be compacted so that the road will be able to withstand not only the enormous pressure exerted by the traffic but also the effects of the weather. The only thing that the drivers can see when they are in their cars is the top layer, the so-called surface course.

A road really is a high-tech construction that consists of a number of different layers or courses – sometimes more, sometimes fewer depending on what the road will have to withstand. The surface course is the asphalt, the binder courses below it even out any surface irregularities and the base courses have to be able to withstand a great deal – as the huge loads caused by the traffic are passed down to them. Which is why Mike has to really pack down and compress the materials with his steamroller or the road surface will be damaged in no time at all. And that means more annoying roadworks. For the most part, there is also a frost protection layer at the very bottom of the road. Its job is to make sure that any water flows away quickly so that the road is not damaged by frost.

Many public authorities putting projects out to tender still want virgin raw materials to be used in their roads. These materials, however, are becoming ever scarcer, in Germany as well. A variety of aggregate can be deployed to build the base and sub-base courses. Mike's employer only uses sand and gravel, as do the majority of the firms operating in the sector. This is what many public authorities want – be it implicitly or explicitly – even though there are other good alternatives and the German Circular Economy Law [KrWG] now stipulates that these alternatives should be used.

Paper is patient and companies like Mike's employer need new projects. And yet virgin aggregate like sand and gravel are finite. And it is getting more and more difficult to get hold of them. >>

HOW ROADS ARE DESIGNED¹

¹ Source: https://www.asphalt.de/fileadmin/user_upload/technik/asphaltschichten_und_ihr_aufgaben.pdf

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It is not because there is a lack of deposits. "The way Germany was formed means that there is an almost infinite amount of sand in the ground," Harald Elsner from the BGR [Federal Institute for Geosciences and Natural Resources] noted a few years back in a short study about aggregate raw material supplies. Too many areas of Germany have been built on, too many areas have been planned for and it is too densely populated to be able to get at all this sand. According to the BGR, for example, 85% of the surface area of the German state of Baden-Württemberg has already been planned for other uses. Protected waterways, nature reserves, areas of outstanding natural beauty and developed land all prevent the sand and gravel from being extracted.

A resource-friendly alternative would be to use the ash from waste-to-energy plants – simply referred to as IBA by those working in the industry. It has, though, been very difficult to market IBA as a substitute aggregate in Germany for many years now.

Over six million tonnes of minerals cleaned by the fire

Not all wastes can be recycled for reuse. Residual household waste, for example, is thermally treated by the almost 70 waste-to-energy (WtE) plants in Germany and used to generate, for the most part, heat and electricity.

These WtE plants incinerated around 13 million tonnes of so-called mixed municipal waste (primarily household and bulky waste from local residents) in 2019. In addition to this, they also treated commercial waste. It is not possible to put an exact figure on these volumes but it must be about the same amount as the municipal waste.

Many construction firms also have waste materials that cannot be recycled and must be incinerated – old wood, for example, that has been treated with chemicals. With the fire reaching temperatures of over 800°C, these pollutants are safely destroyed and can no longer harm either humans or the environment. These mixtures of waste often contain mineral fractions that simply fall through the furnace grate.

Around 25% to 30% of the waste (by weight) handled by a normal WtE plant is mineral material. Some are calling it a scandal to simply dispose of these minerals, especially as the country has put the circular economy and resource conservation at the top of its agenda. According to the latest figures published by Destatis [Federal Statistical Office of Germany], over six million tonnes of this material were generated in Germany in 2019. One-fifth was sent straight to landfill – a total of 1.3 million tonnes. In reality, this figure was much bigger but the material was first processed in so-called IBA-processing facilities – almost 4.7 million tonnes in all.

IBA processors' primary focus is on the metals

The majority of processing plants are only really interested in the ferrous and nonferrous metals in the IBA. These can be sold on to industrial businesses and are a good source of income. According to a study compiled by Kerstin Kuchta, a scientist at the University of Hamburg, around 10% of the IBA's content is made up of metals. Around 80% of this is iron and can be removed from the rest of the IBA comparatively easily by using a magnetic separator. Getting to the high-priced nonferrous metals is considerably more difficult.

But where there's a will, there's normally a way: thanks to state-of-the-art systems, IBA processors are now able to recover even the smallest particles of copper and aluminium as well as gold, silver, platinum and palladium from the ash.

However, 90% of the IBA is made up of minerals – and far less effort is spent on this material. This mineral fraction is washed, sorted according to type and stored for several months. This storage period – socalled ageing or weathering – stabilises the material as a number of chemical processes take place and the heavy metals become more closely bound. This makes it more difficult for them to be washed out so that the risk to the environment is negligible.

Having been processed, the IBA has comparable structural properties to the sand and gravel used by road workers like Mike to build the base and subbase courses. Mike could, therefore, easily use this substitute aggregate, conserve natural resources, cut costs.

Landfill construction claims to be part of the circular economy

As mentioned above, though, firms like Mike's employer do this far too seldom. Instead, the majority of the IBA ends up at landfills as material for construction work. Using IBA in landfill construction measures has been classified by the UBA [Federal Environment Agency] as a "low-ranking recycling measure".

DISPOSAL	0 F	I B A	FROM	WTE
PLANTS IN	20	19		

LANDFILLS	1,302.6
THERMAL WASTE TREATMENT PLANTS	4.3
FURNACES	0
CHEMICAL-PHYSICAL TREATMENT PLANTS	26.3
EARTH TREATMENT PLANTS	0.7
OTHER TREATMENT FACILITIES	4,658.3
UNDERGROUND MINES	39.7
SURFACE MINES	195.7
TOTAL	6,227.6
in 1,000t / Source: Destatis	

Officially, therefore, the IBA is being recycled; in practice, though, it is not really contributing towards the circular economy.

The German aggregate sector could also be one of the reasons for this: in 2018, a request submitted by Bettina Hoffmann from the Green Party (then a German MP and now a parliamentary undersecretary at the Ministry for the Environment) to the Government revealed that around 3,900 stone and clay quarries and gravel and sand pits and 30 mines supply German road construction projects with virgin aggregate. With 294 administrative districts and 107 independent city councils in Germany, that is an average ten pits or quarries per local authority – all of them sources of business tax that no councillor is voluntarily going to give up.

The mining and quarrying of aggregate is big business with the construction sector booming in Germany: Miro [German Mineral Products Association] estimates that around half a billion tonnes of aggregate are mined in Germany every year. According to the BBS [German Association for Building Materials – Stone and Earth], approx. 2.3 billion tonnes of aggregate were used between 2010 and 2016 (not including the production of concrete) – an average 330 million tonnes per year.

And so, rather than being used to build public roads, the IBA ends up – either directly or indirectly – at landfills, further aggravating the already strained landfill capacities. According to a study published by Prognos in 2020, Germany will have no free landfill capacities left by 2033 at the latest. A situation that will again benefit quarry operators: it is not rare to see gravel and clay quarries being given a second life as a construction waste landfill site once all the raw materials have been extracted. »

ADVANCES MADE IN IBA PROCESSING IN THE NETHERLANDS; 2020 TARGET (100%)

The Netherlands are showing how things could be different

This waste of resources in Germany has the same structural causes as can be found in the resource-rich developing countries that extract their mineral resources unchecked. The Netherlands have been showing for years now that things can be done differently.

Our neighbours do not have as many deposits of virgin aggregate as we do. They rely on imports. Operators of gravel pits and stone quarries in Germany alone exported almost 20 million tonnes of aggregate to the Netherlands between 2010 and 2017.

Importing aggregate, however, makes a country dependent on others. Those that want to be independent must come up with innovative recycling solutions. The Dutch government has known this for a long while and negotiated a so-called Green Deal with its waste management sector around ten years ago. Put simply, they agreed that the material could be used in more projects if the IBA processing systems were improved.

The goal was to be able to freely use IBA from WtE plants as aggregate without any further "isolatie-, beheers- en controlemaatregelen" (IBC), i.e. insulation, management and control measures. And so the Dutch waste management businesses invested in IBA processing facilities, for example to further reduce the heavy metal content. Thanks to the introduction of the Green Deal, these new systems have improved the quality of the processed IBA in the Netherlands to such an extent that it has been able to be used as normal aggregate in road construction projects with absolutely no restrictions since the beginning of 2022. IBA may no longer be used in IBC measures; it has been forbidden for a while now to send it to landfill or export it.

The Umbrella Ordinance:

a controversial solution for Germany

The so-called 'Mantelverordnung' [Umbrella Ordinance on Substitute Building Materials/Soil Protection] aims to improve the use of substitute aggregate in civil engineering projects in Germany. When Florian Pronold, the former undersecretary at the Ministry for the Environment, spoke about the Umbrella Ordinance in the Bundesrat (Germany's upper house) last summer just before the members voted, he compared it to Michael Ende's novel "The Neverending Story".

Central government, the German states, the construction sector, waste management firms, local authorities and anyone else in Germany who had anything to do with aggregate had argued about the ordinance for 16 years. As a result, this set of rules is now complicated and contains many compromises that, the circular economy believes, are inadequate in many cases. Having said that, this solution is probably better than having nothing at all.
The Substitute Building Materials Ordinance, which is regulated by the Umbrella Ordinance, defines three categories of incinerator bottom ash aggregate (IBAA) called HMVA-1, HMVA-2 and HMVA-3. The Umbrella Ordinance sets out material qualities for each individual category and specifies what they may be used for.

However, even the highest quality of IBAA (HMVA-1) with the strictest material values is regarded as waste – a psychological black mark that virgin aggregates do not have even though their pollutant and heavy metal contents are, objectively, higher than those in the IBAA.

Under these circumstances, it is unlikely that Mike will use more incinerator bottom ash from WtE plants to build the loadbearing courses under German roads in the future.

The future: high-tech processing for building construction work

While the highest recycling goal for IBAA in Germany is road construction work, the Netherlands have already gone a step further. REMONDIS' subsidiary Heros operates one of the largest IBA processing facilities in Europe. Situated in Sluiskil on the Ghent-Terneuzen Canal between the two major ports of Rotterdam and Antwerp, this 45-hectare site processes up to 700,000 tonnes of IBA from the Netherlands and Belgium every year. This is equivalent to the amount of household waste generated by around six million local residents.

Heros' specialists have developed a 'hydro-mechanical washing' system that enables them to produce a particularly high quality of aggregate with a particle size of 0-14 millimetres. During this two-stage process, the mineral materials are repeatedly washed and screened until they have generated a cleaned aggregate that is effectively free of pollutants and heavy metals.

It is not only possible to use Heros' aggregate for road courses but also to produce asphalt and concrete – which means it can be used to construct buildings. By the way, this washing process also enables copper, zinc, lead, highgrade steel, gold and silver to be recovered which metalprocessing businesses are happy to buy from them.

The line between virgin and secondary aggregate is, therefore, becoming increasingly blurred in the Netherlands. Spurred on by its lack of natural resources, the country has become inventive. Germany could also substitute some of its demand for virgin raw materials with recycled material, including the IBA from WtE plants.

The technology is there. What is lacking is the political will. It makes no difference, quality-wise, whether Mike drives his steamroller over sand and gravel or over synthetic aggregate like the material produced by Heros: Dutch roads are certainly not known for being worse than those in Germany.

Thanks to the introduction of the Green Deal, the new systems have improved the quality of the processed IBA in the Netherlands to such an extent that it has been able to be used as normal aggregate in road construction projects with absolutely no restrictions since the beginning of 2022.

GERMAN-FRANCO FRIENDSHIP FRANCO-GERMAN RECYCLING

Philippe Girard is managing director of the Group's French subsidiary REMONDIS S.A.S. RE:VIEWS spoke to him about the current situation and the future of the French circular economy after the French presidential election.

RE:VIEWS: Mr Girard, as the Directeur Général of REMONDIS S.A.S., you are responsible for REMONDIS' operations in France. The second round of voting for your country's next president has just come to an end while we are having this interview. It would seem that Emanuel Macron has won the election. Do you believe that this result will impact on the French circular economy and what are you expecting to happen?

Philippe Girard: Over the last five years, the Government – which has now been re-elected – has clearly been promoting France as a country of opportunity for foreign investments. The Choose France Summit that was held in Versailles in 2018 brought together business leaders from 140 different firms including REMONDIS as one of the leading recycling companies in Europe.

This summit is being held again in June 2022 and has new ambitions regarding the decarbonisation of the economy. The last summit was certainly successful as it led to 21 projects with a total investment volume of 4 billion euros. The old – and the new – Government will continue along the path it has set itself, which also includes further promoting the circular economy and the targets set out in the European Green Deal. France has also recognised the need to continuously intensify its recycling activities. The Franco-German partnership in the field of recycling will, therefore, only be strengthened. >>





a key engine for economic growth.

RE:VIEWS: Could you give a quick summary of REMONDIS' activities in France – where it is located, what fields it operates in?

Philippe Girard: REMONDIS has 232 employees in France and had a turnover of 40 million euros last year. For 20 years now, REMONDIS has been operating in France via its business, REMONDIS France SAS. The company collects and treats 25,000 tonnes of hazardous waste per year and also has contracts with public sector customers such as CAB, the Communauté d'Agglomération de Beauvais. Every day, the 51 members of staff deliver customer-oriented services from their five business locations, which, of course, have all the necessary environmental permits.

The most important step made by the company within France's public sector was the acquisition in 2020 of a 5.5% share in Semardel, a firm based near Paris. Semardel is a Société d'Economie Mixte – known simply as an SEM. That is equivalent to a public private partnership. Semardel operates in the fields of waste collection, the recycling of organic waste and energy recovery. It has a workforce of 570 employees and had a turnover of 120 million euros in 2021.

Thanks to Semardel's shareholder structure, we not only have direct access to large regional players, such as Syctom, but can also strengthen our existing partnership with the French public institution CDC, the Caisse des Dépôts et Consignations. This partnership with the CDC began back in 2019 when the RETHMANN Group became a shareholder in Transdev. It is key for our future development in the country because CDC owns many shares in a variety of utility companies in France that operate in the areas of waste, water and wastewater treatment.

And so REMONDIS continues to steadily develop its business in France while my home country turns into a genuine growth market for the circular economy. This can also be seen at our two subsidiaries REMEX and REMONDIS Electrorecycling SAS. REMONDIS Electrorecycling has a facility in Troyes that recycles 40,000 tonnes of waste electrical and electronic equipment every year making it one of the leading businesses on the French market.

RE:VIEWS: The business faces strong competition in France with Veolia, Suez, Derichebourg and other firms. Unlike here in Germany, where the Cartel Office is even sceptical about small-scale takeovers, the authorities in France would appear to welcome such mergers and even actively support them. The merger between Veolia and Suez is the most prominent example of this. Experts are saying that only big companies will have a realistic chance of overcoming global problems such as climate change and protecting our planet's natural resources. Would you say that the future of modern waste management and recycling will be found in France?

Philippe Girard: A modern and a better circular economy is not just a topic for the 450 million people living in Europe but is absolutely essential for a world with 8 billion inhabitants. Large firms are better prepared to respond to markets such as Eastern Europe, South America, Africa and Asia. Which is why both France and Germany are the innovative places today where state-of-the-art concepts should be developed – acting effectively like a technology display cabinet.

What's more, the way the French waste market is organised is being completely changed. In contrast to the water and wastewater sector, it is still very much atomised. Our team recently drew up a detailed map of the market that showed over 70 MidCap firms. Large companies like Veolia, Suez and Paprec are now looking beyond France's borders when it comes to mergers and takeovers. Which clearly opens up some interesting opportunities for REMONDIS.

RE:VIEWS: What can we learn from France as far as recycling is concerned? And what, if anything, can France learn from Germany?



Philippe Girard: The French are just starting to collect municipal organic waste separately from other waste streams. Germany has been doing this since 2015 and already collects 4.5 million tonnes per year. REMONDIS and SARIA are currently working on this topic in France and can draw on the years of experience they have gathered in Germany.

Germany still has a federal structure which means that the regulations and framework conditions can differ from German state to German state. In this point, France is organised in a more central and clearer way which makes it easier to develop large-scale projects such as plastics or battery recycling schemes. They both have their advantages and disadvantages which is why the key to success also lies in being able to adapt to the different conditions and to have a deep understanding of the cultural idiosyncrasies. This is where the long-standing Franco-German friendship really pays off. It is the EU's engine and together we will succeed in making Europe more sustainable.

RE:VIEWS: Is there one particular area of the waste management sector that you believe will make some big advances over the next 10 years?

Philippe Girard: It's France's goal to halve the amount of waste it sends to landfill between 2010 and 2025. The reductions reached so far have been minimal which means that a lot more must be achieved over the coming months, especially by developing plants that can burn RDF.

Many targets and projects have been announced over the last few weeks regarding plastics recycling and a reduction in plastic use. This includes, for example, recycling all plastic waste by 2025 and banning single-use plastics by 2040. A number of chemical recycling plants should be set up to achieve this. Whether they actually materialise will primarily depend on the political framework conditions and the price of oil over the coming months. What's more, in contrast to the well-established mechanical recycling systems, chemical recycling has yet to show that it can generate genuine recycled products and not just some kind of pyrolysis oil that can only be burned.

RE:VIEWS: The circular economy is beginning to decarbonise its operations in Germany, particularly in the area of logistics. What stage is France at? Could Transdev help out here?

Philippe Girard: France is developing in a similar way to Germany as far as waste management logistics are concerned. Here, too, our diesel-run fleets are gradually being replaced with lorries run on CNG, electricity and hydrogen. Practically all public procurement projects involving waste collections now demand that the trucks are run on alternative fuels.

The first thing that we must all work towards together is to become less dependent on imports of raw materials. The circular economy can make the most effective contribution here. Transdev could certainly help bring about this transition: firstly, by passing on its feedback to us about the new technologies it's been using with its buses. Secondly, we could think about possibly sharing infrastructure – like charging points and workshops – for future developments. Transdev operates in 17 countries across five continents and has years of experience of public transport.

The company is already well advanced as far as decarbonising its vehicles is concerned and has the largest fleet of electric buses across Europe: over 1,000 in a variety of countries at the moment. We can benefit from the experience of our sister company in this area.

RE:VIEWS: If you could make one wish come true for Europe, where would you see the European Union in – say – 30 years' time?

Philippe Girard: A whole host of things come to mind. The first thing that we must all work towards together is to become less dependent on imports of raw materials. The circular economy can make the most effective contribution here. No matter whether it has to do with batteries, e-waste, ferrous and non-ferrous metals, wood, plastics or mineral aggregate: what we recycle does not have to be imported and nowhere in the world does the environment have to be destroyed.

We need a uniform market with harmonised laws so that we can do this much more effectively and in a much more coordinated way. For the most part, the circular economy is organised at national level with each country having different regulations. Many things could be improved if European waste legislation was systematically harmonised and implemented in all member states.

We, at any rate, will continue to do everything we can so that Europe becomes a world leader in recycling and its model and technologies can be exported to other continents. This is precisely what our teams are working towards.

RE:VIEWS: Mr Girard, many thanks for taking the time to speak to us.

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The climate committee, the Miljömålsberedningen, of the Riksdag (Swedish Parliament) has actually managed to negotiate its 860-page "Sweden's Global Climate Footprint" plan with all eight political parties in the parliament so that all of them agreed to it – from the right-wing Sweden Democrats to the Left Party. Emma Nohrén, chair of the climate committee, handed over this substantial paper to the Swedish Minister for the Environment and Climate, Annika Strandhäll, during a press conference on 07 April 2022. It is now up to the Government to legislate the path towards this new and more ambitious target and to underpin it with robust accompanying measures. No other country in the world would then be able to match Sweden's sustainability requirements.

So what is in Sweden's new Climate Change Plan?

To begin with, the Climate Plan contains the previously set goal of reducing domestic emissions to net zero by 2045. The committee recommends adding two further goals here. The first covers the so-called 'grey emissions' that are generated by the Swedish population consuming foreign goods. According to the proposals put forward, these emissions should be reduced to net zero by 2045 as well. The second additional goal focuses on the so-called 'climate benefits of exports', i.e. the benefits that Swedish exports have over comparable products from other countries because they have a better climate footprint (such as more climate-friendly steel, forest products and electricity).

Sweden targets recycled raw materials

As a result, Sweden will also be setting totally new standards in its circular economy. Information about the materials used, product cycles, regional structures, transport routes and environmental technologies are all important for the country to free itself of the "grey" imported products and their high emissions. Which is why it is targeting the delivery and procurement of raw materials. Besides introducing sustainability labels and product passports, its plans will mean the country will have to focus more and more on supplying itself with recycled raw materials. At the end of the day, Sweden is a big importer of goods. Around 60% of its greenhouse gas emissions can be attributed to the so-called "grey emissions" that were generated abroad.

WHAT ARE GREY EMISSIONS?

Greenhouse gas emissions are normally attributed to the country in which they are generated. This so-called territorial principle, therefore, also applies to the emissions of products that are to be exported to other countries. Countries with a high trade surplus, such as China, understandably feel disadvantaged by this. It makes sense, therefore, to consider the emission footprint of the imported products according to where they are consumed. It certainly makes a huge difference if greenhouse gas emissions are calculated according to the territorial principle or according to where they are consumed.

The problem: although sustainability plays a particularly important role in Sweden the country's absolute recycling rates tend to lag behind those of the rest of Europe. Around half of all household waste in Sweden is used for energy recovery. Sweden's seemingly endless forests gives it a natural locational advantage. The country has access to correspondingly high quantities of forest and wood waste, which makes up 42% of total volume. However, as the amount of waste generated is not enough for its waste-to-energy plants to run to capacity, it must import additional volumes of material. For the most part, these come from the UK and Norway.

Things should change in favour of more recycling

The Swedish government's plans include promoting recycling, banning the incineration of separately collected waste and introducing a waste incineration tax. This is based on the Government's 2018 to 2023 Waste Management Strategy that provides for a reform of packaging, paper and food waste.

The general goal here is to steadily grow the recycling rates of recyclable materials by sorting waste better. In the future, therefore, separately collected waste streams may no longer be sent to waste-to-energy plants.

This will not be so easy for Sweden as the progress it has made in transitioning to clean energy is much more closely linked to the circular economy than is the case in other



countries.

If more volumes of sorted waste are recycled for reuse, then a key cornerstone of Sweden's energy supply mix will be lost. And the country wishes all of its energy requirements to be covered by renewable, non-fossil sources by 2045. Nothing would then be standing in the way of it systematically expanding its local circular economy. >>



Better collections & more technology

According to the plan, households should have two further bins from 2024 onwards so that more waste can be sorted. Besides the separate bins that they already have for residual waste, paper, plastic & glass packaging, old paper, and e-waste, households should also be provided with bins for their old textiles and hazardous waste.

The country already has 580 collection centres (Atervinningscentral / AVC) for large volumes of waste and 5,800 unmanned collection points (Atervinningsstation / AVS) for old paper and packaging. Measures will be undertaken to extend the AVS network so that, by 2025, the system can be found in more residential areas and closer to local residents.

The costs for doing this should not be covered by the councils but by the manufacturers by expanding 'producer responsibility'.

At the same time, Sweden is specifically supporting start-ups in the circular economy. The 'Cirkulära Affärsmodeller' programme initiated by Tillväxtverket, the Swedish Agency for Economic and Regional Growth, not only offers seminars and workshops but also grants amounting to 58,000 euros to facilitate the purchase of technical systems for innovative circular business models.

A perfect match

While people in Germany are green with envy at the political course Sweden's government is taking to support the recycling sector, they, in turn, can provide help with their mature and well-engineered recycling infrastructure. State-of-the-art recycling technologies, closed material cycles and systems to recover raw materials from waste – leading recycling companies in Germany know all about the variety of collection, logistics and recycling options that are available for practically all kinds of material streams. And so it stands to reason that

REMONDIS primarily sees the Swedish market as an opportunity to set new standards within the circular economy. Its recent takeover of approx. 21 business locations in the south west and north east of the country happened just at the right time – enabling it to accompany and actively support the country on its path towards becoming net zero.

REMONDIS IN SWEDEN

The business locations that REMONDIS recently acquired in Sweden and that had been run by its competitor Veolia for four years originally belonged to the Hans Andersson company – a Swedish family-run recycling business steeped in tradition. The firm was founded by the brothers Herbert and Norbert Andersson in 1948 and primarily specialises in handling industrial waste. Veolia acquired the whole of the Hans Andersson Recycling Group AB on 01 September 2017. In 2022, REMONDIS then took over 21 business locations from the Group's recycling division and 13 business locations from its industrial services division which were integrated into XERVON. REMONDIS now has a strong and experienced base in Sweden with its 400 new colleagues and fleet of over 530 vehicles. Being itself a family-run business, REMONDIS will be doing everything in its power to unite the Swedish and German cultures in the best possible way and to transfer the country's progressive sustainability strategy into the circular economy.

DEVELOPMENT RECYCLING

TWO QUESTIONS FOR ULF ERVÉR

ULF ERVÉR WAS BORN IN 1953 AND HAS BEEN WORKING IN THE WASTE MANAGEMENT AND RECYCLING SECTOR SINCE 1992. AFTER GRADU-ATING FROM THE UNIVERSITY OF GÖTEBORG, ERVÉR HELD A NUMBER OF SALES AND MARKETING POSITIONS AT LARGE SWEDISH RECYCLING FIRMS. HE HAS BEEN AT REMONDIS SINCE 2017, LIVES IN GÖTEBORG AND IS A BOARD MEMBER OF THE SWEDISH COMPANIES.

Ulf Ervér, you know both the markets in the north and in Germany really well. What are the special features of the Swedish and Scandinavian markets?

There has been considerable consolidation on the Swedish market over the last few years and many small, family-run businesses have been bought up by larger firms. Now that REMONDIS and Urbaser are established here, there are a handful of big companies leading the market.

Swedes see REMONDIS as being an innovative firm that enjoys steady growth. The market had been looking forward to seeing REMONDIS establish its business in Scandinavia. Environmental issues have been at the top of Sweden's agenda for many years now. Corporate decisions are not only being shaped by economic factors but by environmental parameters as well. Recycling is a core topic here and Sweden is a world leader in some areas of the industry.

Minimising the volume of traffic is important to many customers and the electrification of all types of vehicles is increasing. It is considered to be an advantage if a company has its own fleet and its own drivers – as REMONDIS does – as we then have control over the whole of the waste management chain.

The fact that we can deploy the new technologies and systems that REMONDIS has developed is a further key benefit as far as developing new fields of business is concerned. RETRON, the company's battery management system, is an excellent example of this – in fact, we are in the process of launching it onto the Swedish market right now.

2 Are there any big differences between the way Swedes and Germans work? What should they take into account when they meet each other?

When it comes to business and leadership, the Swedes tend to have a more cautious and softer approach than Germans. Swedes often look to get a consensus of opinion so that absolutely everyone understands and is on board with the decisions that are made. Sometimes, when "German" decisions have been made, we say they should be "defused" and be widely supported before presenting them to the employees concerned. A further important subject on the Swedish market is the ownership structure. REMONDIS has a big advantage here as the company is family owned and not in the hands of a financial investor. Such investors are seen as only being in the business for the short term and unlikely to want to invest in longterm projects. The situation is quite different at REMONDIS. The managers of Swedish firms tend to be all-rounders rather than specialists in a particular area. Which is why Swedish companies delegate more than German ones. The detailed know-how and great commitment of the German partners are much appreciated here in Sweden – but they can also be a bit of a shock for the others taking part in the meeting.





t goes without saying that we would rather be fully recycling all materials right now. However, until this is possible – something that is hopefully not too far off – there will continue to be industrial production processes that

generate residue that cannot be recycled. And it is these wastes that we should be handling more sustainably in the truest meaning of the word. Why? Because the two key factors here are safety and time. What is needed is a location that will not experience geological changes over the next hundreds of thousands of years so that nature safely encapsulates these residual materials. Here in Germany, this is only possible deep down in the ground in our old salt mines.

Working together, the circular economy and salt mines have proven to be ideal partners for delivering a sustainable, long-term and resource-friendly way of storing waste that cannot be recycled or used for energy recovery. Underground storage areas are the safest place for hazardous waste. These residual materials can be placed in the decommissioned sections of potash mines where they remain, gas-tight and watertight, separated from the biosphere by the layers of rock and salt which are hundreds of metres thick. This is the best place for them. There is no safer solution. These mined sections, up to 800 metres below ground, have the natural geological properties that provide the safest place for hazardous substances. Safely compacted here, all types of mineral wastes are laid to rest here for the final time.

50 years' experience solving the challenges of tomorrow

The traditional mining company K+S and the mineral recycler REMEX have joined forces so that they can provide a wide range of industrial businesses and, in particular, waste-to-energy plants with a secure, longterm solution for their residual materials. Thanks to their newly founded company, REKS, they now have access to one of the largest underground storage capacities in the country. RE: VIEWS



Out of sight, out of mind? Absolutely not!

In line with the company's stringent safety standards, all waste (1) that is delivered to our storage facilities – be it liquid, solid or dusty – is first checked. Besides ensuring that all papers and documentation are complete and correct, we also examine the packaging very carefully. A control sample is taken and stored before the waste is placed below ground. (2) The residual materials are then transported several hundred metres below the ground via a hoisting shaft. Special vehicles located under the ground then take the materials to their storage place which is often several kilometres from the shaft. Different types of materials are stored in different areas for safety reasons. (3) Once it has reached its destination, the waste is stacked in storage chambers. A multi-barrier system is used to deposit the waste: when a storage chamber has been filled, it is sealed off with walls or salt barriers. (4) The volume and the nature of the waste, the area and the time it was deposited in are all documented. Furthermore, a control sample is stored in the sample archive below ground. It is, therefore, possible to see what substances are stored where at all times. (5)



They have over half a century of experience in their two underground storage facilities in Herfa-Neurode (in the German state of Hessen) and Zielitz (in the German state of Saxony-Anhalt). Herfa-Neurode was the world's first ever underground storage facility with the first tonne of hazardous waste being deposited there back in 1972. A unique process has been developed over the years to provide a long-term and secure storage place for the waste in decommissioned sections of the mines as well as to stabilise the cavities with the deposited materials.

German law stipulates that sections of mines that are no longer used for extracting raw materials and that do not meet today's safety standards must be backfilled. This also affects the mines in Zielitz and Herfa-Neurode. They meet their statutory backfilling obligations by depositing non-recyclable waste in the cavities created as a result of mining potash and rock salt. This conserves valuable virgin raw materials and makes an important contribution towards the disposal of hazardous residual materials. The term "disposal", however, is a word that is gradually being phased out at REKS. The only time this term should ever really be used is for hazardous waste that has no chance of being recycled. The REMEX and K+S joint venture is also proving that this is the case, especially above ground, where they create near-natural spaces and recover raw materials. By capping and sealing off potash waste heaps and recycling aluminium slag containing salt, they create new landscapes and sustainably conserve natural resources.

Some time, in the far-away future, the last thing that we humans "dispose of" will hopefully be the term "disposal". And only the residual mineral materials safely deposited deep in the ground will remind us of a time when humans produced things that had a beginning and an end. The moment we have perfectly closed material cycles will signal the start of a long recovery period for our planet.



SUSTAINA

PERFOR



SC FREIBURG ACTIVELY PROTECTS THE ENVIRON-MENT IN A VARIETY OF WAYS – FROM SOLAR ENERGY, TO TREE PLANTING AND TALKING BINS, ALL THE WAY THROUGH TO EFFICIENT WASTE MANAGEMENT

he City of Freiburg im Breisgau is situated, quite literally, on the sunny side of life: with around 1,800 hours of sunshine a year, the town is a popular tourist destination and an attractive place for the approx. 230,000 local residents to live. A town that sets great store on sustainability. Which is why Freiburg gave itself the title "Green City" in 2008 and has been marketing itself as such since then to reflect its many environmental activities. It is not by chance, therefore, that its well-known football club, SC Freiburg, has also taken on a pioneering role. A look at Freiburg shows how football and sustainability are intertwined. At the end of the day, being a success is a team performance – also when it comes to conserving resources and tackling climate change.

The Europa-Park Stadium has the space to hold 34,700 people. That's 34,700 fans (minus the away fans) who regularly support their SC Freiburg pushing them on to win another three points in Germany's top flight league, the Bundesliga. "You'll never walk alone" has become one of football's most famous songs and there are very few other songs able to better describe that sense of unity that makes football so unique. There may be eleven players on either team battling it out on the pitch but success is often marked out by the surroundings - by the 'twelfth man' backing them all the way. The twelfth man - this is the fans who support their team through thick and thin. The twelfth man is also all the staff who work hard every match day - at the beer stands and at the turnstiles. \gg



And the twelfth man is also all the external partners who deliver their services to make sure the match is able to be held in the first place.

Setting new standards: the Dreisam Stadium

When the Europa-Park Stadium was used for a Bundesliga match for the first time in October 2021 (it ended in a 1:1 draw against Leipzig), it also meant an era was coming to an end: the era of the Dreisam Stadium. Since then, the Dreisam Stadium has been used to host the home matches of SC Freiburg's 2nd eleven men's team and its women's team. Built in 1953, this stadium has been setting exceptional standards in one area in particular: Freiburg's 'old' home ground has always had sustainability high up on its list of priorities.

It is hardly surprising, for example, that solar energy plays such an important role in a town that has so many hours of sunshine a year. Which is why, when the new south stand was built at the Dreisam Stadium back in 1995, solar panels were also installed on the roof – the first ever on the roof of a Bundesliga club. When Germany held the World Cup in 2006 and football fever gripped the country, the Dreisam Stadium was the first fully solar powered stadium in Germany. A place where many people come together is also a place where people can get things moving. And so, with the club launching a whole number of activities to ensure resources are handled responsibly, it was not just the football fans who liked the stadium but climate campaigners as well. Just two examples

here are the waterless urinals and the water-saving taps that were installed in 1996. The solar panels have also been continuously extended and are now on the roofs of the other stands as well. Other sustainable measures on the list include building a combined heat and power station and a deep well so the club can access its own supply of water for watering its grounds.

The Dreisam Stadium is, therefore, a tough act to follow. "Handling resources responsibly and using them sparingly are fundamental principles that are at the very core of SC Freiburg's identity. And this is what we wanted to see reflected in a variety of areas in our new Europa-Park Stadium," explained Marcel Boyé, head of SC Freiburg's organisation For a clean stadium: REMONDIS is one of SC Freiburg's team partners



and stadium department, before adding: "And, of course, our stadium should fit in with our club, our city and our region."

The goal: a sustainable stadium

Lever Like

> And so the "sustainable stadium" in Freiburg is taking shape. What, though, actually makes it sustainable? One major project, for example, aims to make the very most of the town's many hours of sunshine. Solar panels are currently being installed on the roof and once the work has been completed, the new Europa-Park Stadium will have one of the world's largest solar roofs ever to have been built on a football stadium. If everything goes to plan, the solar

panel installation will be generating electricity by the end of the summer and, with an output of almost 2.4 million kilowatt hours a year, this source of net zero energy will be able to cover all of the stadium's energy requirements.

While the stadium's heat supply may not be as conspicuous as the new solar roof, it is certainly also sustainable. One of the first steps of the new stadium project was to connect the building to a heat network that supplies it with process heat – harnessed from waste heat – from the neighbouring industrial estate. Other neighbours located close by, such as the exhibition centre, also benefit from this closed-loop system. The infrastructure around the stadium has also been designed to promote climate action: besides the dedicated stops for the local public transport systems (bus, tram and Breisgau suburban train), the stadium now has more parking spaces, especially for bicycles. Many Freiburg fans prefer to travel to the games by bike and they can now choose from around 3,700 parking spaces. Everything is in place, therefore, to ensure that the twelfth man can get to their seats in the stadium.

Collaborating with partners

The other twelfth man, the external partners, also play a decisive role. The key word here: team performance. SC Freiburg can count on getting a great deal of support on that score. Collaboration works particularly well when the partners share the same values and have the same goals. A look at the club's partnerships shows that there are many facets to sustainability at SC Freiburg. >>

THE EUROPA-PARK STADIUM

Building began in:	November 2018
Commissioned in:	October 2021
Cost of the stadium:	76.5 million euros
Cost of the infrastructure:	ca. 50 million euros
Capacity:	34,700 fans (incl. terraces for 12,400 fans)
Parking spaces cars/buses:	2,100
Bike parking spaces:	3,700

"Handling resources responsibly and using them sparingly are fundamental principles that are at the very core of SC Freiburg's identity. And this is what we wanted to see reflected in a variety of areas in our new Europa-Park Stadium."

> Marcel Boyé, Head of SC Freiburg's Organisation and Stadium Department

Badenova, for example, has been the club's energy and environmental partner for over 20 years now. Based in Freiburg, it is the biggest energy provider in the Südbaden region and has set up a number of sustainable projects with SC Freiburg over the years. Badenova is also there helping the club to set up solar, digital and e-mobility systems at the new stadium. Let us take a look at e-mobility, such an important subject for the future: Badenova and its network subsidiary bnNETZE is currently equipping the Europa-Park Stadium with the necessary infrastructure to cover the growing demand for e-mobility. Ten 22kW charging points are to be installed on the visitors car park to begin with. Further charging points can be added at any time should demand for this service grow.

A tree for every goal scored

A further example of the productive collaboration with Badenova is their tree-planting campaign: since the 2013/14 season, the energy provider has planted a tree in the region every time the club scores a goal. A plaque is also placed next to the tree informing



passers-by about the campaign and the name of the goal scorer. Goals for more sustainability, so to speak, and proof that football and climate action can be a successful duo.

Another project was initiated with Badenova at the beginning of the 2021/22 season: seven "talking bins" - made from recycled material - were set up around the Europa-Park Stadium. The distinctive voice of Claus Köhn, the stadium announcer, can be heard whenever waste is thrown into one of these blue bins. Well-known German sayings similar to "Well done! You hit the back of the net!" can be heard - a bit of light humour to encourage fans to use the bins rather than drop litter onto the ground. The electricity needed to do this is provided by the solar modules integrated into the bins. They will continue to be used during the coming 2022/23 season to make visitors more aware of environmental issues and keep the access routes free of litter.

The new Europa-Park

Stadium will have one of

the world's largest solar

roofs ever to be built on

a football stadium.

While the talking bins can certainly help promote sustainability, it would be better for the environment if the volumes of



waste generated were reduced. The "Plastikmensch" [Plastic Human] was installed on the boulevard in front of the stadium at the beginning of 2022 to encourage people to avoid producing waste. This 3¹/₂-metre-high sculpture was created by the artist Thomas Rees for Freiburg's "Clean Up Week" in 2018 and, besides iron and wire, is made completely of plastic waste.

This piece of art is regularly moved from site to site to make people more aware of the impact of our modern consumer society and of carelessly discarding plastic waste. And large events, such as football matches, generate particularly large volumes of waste. Making the fans more aware of this is key to having an even cleaner stadium in the future.

From waste management to recycling

However, a "waste-free stadium" is still a long way off. What is important is to collect all the waste generated and make sure it is sent to environmentally friendly recycling facilities so that the materials can be reused. A suitable waste management partner is needed here to ensure the stadium's waste is recycled. Which is why REMONDIS South has been supporting SC Freiburg for many years now. The task here is to meet the logistical challenges sustainably and efficiently. At the end of the day, more than 30,000 fans coming together at such a stadium to support and celebrate their team produce a whole range of different recyclable materials.

Thanks to its branch in Freiburg, REMONDIS has strong local roots and does not need to travel far to deliver its services. And REMONDIS is proud to be able to support this Bundesliga team. "It has been our job to handle the waste management tasks in and around the stadium for many years - first at the old Dreisam Stadium and now at the new stadium as well," explained Tom Haubrich, assistant to the branch manager at REMONDIS' branch in Freiburg. "We collect a whole range of different waste streams - from plant and tree cuttings all the way through to paper. Which means we, too, are helping to make Freiburg more sustainable. And we all want to have a clean city."

Responsible for the stadium and the region

It was German football legend Alfred "Adi" Preißler who put it in a nutshell: "Theory is a grey area – what's important is out on the pitch". SC Freiburg has brought colour to the subject of sustainability with its many activities on and off the pitch. Besides the activities mentioned above, particularly those involving the stadium's infrastructure, the club regularly launches small and large campaigns across the region. Many of these are targeted at children and adolescents to help make them more aware of environmental issues.

From solar energy, to tree planting campaigns and talking bins, all the way through to efficient waste management: the club takes its responsibility towards the city and the region seriously and, by doing so, grows acceptance and environmental awareness among its fans. This feeling of unity is not just something that is found in Freiburg but is definitely pretty unique to football!

Home game for the wilderness

SC Freiburg also promotes sustainability and climate action beyond its stadium's boundaries. In 2018, for example, it entered into a cooperation with the conservation organisation WWF. Due to run over a period of several years, this project aims to maintain and conserve the Black Forest, a UNESCO Biosphere Reserve. A wilderness adventure trail was opened up at the beginning of 2020 in St. Wilhelm, a district of Oberried. Covering a distance of almost five kilometres, children, adolescents and adults can visit the 14 interactive stations set up along the route to discover more about the local plants and animals in the Black Forest.

SC Freiburg and WWF are also intending to enter into a longer environmental partnership that involves, for example, offering hiking trips for SC fans through the wilderness. Football and sustainability are on the same side here!

FULL (WIND)SPEED AHEAD

Onshore and offshore wind turbines already make a big contribution towards the production of electricity in Germany. The Green Deal and the efforts required to become climate neutral, however, have created some major challenges for the wind energy sector as well. More than ever before, wind farm operators are being called on to deliver as secure a supply as possible – at cost-effective conditions. Now bear in mind that Germany currently has around 31,100 wind turbines. More than 30,000 turbines that, as a general rule, are designed to run for a period of 20 years. A long time, during which technical progress continues to be made. At the same time, wind turbines gradually become less productive as they age – a consequence of wear and tear and an increased need for repairs. The magic words here are servicing and maintenance. Wind farm operators that ensure their turbines are maintained regularly and equipped with the latest technology will be rewarded with a more efficient and more sustainable business.

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B e it onshore or offshore: a wind turbine's advantages can only truly come to the fore if it is reliable, efficient and productive – and that throughout the whole of its operating life. In practice, this means detecting and resolving any possible faults in good time. However, no matter how well wind turbines are maintained, it is impossible to completely prevent either wear and tear or faults from occurring. Speed is of the essence when repairs are needed. Every day of downtime is a day lost – after all, the wind doesn't stop blowing when the turbine has been switched off.

XERVON Wind has been offering the wind energy sector the support it needs since the middle of 2021 – from installing and commissioning wind turbines, to inspection and servicing work, all the way through to replacing main components and working on the rotor blades and gearboxes. And so XERVON Wind is able to accompany onshore and offshore wind turbines throughout the whole of their operating life. The portfolio of this newly founded company is complex and its market highly faceted. Maik Schlapmann and Tobias Wilming, XERVON Wind's managing directors, talked about the company's first successes, their strategic initiatives for the future and the link between wind turbines and Industry 4.0. RE: VIEWS

RE:VIEWS: XERVON Wind has been around for just six months. Is it really possible to talk about successes after such a short period of time?

Maik Schlapmann: For sure. It's been full speed ahead for us right from the start. We had the company up and running in no time at all and our staff were out and about over the following months. Our first projects came in just a few days after we officially opened our doors – projects that included working at offshore wind farms in the North Sea as well as servicing onshore wind turbines. At the same time, we had our sights on the coming year and began preparing for 2022 – something that has further strengthened our current position.

RE:VIEWS: And what exactly were these preparations?

Tobias Wilming: For example, building up a qualified team of experienced service engineers. XERVON Wind began with a small number of skilled operatives and we were able to steadily grow our workforce throughout the second half of last year. Our company had 70 employees by the end of 2021. We could have taken on more staff but we just didn't have the space. We've now found a new

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There are over 31,100 wind turbines currently operating in Germany; unlike fossil fuels, such as crude oil and coal, there is an endless supply of wind. business premises in Lingen. We moved there at the beginning of this year and now have the capacities to further grow our business.

RE:VIEWS: Was there one project in 2021 that you would describe as being a key milestone?

Maik Schlapmann: XERVON Wind succeeded in being accredited by two of the largest wind turbine manufacturers within just five months. That was a great achievement on our part – especially the tight time frame. Such accreditations normally last much longer as the manufacturers are very exacting.

Tobias Wilming: The certification process involves stringent requirements and a heavy workload. You need to provide proof of your employees' various qualifications, a quality management system has to be put in place and much, much more. It is extraordinary that we managed to do all the work so quickly. It was a team effort and something we can be very proud of.

RE:VIEWS: You have to compete with others and are still building up your business. And

MAIK SCHLAPMANN, MANAGING DIRECTOR

> TOBIAS WILMING, MANAGING DIRECTOR

you must prove yourselves at the same time. What's the best way to do this?

Maik Schlapmann: The size of a company and its existing structures are not everything in our business. The wind energy sector has so many different facets – from large wind farms at sea to small local community wind farms on land. Being flexible is key if you want to succeed in this industry. You have to be prepared and be able to enter into partnerships with wind farm operators of all sizes and treat them all equally no matter how large or small they may be.

Tobias Wilming: Other things that are important include being reliable, demanding very high quality results of your own work and being innovative – something that also involves the subject of Industry 4.0 nowadays. This is precisely what XERVON Wind offers and it is this proposition that will help us to succeed on the market.

RE:VIEWS: 'Industry 4.0' – that sounds like digitisation and industrial production.

Maik Schlapmann: That's exactly what it is. The world of servicing and maintenance work is changing - and this is true in the wind energy sector as well. Tools such as digitisation, automation, artificial intelligence and data management are becoming more and more important. We want to lead the way here. Optimising processes, driving forward efficiency, making the most of opportunities. This is not just in keeping with the times but also a question of sustainability. Maintaining wind turbines remotely, for example, means more green electricity, and datadriven materials management conserves natural resources. Large wind farms with 10 MW wind turbines can no longer be seen as a simple collection of windmills. These farms are power stations and their requirements are most certainly comparable to those of industrial production plants.

RE:VIEWS: What big challenges are on your radar at the moment?

WHAT DOES XERVON WIND DO?

Being a partner for the wind energy sector, XERVON Wind offers highly specialised services for onshore and offshore wind turbines. Besides carrying out inspection, servicing and repair work, it also installs and commissions wind turbines. Its extensive range of services covers all tasks relevant to the sector as well as complex solutions so that wind turbines run smoothly and achieve the highest possible electricity output. Founded in the middle of 2021, the company has around 70 employees working at its two business locations in Lingen and Cologne. XERVON Wind is part of the XERVON Group and belongs, therefore, to REMONDIS Maintenance & Services. Find out more at www.xervon-wind.de

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Using wind to generate electricity produces neither carbon emissions nor pollutants. They supply offshore wind farms, taking materials and crews to the platforms, and we're looking to further intensify this cooperation. **RE:VIEWS:** How do you believe XERVON Wind will develop this year? What expectations do you have as far as its operations

are concerned?

Tobias Wilming: As far as XERVON Wind's range of services is concerned, we are cur-

rently in the process of strengthening our

wind turbine installation activities - in add-

ition to our servicing and maintenance work.

At the same time, we are continuing to grow

our workforce and drive forward collabor-

ation within the group. Our goal here is to

pool our various fields of expertise and ben-

efit from each other's strengths – something that will benefit our customers of course. We

began collaborating with our REMONDIS sister company, Rhenus Logistics, last year.

Maik Schlapmann: 2022 will be our first full year of business and XERVON Wind is in a good position to get its operations well and truly started. Over the next few months, we are intending to significantly expand our onshore maintenance work. What's more, we also have several large offshore projects in the pipeline that will see our teams of engineers spending long periods of time on a ship at sea. Every project will help XERVON Wind to further strengthen its position on the market as actions always speak louder than words.

RE:VIEWS: Many thanks for taking the time to speak to us. Here's wishing the company continued success for the future.





OUR TOWNS ARE GETTING SMARTER

How digitisation is helping to make our cities cleaner

When the orange road sweeper sets out early in the morning on its rounds around the cobbled streets of the historic quarter of the Swiss city of Basel on the River Rhine, it is not only polishing its image for the tourists but also measuring how clean the roads are. The amount of debris along the vehicle's route is recorded by a sensor before being removed by the brushes and deposited in the road sweeper's storage hopper.

Using artificial intelligence (AI) and dedicated software developed by the IT firm Cortexia, the amount and type of wastes are recorded while the cleaning work is being carried out. As a result, the application is able to objectively assess the levels of cleanliness; by using time series, data can also be collected that makes it possible to take a look into the future. Thanks to AI, the planners at Basel's street cleaning department get a reliable assessment of the type and volumes of waste that will be generated at particular times or on particular days. Rather than having to rely on the gut instinct of their staff and the (too) critical observations of local residents, it is now robust figures that determine when and how often the roads are cleaned.

For local authorities, therefore, digitisation in the waste management sector also means a cleaner city at lower cost. Another key benefit: it enables councils to further improve their climate footprint. Which means the 'smart city' is spearheading climate action.



Using artificial intelligence and dedicated software developed by the IT firm Cortexia, the amount and type of wastes are recorded while the cleaning work is being carried out.

Digitisation & waste management

While sectors such as commerce and logistics used digitisation a few years back to effectively reinvent themselves, the waste management sector has been using networking and big data to integrate established processes and then to improve them with data management. It is not new supply chains that are changing the industry, therefore, but new concepts for delivering the services that should win over public and private sector clients and promote competition.

Thanks to the progress made in data standardisation, fields that belong together can finally be united. This is particularly true for transport logistics and route planning: integrated data management simplifies processes, makes it easier to plan staff schedules and grows efficiency.

Other areas of waste management, though, also benefit from digitisation, such as keeping cities clean. Bernd Bienzeisler from the Fraunhofer Research and Innovation Center for Cognitive Service Systems describes prediction-based services as a key innovation.

The advantage of such systems over previous processes is obvious: reactive city cleaning services have always meant going out after the employees or local residents have noticed that an area is particularly dirty. As far as everyone is concerned, this point is always too late. A proactive approach – i.e. cleaning everywhere very often so that nowhere can get really dirty – was simply not an option for many city authorities because of the high costs involved. Things are different nowadays: digitisation has made it possible to plan cleaning measures and the deployment of resources and personnel effectively. Over the last few years, this has been used in the field in many different ways. Other approaches are still in their infancy. One activity that is of key importance here is gathering data.

Clean street apps

Smartphone apps such as "Düsseldorf bleibt sauber" [Keeping Düsseldorf clean] and "Stadtreinigung Hamburg" [Hamburg street cleaning] make it possible for local residents to report waste issues. Looking at the reviews on Google Play Store and Apple, it is clear what the locals use this app for. Be it a shopping trolley in the Düssel River, bulky waste left on the street or construction waste dumped next to a bottle bank. Whenever local residents get frustrated about street cleaning issues, they can pass on their complaint – with a photo of the problem and the GPS coordinates of the offending spot – without having to wait in line.



Smartphone apps such as

"Düsseldorf bleibt sauber"

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for local residents to report

and "Stadtreinigung

waste issues.

RE:VIEWS

Such solutions offer a number of advantages that include their high levels of efficiency and their high levels of standardisation with all data being automatically recorded. A lengthy telephone call is no longer needed to document the problem – a laborious task that may also require the department to handle the callers with great sensitivity as their expectations of the local authority are often too high. Several call centre employees would have been needed to cope with the approx. 1,500 messages that were sent to Düsseldorf Council every month via the app in 2020. What's more, ideally, the technology allows the data to be automatically processed, prioritised and passed on electronically to AWISTA. This public private company is responsible for keeping the city clean. Another plus point for the users is certainly the fact that these apps can be used 24/7.

makes it possible to unequivocally document an

progress made in keeping these areas clean.

can be recorded and an objective picture of thei

evels of cleanliness drawn up. This,

Dr Felix Thiele, Managing Director of REMONDIS Digital Services

Thanks to AI-based solutions, all public spaces



Thanks to Datafleet, collection vehicles are turned into travelling eyes: the integrated cameras can, for example, identify illegally dumped waste and potholes.

Datafleet

REMONDIS Digital Services has taken a different quality control route with its Datafleet. The refuse collection vehicles operated by Wirtschaftsbetriebe Oberhausen (WBO), for example, are using this scheme which effectively turns their vehicles into travelling eyes. The vehicles' cameras and dedicated software identify traffic signs that are dirty, damaged or hidden by vegetation, faded road markings and even potholes while the collection trucks are travelling along their regular routes. They are also able to spot illegally dumped waste. The findings are automatically processed and then passed on electronically to the client so they can arrange for the repair work to be carried out or for the waste to be picked up.

Similar to Cortexia's system, the big advantage of this application is the completeness of the data reporting. Dr Felix Thiele, managing director of REMONDIS Digital Services, stressed: "Thanks to AI-based solutions, all public spaces can be recorded and an objective picture of their levels of cleanliness drawn up. This, in turn, makes it possible to unequivocally document any progress made in keeping these areas clean." This specialist is certain of one thing: our cities are cleaner than the impression given in public discussions. Each local resident, however, has different expectations of cleanliness and, in most cases, it is the critical voices that are the loudest.

RE:VIEWS

According to Bernd Bienzeisler, examples from other European countries show that much more is possible when it comes to recording data about public spaces – such as using mobile phone data from passers-by or measuring how often bins are used. Germany's data protection laws are very strict here, however, and these must be taken into account when developing applications.

Fill level sensors & effective route planning

Overflowing bins are certainly one of the biggest problems when it comes to keeping cities clean. Experience has shown that people are more likely to drop litter or discard their rubbish if an area is already dirty. "It already looks so bad, so my rubbish won't make any difference," some people would appear to think as they add their old television to the discarded bottles next to the bottle bank.

There are other software solutions besides Cortexia and Datafleet that can help detect such problems and ensure bins are emptied. Just one example: fill level sensors. The information passed on by the sensors – via applications such as REMONDIS' Binity – are used by the scheduling departments to

plan the bin collection routes. Instead of travelling the same schedule every week, the routes are planned according to need: on the one hand, this prevents unnecessary journeys and, on the other, allows the vehicles to get to the hotspots at short notice.

Thiele pointed out the other benefits of such solutions: "Needs-based route planning Needs-based route planning makes sense if it can grow efficiency and positively impact on a city's climate footprint. makes sense if it can grow efficiency and positively impact on a city's climate footprint. Kerbside collections of household waste in towns, for example, will continue to use fixed routes simply because of the costs involved. It makes little sense to install a fill level sensor in a household's 120-litre wheelie bin." The main argument here is that, with the buildings being so close to one another, there is a large number of bins next to each other and it would, for the most part, cost more to send the trucks out to collect individual bins than empty bins that are half full.

Collections rather than collection points

Cities often use central collection points for recyclables – such as local recycling points or recycling banks – and these play an important role. Digitisation is setting the course for their future use as well.

Such recycling points, however, often turn into hotspots being both noisy and a place

where people tend to illegally dump their waste. Which is why some councils, such as the Frankfurt am Main city authorities, would like to reduce the number of their recycling banks. The problem here is that they must find a suitable alternative – and one that reflects the current political environment where statutory collection rates are being increased.

This is where textiltiger.de [textile tiger] comes into play: the number of clothes banks across the country has dropped significantly over the last few years. The private sector companies offering this service have found themselves facing considerable problems regarding the quality of the materials discarded by the public. Sometimes they find a whole selection of materials in their clothes banks – just no recyclable textiles. On the other hand, the kerbside collection of old clothes still makes sense to ensure they are recycled and to prevent them from being thrown away into the residual waste bin.

Textiltiger has been carrying out a pilot project in Hamburg for a good six months now that enables old clothes to be picked up from people's homes free of charge. Households can order this service digitally. Employees from a cargo bike service then travel to the address to pick up the clothes. An electric van is used if large volumes of textiles need to be collected. The offering has deliberately been set up as a decentralised and low-emission service.

Initial findings have revealed that there is great interest among Hamburg's residents for such a service – and the quality of the materials is much better than those put in the clothes banks. Most of the feedback from the several thousand people who have used the service to date has been positive. The recyclehero.de platform operates a similar service for glass and old paper in Hamburg as well although this does involve a fee.

Digitisation means flexibility

Household waste recycling centres (HWRCs) also play an important role as a place to hand in a whole host of materials – from garden waste all the way through to old paint. A survey carried out on behalf of REMONDIS Digital Services in January 2022, however, showed that some users were dissatisfied with the limited opening hours and the lack of payment options. Statistics show that most people would like to go to an HWRC in the late afternoon on a weekday or on Saturday – an option that very few centres are able to offer because of the amount of personnel needed.

One way to increase potential recycling rates here could be by introducing a self-service scheme with a small service charge that can be paid by card or mobile phone when the customer enters a separate dedicated area for handing in materials. The pilot projects that have been launched in Germany, including the one in Coesfeld, may not have achieved the standards in Denmark yet where the HWRCs can be used 24/7. These projects are, however, offering a service in some towns in Germany that allows people to access recycling centres outside normal business hours using an app.

As residents have to sign up to use the app and enter precise information about the waste they are handing in, it is possible to clearly identify who left what material. Self-service does not automatically lead to reduced control and littering. Such concepts could en-able recycling centres to be situated closer to residents as smaller satellite collection points could be set up and operated.

All these projects clearly show that digitisation is an important component for the waste management sector to achieve its climate targets. It makes the organisation of collections more efficient, which means fewer carbon emissions. At the same time, recycling rates are increased – giving the circular economy an additional boost.

WHERE VALUE VALUE IS A HUGE EFFORT

Hopes are being pinned on processes that systematically recover wastewater as a means to counteract the shortage of water in India In 2022, India experienced its hottest summer ever with temperatures reaching up to 47°C

One of the biggest hurdles to social and economic development in India is water supply. With over 1.25 billion inhabitants, India has the second-largest population in the world behind China. This subcontinent is home to around 18% of the world's population but has just over 4% of global water resources. According to studies published by the United Nation's Environment Programme (UNEP), India could already find itself suffering from extreme water stress in 2025.

The reasons behind India's water shortage:

- On average, 37% more groundwater is withdrawn in India than can be naturally renewed.
- 2 The water available from surface watersis becoming scarce.
- 3 Many rivers and lakes are becoming increasingly polluted.
- The falling water table in the north west and south east of the country has led to the groundwater reserves in 20 cities (including Delhi, Chennai and Bengaluru) being almost completely used up.
- 5 The water pipe networks are in such a bad state that up to 40% of the water being transported is lost.
- **b** There are few incentives to use water sparingly due to the heavily subsidised prices for farmers and households.

- The demand for drinking water is steadily increasing; not only because the population is growing but also because industrial businesses need more water.
- Frequent extreme weather events: in 2022, the country experienced its hottest summer ever with temperatures reaching up to 47°C.

So where is India's fresh water?

India consumes around 634 billion cubic metres of water every year. A whole 89% of fresh water supplies are used by the agricultural sector. Private households consume a mere 6% of the water and the industrial sector's share is very low lying at 5%. Approx. 40% of households have tap water connections; in rural areas this figure drops to just 20%. Experts are forecasting that the demand for water from public sector institutions and private households will have doubled by 2030. What's more, they expect the demand for water from the industrial sector to quadræple.

Wastewater treatment is rare

The situation is no better with the wastewater: 62 billion litres of wastewater are generated in the country's towns and cities every day and just one-third of this is treated. Across the whole of India, there are 615 operational sewage treatment plants with a capacity to treat 24 billion litres. For the most part, the plants only have mechanical treatment systems. The quality of the drinking water also suffers because wastewater is discharged into the ground, rivers and lakes. Mumbai is the only city that fulfils all the statutory requirements. According to an investigation carried out by the Bureau of Indian Standards, other large cities, such as Delhi, Kolkata and Chennai, were not able to meet up to ten of the eleven criteria.

Recycling is growing in importance

With their supplies of drinking water dwindling, Indian councils are turning more and more to wastewater recycling. The country's capital city, New Delhi, has 36 plants that generate 1.6 million cubic metres of process water every day. Mumbai intends to have built processing facilities with a daily capacity of 1.8 million cubic metres by 2025. And one particular system is becoming increasingly important for industry: zero liquid discharge, which, as the name suggests, creates a wastewater-free production cycle. Many German companies have, therefore, made their way to India with their technologies and product solutions to support the country in its efforts to improve its water supply and wastewater treatment systems. For many years now, Dr Keno Strömer, managing director of REMONDIS Aqua India, has been looking into India's vanishing water supplies – also from a scientific point of view. He is convinced that "modern wastewater management, including ZLD, will play a decisive role in overcoming the water crisis that so many regions around the world are facing."

"Modern wastewater management, including ZLD, will play a decisive role in overcoming the water crisis that so many regions around the world are facing."

Dr Keno Strömer, Managing Director of REMONDIS Aqua India

DEVELOPMENT WATER



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A partnership reducing water loss

Which is why, working closely with REMONDIS Aqua, EVONIK also recently opened its first plant in Dombivli, India, that uses zero liquid discharge (ZLD). The ZLD facility cleans and recycles the wastewater at the end of an industrial process so that there is very little or no wastewater left over. This not only enables water to be used more efficiently, it also significantly reduces the plant's volumes of waste liquid.

EVONIK has been developing location-specific action plans as part of its global water management strategy. It has, in particular, been focusing on its plants that are located in regions that may be affected by a water shortage.

ZERO LIQUID DISCHARGE (ZLD)

ZLD is system for treating wastewater that is particularly suitable for large industrial businesses. By using ZLD, water is kept in a continuous loop so that it can be treated and reused again and again. The result is a production system that generates absolutely no wastewater. Thanks to ZLD, costs are cut, water reserves conserved and the environment protected.

HOW REMONDIS AQUA SUPPORTS INDIA

Being an expert in wastewater treatment and water supply, REMONDIS Aqua realised early on that there was a need for ZLD in India. It has already launched a comprehensive range of services related to this system over the last three years – and this despite the fact that ZLD technology is extremely complex both to design and run. REMONDIS Aqua is one of just a handful of companies with the necessary expertise and many Indian businesses and international firms based in India have already benefited from its knowledge. Besides helping to secure the future of industrial firms in India, the system also has a positive impact on the environment, helping to stabilise the whole of the Indian water supply network.

Pankaj Kumar, REMONDIS Aqua Ind is the technical head EVONIK's ZLD facility


What we've always needed to survive

eaving waste and overflowing bins in the streets of densely populated towns for a few extra days after they should have been collected. This was one of the most effective measures that used to be used in industrial disputes - how can we forget those images from London, Paris, Madrid and Naples. Life cannot function properly without a well-established waste management sector as unemptied bins can cause considerable hygiene and health problems for local residents. Which is why the waste management sector considers itself to be a part of the so-called Critical Infrastructure. According to the most commonly found definitions, this term covers sectors such as energy, water supply and wastewater treatment.

A forever changing definition

This term has, in fact, not been around for that long. The phrase was first coined in the USA during the 1990s and initially focused on the world of digitisation. At that time, those responsible in the worlds of politics and business were well aware that, while digitisation would get many things moving, the IT systems crashing would also mean having to manage much higher risks than before. Which was why the risk analyses and resulting security concepts were initially set up to protect the IT infrastructure of companies, authorities and councils.

With an eye to the 'National Strategy to Protect Critical Infrastructure', which transposed an EU directive into national law and came into force in Germany in 2009, the BMI [Federal Ministry of the Interior] expressly refers to the 'National Plan to Protect Information Infrastructure'. Other events – from epidemics, to natural disasters, to war – can obviously impact on the ability of the Critical Infrastructure to function effectively as well. RE:VIEWS

The kerbside collection of household waste was not added to the list of Critical Infrastructure sectors until 2021 when it was listed in the IT Security Act 2.0.

While the central and state governments have always considered water supply and wastewater treatment to be a part of the Critical Infrastructure, the 'kerbside collection of household waste' was not added to the list of Critical Infrastructure sectors until 2021 when it was listed in the IT Security Act 2.0. Indeed, this addition was so new that industry representatives had to remind the Federal Government's Covid Committee of the fact at the end of 2021 after it omitted the sector in its recommendations.

Over the last two years, the disruptions caused by the Covid-19 pandemic to, for example, our healthcare systems and global supply chains have made it very clear how the lives of local residents are not hanging by one thread but by a whole host of threads that are not as strong as we had assumed back when life was 'normal'.

A look in the rear view mirror

In reality, though, the Critical Infrastructure has been around for much longer than the actual term. Over the centuries, technical progress, the ever-developing division of labour, urbanisation and population growth have all made us dependent on our fellow human beings. It is virtually impossible for someone to survive on their own – especially with the quality of life we have become accustomed to. But how reliable are our neighbours? For years now, the doubt in people's minds has led to some common practices such as stockpiling goods. External factors can also put us at risk. This can be seen simply by looking back at the past. At the same time, it explains why waste management and wastewater treatment are central components of the Critical Infrastructure.

Recycling rather than disposal

It is not possible to determine exactly when humans began to systematically collect and, for the most part, landfill waste materials. There is a simple reason for this: it was standard for communities that had a shortage of materials to repair and reuse practically everything they had - be it wood, bone, glass, metal or animal skins. In the past, tinkers and cobblers mended utensils that were worn out and could no longer be used. Ragmen, who were also organised into a guild like other tradespeople, paid a fee so that they could systematically look through household waste to find valuable materials. Animal bone was boiled to make glue. Urine was collected and used to process leather. Even faeces were collected in the Middle Ages and sold as a fertiliser or fuel. "Turning s**t into gold" really was possible back in the Middle Ages.



"Turning s**t into gold" really was possible back in the Middle Ages. Very few materials were sent to rubbish tips at that time. These included sweepings – the smallest volumes of waste from households. For the most part, towns buried these in ditches with other materials that could not be reused, one of the most productive sites for archaeologists nowadays. Indeed, a few towns back in the Middle Ages even began collecting the material and taking it outside the city walls to prevent it from being left next to the front door, blocking the roads and causing accidents. Hygiene pretty much took a back seat at that time.

A changing attitude towards waste

Waste only really became a challenge in recent history. Why? Because of the ever-growing volumes. As the size of the population in cities grew, so, too, did the amount of fly-tipping – causing a real problem for the authorities. A number of factors were driving this development. Technical progress meant that previous recycling processes were no longer profitable. Coal took over a central role in energy production. The centuries-old practice of collecting wood and paper as fuel was suddenly obsolete. And cheaper, man-made raw materials such as fertiliser had a similar impact.

Our cultural and social attitude towards our 'leftovers' has also changed. While there was still a pretty relaxed attitude towards many parts of our lives in the Middle Ages, there was a much greater sense of shame later on – particularly after the Reformation – and a desire for privacy and seclusion, especially as a family unit. We no longer wanted to have to think about our waste: "take it away as far as possible" became the overriding standpoint.

Cleanliness became a subject in itself in absolutist states and as part of the Enlightenment movement and a topic that people felt they had to teach to the uneducated classes. Anyone carrying out a waste-related profession found themselves being stigmatised and sidelined as if they were responsible for the dirt. Authorities began using cleanliness as a reason to discipline and monitor their own people. This was reflected in urban development in the 19th Century. As the cities rapidly expanded, places had to be built to accommodate the workers coming in from rural areas. The lower the position a person had in society, the closer their home was to the municipal waste ditches and septic drainage fields.





Hygiene as a principle

People gradually began to realise that waste was not harmless but could contaminate the air, water and soil and create a major health risk for the city dwellers. This was first expressed in the so-called miasma theory of the 17th and 18th centuries, which suspected that there was a connection between the two. As people had no proof of this, however, they primarily focused on outer appearances. It was simply assumed that if something smelt bad or looked dirty then it was not good for humans. The invisible elements, i.e. bacteria and viruses, and their effect on humans did not come to the fore until the field of bacteriology emerged. The whole idea and the importance of hygiene grew quickly after the beginning of the 19th Century. And now it is clear that waste is dangerous and must be handled with care.

The development that this triggered, though, was highly problematic to begin with. The previous recycling infrastructure and its representatives, the relevant professions, had completely disappeared by the end of the 19th Century. The volumes of waste being generated in the 20th Century were growing at a very rapid rate and the new structures being set up were unable to keep up with this development. By the end of the 19th Century, it had become a standard task for local authorities to remove waste from their towns. But what should they do with it then?

The first signs of a circular economy could be seen in Germany after the Second World War when the country enjoyed rapid economic growth, the so-called 'Wirtschaftswunder', and there was a surge in the volumes of waste.



Heated arguments were exchanged about this problem during the first three decades of the 20th Century. Those who supported the reuse of the materials considered landfilling and incineration to be an 'environmental outrage'. Individual efforts – such as Munich's attempt at the turn of the century to sort household waste after it had been collected so materials could be reused or Kiel's bid to process human waste into fertiliser – failed in the end for financial reasons and hygiene concerns.

Hygiene is the main reason why the people on the other side of the argument were in favour of incineration as this process enables the materials to be completely destroyed. However, the incineration systems used at the time – or at least those used in Germany – did not function very well as there was not enough combustible material in the waste, particularly during the war years. In the end, the decision was made for landfilling, something neither side really wanted. With there being no system organising the way the materials were landfilled, this development had a huge impact on the local environments.

The first signs of a circular economy could be seen in Germany after the Second World War when the country enjoyed rapid economic growth, the so-called 'Wirtschaftswunder', and there was a surge in the volumes of waste. Not until the 1960s, when the emergency could no longer be hidden and landfills were filling up faster than new space could be found, were the first steps taken to systematically collect and process waste - the recycling sector had begun. Looking back over the centuries, neither waste management nor wastewater treatment began simply as a matter of course. They were a response to the essential necessities of human beings living on a highly developed, densely populated planet characterised by division of labour. They fulfil tasks, without which life - and in particular urban life - would simply not be possible. And they require many different players and processes that must be able to interact with each other sensibly and smoothly so that they can function properly.

RE: VIEWS

Wastewater treatment



A separate subject – but one that is still closely connected to waste management – is the field of wastewater treatment. Archaeological digs have shown that sewage systems were built in the Bronze Age in Sumerian towns, more than 4,500 years ago, to remove human waste from populated areas by using water to transport the material to suitable rivers or streams. Comparable systems were built and used throughout the whole of the Ancient and Roman Times.

This knowledge then got lost. Or rather changing political environments, a lack of economic opportunities and new religious beliefs led to some people leaving the cities and the systems no longer being operated. Within a few generations, no one knew about this solution.

Instead, in the Middle Ages and the Early Modern Age, human waste simply ended up outside the front doors, in pits or in the nearest stream. People gradually became bothered by the way this contaminated their local environment, especially with the dawn of the Modern Age. Authoritarian methods were turned to, to begin with, to try and handle the smell and filth. A series of cholera epidemics in the 19th Century and the realisation that these were primarily caused by human waste led to some large cities building extensive sewer systems in the second half of the 19th Century. Not until the 20th Century were sewer systems found across all cities.

The practice of simply discharging sewage into the rivers, however, also proved to be a problem. At the end of the day, it is not possible to use contaminated water as drinking water nor can such waters be used for swimming or fishing. Innovative towns began using a natural sewage treatment method: septic drainage fields. This system was very soon stretched to its limits as too much surface area was needed. Over the 20th Century, mechanical, chemical and biological systems were then gradually developed to treat the wastewater – not only so that it could be discharged safely but also so that the recovered products, primarily water, could be reused.





Julia Hadrossek has been managing REMONDIS' branch in Coesfeld since 2016. She is also comanaging director of a local joint venture and, since 2020, of REMONDIS Münsterland. We took a closer look at Julia's career and leadership style, which is based on transparency, respect and trust – and is proving to be very successful.



RE: VIEWS

ight from the very first day she began her job as branch manager, she has been on first-name

terms with her team. "Hi, I'm Julia" was the way she introduced herself at the first works council staff meeting. Much to the irritation of some of the other long-serving managers. And who knows: had they known she was going to be so informal, maybe they would have taken the young lady to one side and advised her to keep a greater distance between herself and her staff. Fortunately, they couldn't. And the then 29-year-old obviously hit the right tone. Clear, firm, likeable and, as always, with a smile. She came across really well.

Just as she had done three years previously. In December 2012, having just handed in her Master's dissertation to the University of Hamburg, Julia was celebrating Christmas with her family in Dortmund – and wanted to take a break having spent the last five years studying economics in Düsseldorf and Hamburg and done two long internships at Kühne und Nagel and RWE Power.

Things turned out differently though. Julia Zierow, as she was called back then, had not anticipated her future employer reacting quite so quickly: "I sent an unsolicited application to REMONDIS at the beginning of February 2013, had an interview on the 19th and started my job on 1st March." She still remembers the exact dates. Well-structured processes with positive results are simply her thing.



Even if she becomes thoughtful for a moment: "Looking back, I must say that after having got my Master's, I would have liked to take two or three months ... – but I did get a week's skiing in. And then everything got under way," the now 35-year-old said laughing. She's obviously very happy with the way her career has gone to date.

She began at REMONDIS West in Bochum as a trainee. 'Born and bred' in Dortmund, her first job was just a short commute: "I was pretty lucky when I joined REMONDIS. My boss back then, Jürgen Mauthe, who also hired me, took me to every branch manager meeting right from the start. That meant that, even as a trainee, I was able to really get to know the business and meet the decision-makers in the company during my first year."

Westphalia

At the end of her first year as a trainee, during which she also worked at a number of REMONDIS sister companies, she then spent 18 months in logistics, the main subject of her university course and Master's dissertation. It also became very clear that she was more than willing to take on responsibility.

This also fitted in with the expectations of Jürgen Mauthe, who Julia sees as being her mentor – and someone she can share her love of football and her passion for BVB with. "He had so much confidence in me. He said she can do it and that really made me believe in myself," she said looking back. And so she applied for a vacant branch manager position, was even the preferred candidate of the incumbent manager – and took over responsibility.

JULIA HADROSSEK

BRANCH MANAGER IN COESFELD (MÜNSTER-LÄND), CO-MANAGING DIRECTOR OF REMONDIS MÜNSTERLAND AND OF THE THEISSEN JOINT VENTURE



And so Julia Hadrossek, as she is now called since her wedding in 2021, has been managing REMONDIS' branch in Coesfeld since 2016 (and, being a local Westphalian lady, knows exactly how to pronounce the name of the town correctly).

On top of this, Julia is also the managing director of a joint venture and, together with a colleague, of REMONDIS Münsterland since 2020. All in all, she is responsible for around 230 employees at five different business locations. >>

Qualifications

At the moment, she is one of a small group of women with such a position within the REMONDIS Group. "But things are changing," she pointed out. She likes being one of the first. Julia Hadrossek really enjoys leading the way and wishes to improve whatever situation she finds in front of her.

Asked whether the cliché that the recycling sector is a man's world is still true, she answered immediately: "Absolutely!" She seems to see this as a challenge though and is always asking herself: "What does our company look like to others, our public image? How do women see us?"

She finds it a shame that more women don't apply for the vacancies across the Group. Having said that, though, her attitude is always the same when it comes to hiring new staff: "I'm still a fan of selecting people according to their qualifications. We shouldn't take on staff to meet a specific quota."

She is banking on the situation changing bit by bit and is very optimistic: "I had a really young team when I started six years ago. They accepted me really quickly as their boss even though I was the same age. What I have learned from my time back then is that heterogeneous teams with different cultures and sexes work best."

Why? "Perhaps it is simply because women approach some things a little differently: their problem-solving skills and their analytical way of thinking and sometimes they have a little bit more empathy."

Respect

She was somewhat apprehensive about her first meeting with the works council in Coesfeld in 2016. But she approached it as she has done many other situations – consulting with others and then building up trust with dialogue and transparency. Over the years, she regularly joined the Coesfeld drivers and their team on the lorries to get to know them better as well as to be able to study the processes in more detail.

Her understanding of the work, attitude, safety awareness and the atmosphere among the staff have all proven her right – and the numbers speak for her as well. Apart from one small outlier, the branch's sickness absence rate of below 5% is very low for the industry and remained so even during the Covid pandemic.

"I have a super team behind me and they all pull together," Julia Hadrossek said beaming. And her wording sums up the situation perfectly: "It goes without saying that I like to be there right out in front trying out new things, checking out new segments we've not worked in before and introducing innovations into the business."

Her staff see her as being "ambitious" as one of them said. People trying to keep up with her certainly need to have plenty of stamina. Julia Hadrossek not only works quickly, she is also quick-witted – both in meetings and on the tennis court. And she is always heedful of those she is facing in both environments:

"I'm always open to begin with and try to communicate with everyone on an equal footing. I hold them all in high esteem, of course – whether they drive a digger or lead the district authority." And this was the attitude she had when she first stood in front of her team of staff and had to introduce herself. She knew instinctively: "Respect has nothing to do whether you address someone formally or call them by their first name."

Leadership

In 2016, Julia Hadrossek – just 30 years old – joined a small group of staff who had been selected to take part in the company's so-called 'management tour'. Regional managing directors and other top managers within the Group put forward the names of the second-tier managers they would like to see participating.

This 'tour' involves them taking part in further training courses and seminars that focus on the role of managers, on developing soft skills and on working with politicians and local authorities. And, of course, it's all about networking among each other. Still a young manager, Julia knows: "No one is a perfect manager. Which is why further training courses are so important. I play tennis and I would even say that I play well. I still take part in training sessions though."

And she is more than happy to pass on what she has learned to others. Just as she benefited from having a



"I hold everyone in high esteem, of course – whether they drive a digger or lead the district authority"

mentor when she joined the company, she is now constantly trying to help her young colleagues to further their careers. For example, with their university courses and Master's dissertations.

Julia leads her team out of conviction with transparency and trust. "The barriers between my closest team of commercial and scheduling employees are very, very low. We are on an equal footing when we discuss things without our division of roles becoming blurred." It is "super important" to her that her employees have the confidence to go to her if they have a question, that they trust her.

Which doesn't mean that she is not authoritative and cannot put her foot down. There have been situations where she has had to do this at the Coesfeld branch – but these are few and far between. What is much more important for her is making sure the projects are a success with her team behind her.

She has also had to make herself clear at meetings with people outside the company and represent her firm's interests. In such cases, Julia remains friendly and unambiguous, as she was a few years back when she took her courage in both hands and stood before the branch's workforce: "There are a few occasions when you need to sharpen your elbows."



Success

As far as this 'home-grown' REMONDIS employee is concerned, results are important, not power play or meetings where people just wish to show off. "I get bored of meetings that don't produce results – that keep going round and round in circles without achieving anything tangible. Such things tire me out. My employees pick up on this as well," Julia Hadrossek explained quite openly.

The Coesfeld branch, the Theißen joint venture and REMONDIS Münsterland are all run as individual profit centres. Which means the numbers have to be right here as well. And this suits her down to the ground. "If you are good at what you do and the figures back you up then that really does spur you on. That may sound a bit bold of me – but I would be lying if I said something different," the 35-year-old is happy to admit.

And the figures do indeed back up her. This is also reflected in the management teams at REMONDIS West, the firm above hers, and at the parent company in Lünen. The Münsterland team have been running a good and successful business for many years now. >>

This is helped along by projects that Julia and her team carry out alongside their day-to-day work projects that demand a great deal of them. At the end of 2020, for example, when REMONDIS was once again awarded the contract to collect light sales packaging via recycling bins and recycling sacks in the neighbouring district of Steinfurt. This work, however, should no longer by carried out by subcontractors but by the firm itself. Within just a few months, 20 new employees had to be found and shown how to do the work and a completely new business location had to be set up in Ibbenbüren.

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Working together with the then assistant to the managing director and now authorised signatory at REMONDIS Münsterland, she managed the project from the top. She did everything, including getting the necessary waste management permits which - as experts working in regulatory affairs know - are not easy to get from the city and district authorities. "Everything went smoothly," she commented modestly.

Corresponding with the authorities is a hobby horse of Julia which made the task easier, although she admits that this work used to be "really uncertain terrain" for her in the past. "I really loved getting stuck into the Federal Emissions Law and all the other ordinances. Who knows perhaps I would study law today," she says with a smile on her face.

There were also lots of laws and regulations involved when the joint venture Kreye was fully integrated into Theißen Entsorgung, where Julia Hadrossek is a co-managing director.

The skip hire business Kreye joined the Group as a share deal via the Theißen joint venture in which **REMONDIS** West Region owns a 74.5% share. Julia is in charge of strategic matters here and travels to Rhede once a week to visit the company.

Numbers

Normally, though, she leaves her home in Dortmund at 7am to travel the 85 kilometres to Coesfeld so that she is at work by 8am. Then it's a question of reading through her emails, checking in with the scheduling department to find out if there are any staff absences and then spending a bit of time at her computer before walking round the site.

"I think my work is a healthy mixture of operational and strategic tasks." Every second or third day, she takes a look at the turnover because, she stresses: "We are a Group that is certainly shaped by numbers, data and facts." As the business figures are accounted for every single day at REMONDIS, the branch manager examines the previous day's statistics on a daily basis and looks at the input and output materials.

"This is more just to keep an eye on things nowadays. I have handed over tasks and responsibilities to my deputy as I have so many new projects now. This allows me to focus more on strategic matters: collaborating with the local and district authorities, tackling the challenges of energy supply and alternative fuels."

Motivation

It is such projects that Julia particularly enjoys doing. Thinking outside the box, making the most of internal and external networks, driving forward innovations. "At the end of the day, being successful

"At the end of the day, being successful is also really motivating. If we reach our goals or even exceed them, then that gives us that vital momentum."

is also really motivating. If we reach our goals or even exceed them, then that gives us that vital momentum."

She also gets this from the second-most important fuel in this industry: "I certainly drank less coffee before I joined REMONDIS and I used to drink it with milk. Now I love black coffee. As do 95% of my colleagues here at the branch. We are very modest here at the company," she laughs, winking.

Both her team and her bosses are well aware that she does not really mean this and that she is much more likely to be thinking about her next innovative projects. Right at the beginning of her career at REMONDIS, an employee commented quite openly: "We already know that you like to lead the statistics."

She found it a little embarrassing to hear it being said quite so plainly. But the colleague was right; that is what she expects of herself – and also reflects the open way she leads her team.

The next works council staff meeting is being held soon: she will not have to start off her speech with "Hi, I'm Julia". Everyone working at the Münsterland businesses knows her. And presumably many others will get to meet her over the coming years – and, most probably, come to appreciate her as well.

PROFILE

Julia Hadrossek ...

was born in Dortmund in 1986 and had the surname Zierow until she married in 2021. She returned to her home city after she began working at REMONDIS in 2013 and has been living there ever since. Before that, she studied economics in Düsseldorf and Hamburg. After 12 months of renovation work, Julia and her husband, a dentist, will be moving into her parents' house in Dortmund's 'Gartenstadt' district in the summer of 2022 ("I'll be so relieved when we finally move in!"). Julia Hadrossek manages REMONDIS' Coesfeld branch (situated in the Münsterländ region), is comanaging director of REMONDIS Münsterland and of the Theißen joint venture. She describes being able to sleep in at the weekend as being a great privilege.

Sport?

"I love playing tennis, also as part of a team. I first held a tennis racket when I was a child and was an ambitious player all the way through school. I effectively stopped playing for a while when I was studying as I didn't live in Dortmund. But I started again a few years ago and am fully immersed in the sport again as part of a team etc." The 'Damen 30' ladies team at Hörder tennis club certainly appreciate Julia's determination as well as her open and hearty laugh. As far as football is concerned, she supports BVB (what a surprise). She can sometimes be seen at the stadium and points out: "My whole family is 'black and yellow'."

Favourite holiday destinations?

"It sounds so hackneyed but it really is the island of Sylt. We've travelled there every year ever since I was knee-high to a grasshopper. But completely unpretentious – to a nice, small, homely place in Wenningstedt," she explains with her eyes shining. "Another favourite place is Mallorca," she adds and then, after a short pause, laughs: "The typical destinations for Germans then." She visited Portugal for the first time 18 years ago and very much enjoys going to Lisbon and the Algarve.

The people around me say...

Both her friends and her colleagues describe her as being open, likeable, self-confident, extrovert and quick-witted (in meetings and on the tennis court). Julia Hadrossek is a naturally goodtempered person who loves to laugh and laugh loudly. It comes across loud and clear: she really enjoys what she does. E:VIEWS

WHEN ROUTINE BECOMES A THREAT TO LIFE

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HOW ONLINE COURSES AND AN HGV SIMULATOR CAN IMPROVE DRIVER SAFETY

or many years now, technological solutions have been developed and implemented to make it easier for drivers to see what's happening around their lorries. Using blind spot assist systems can help to defuse many dangerous situations. It is a big risk, though, to rely completely on technical aids. It is essential that all road users are both attentive and considerate to minimise the risk of an accident. Making HGV drivers aware of these risks is a big part of their basic and further training courses. The problem here, though, is that it is not possible to practise being in many dangerous situations - either on the training ground or on the roads. How online courses and an HGV simulator can close this safety gap? Accelerating towards greater driver safety!

As always, Lisa is travelling to work by bike. It's not a particularly long way but it gives her enough time to work out in her head what tasks she needs to do today. A relaxed start to her working day, therefore, were it not for that one dicey spot: a major crossroads with several turn-off lanes. The traffic light turns green and Lisa starts pedalling. But then she hears a lorry approaching from behind. Within no time at all it is level with her. Lisa decides to brake – and is very lucky indeed. A few seconds later, the lorry starts turning right and only just manages to stop in time. That could have ended very differently! RE: VIEWS

One of the first questions that learner drivers are asked in Germany is: "Why must you stop before turning right?" The answer is simple: because there may be a pedestrian or cyclist in their blind spot. This is a small but so important area at the side of a vehicle that is difficult for a driver to see despite their mirrors and cameras. According to the BMDV [Federal Ministry for Digital and Transport], there were around 9,906 right turn accidents in 2019 that left people injured. The main reason for these: the blind spot. Blind spots are a permanent risk - especially for HGV drivers who, sitting high up in their cabs, are unable to see everything happening around them.

Technical solutions need to be brought in to reduce the risk of right turn accidents. Regulation (EU) 2019/2144, for example, stipulates that all new EU type approvals for buses and lorries must be equipped with a blind spot assist system from 06 July 2022 onwards; the same will apply to all newly registered vehicles in the EU after 07 July 2024. As far as the technology is concerned, this means that a driver will hear an audible warning if a person is next to their vehicle in their blind spot. The driver can brake and prevent a collision. The UDV [German Insurers Accident Research] has calculated that the use of blind spot assist systems could reduce right turn accidents by 60%. That is certainly a good start.

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Routine is a driver's enemy

No matter how much the technical devices have been improved over the years, however, it is still people sitting behind the wheel. People who drive their lorries from A to B every single day. And, in the best case scenario, do this safely. It is not enough for them to rely on their technical aids and on them working properly. There is something else: the right-hand-turn blind spot is just one of many risks. Other common causes of lorry accidents include driving too fast, not leaving enough space to the vehicle in front and, the number one reason, the driver being distracted. Every HGV driver learns about the necessary tools of their trade when they do their apprenticeship: How do you drive a lorry and what are the everyday tasks? Over the years, though, driving their vehicle becomes routine: I'll just grab my mobile to swap songs. I'll just take a bite of my sandwich to stop my stomach grumbling. "I'll just" can quickly be their undoing. These seemingly routine actions can distract them from what is important - namely keeping their eyes on the road and on the other road users.

60%

of right turn accidents could be avoided by using blind spot assist systems



HGV drivers must take part

in modular training courses

every five years if they

want to keep their HGV

driving licence

"Routine is the enemy of many drivers and can lead to a high rate of accidents," commented Paul Fikus, who is responsible for training and further training HGV drivers and automotive mechatronics specialists in REMONDIS' west region. "No one voluntarily wants to have an accident," he points out. It is more a question of carelessness creeping in over the years: an 'I know exactly how my vehicle works' attitude. That's true certainly. But once a person has learned to drive a lorry, they must also be regularly reminded about what a responsibility it is to handle such a large vehicle. Driver safety awareness, therefore, is an essential component for all driver training and further training courses. In any case, the requirements for professional HGV drivers are much stricter than those for private individuals. HGV drivers are not solely responsible for road safety. If they want to keep their HGV driving licence, however, they must take part in modular training courses every five years something that makes sense simply because of the size of the vehicles, the goods they transport and the area they are operating in.

"Routine is the enemy of many drivers and can lead to a high rate of accidents."

Paul Fikus, trainer and instructor of HGV drivers and automotive mechatronics specialists in the west region

Paul Fikus and his trainer colleagues based in the town of Herne have been looking at ways to optimise their training programme for a long while now. It is especially important to make drivers aware of risks, to pass on individual experiences and increase specific skills as it is often simply not possible to physically practise many situations in advance. "We want to help our drivers and have a sustainable training programme to support them long term. This is all about showing that we appreciate our staff," said Alexander Bartz, who is also a driving instructor and trainer at the Herne business. Paul Fikus added: "We are a family-run company and want to reflect this in our everyday work. This means growing our drivers' skills and developing a wide range of in-house further training opportunities."

In the future, it should be made easier for HGV drivers to take part in further training courses that reflect their needs and are available when they need them. They should also be able to suggest topics that are relevant to their jobs so that these can be incorporated into future courses. "This helps us to remain close to the action and teach specific subjects that will help our drivers," explained Alexander Bartz. "It's all about talking to one another and exchanging experiences."

RECADEMY Drive goes live

A first step has already been taken in this direction: drivers can now learn more about specific subjects by taking part in online courses, so-called e-learning. This e-learning offering is gradually being set up and uploaded onto the company's RECADEMY platform. The individual courses are interactive, examine real driving situations and use questions and images to get the participants actively involved. This is, therefore, a very vivid way to teach, refresh and consolidate knowledge. Online courses proved to be a particularly useful addition to in-person courses during the Covid-19 pandemic.

The first online driver safety awareness course went live in February 2022. This takes a detailed look at the dangers of driving too close to the vehicle in front, of driving too fast and of being distracted behind the wheel. Paul Fikus and Alexander Bartz use real stories in these courses and deliberately make them emotional: "No family should be torn apart because of a driver glancing at their mobile." What is clear at the end of the course is that drivers who drive attentively and considerately also drive more safely.

This, though, is just the beginning: further e-learning courses are already being planned. The second course will present the fundamentals of the digital tachograph. An important subject – at the end of the day, adhering to the driving times and breaks avoids fines and prevents accidents being caused by overspeeding or tiredness.

Drivers can now learn more about specific subjects by taking part in online courses, so-called e-learning.

It is also possible that courses will be developed in the future to teach the drivers, step by step, about how their lorries are designed, especially when new generations of vehicles are launched onto the market: How are they different to the previous generations? How has the cockpit been designed? What is the best way to secure the goods I'm transporting? Eco-driving, first responder skills, fire protection – there really is no end to the list of possible course subjects. And these online courses can also be used to gradually train new employees and make them aware of possible risks.

Finding new drivers is certainly a big subject in the industry. "Generally, you can say that there is a serious shortage of HGV drivers in Germany across all fields of logistics," said Paul Fikus describing the current situation. "What's more, demographic change will lead to a large number of drivers leaving us over the next few years. This means vacancies that will have to be filled and new drivers that will need additional training." This is where the online courses will come into play as they can be accessed anywhere and at any time, are concise and pass on facts in an entertaining way.



BESPOKE LEARNING OPPORTUNITIES

RECADEMY Drive is the central contact point, the headquarters so to speak, for all apprenticeship and further training courses in the west region involving HGV drivers and automotive mechatronics specialists. The west region has around 14 apprenticeship/training centres and between 800 and 900 HGV drivers. Everything that is developed here will eventually be passed on to all of the REMONDIS Group's other business locations. Besides giving regular modular training courses, most of which are taught in person, the driving instructors are always searching for new ways to impart knowledge. Which is why they came up with the idea of developing online courses for HGV drivers – a means to pass on driver-specific knowledge that can be adapted to meet individual needs.

A highlight in the fleet

The driving instructors, however, do not want to just offer online courses to make it easier to train and further train new employees, apprentices and long-standing members of staff. An HGV simulator was also recently installed at the business in Herne. The fleet's newest device provides a realistic experience and can teach drivers about safe and fuelefficient driving and how to react to potentially dangerous situations.

For anyone sitting in the driver's seat, the three screens create a fully immersive experience simulating the streets and traffic in the real world. Practice and training trips can be carried out, repeated whenever necessary and compared to one another. This enables a person's driving style to be analysed; targeted measures can be taken to iron out any weaknesses. The simulator can also be programmed so that drivers can practise manoeuvring all types of trailers and semi-trailers. "Every extra subject that we are able to teach the apprentice drivers when they are learning is one less subject to teach later on. That saves time and increases safety," Paul Fikus explained.

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KEEPING OUT OF THE BLIND SPOT

Making people more aware of the dangers on the road has nothing to do with age as can be seen here: REMONDIS regularly teams up with local police forces and DEKRA to visit primary schools so that the pupils can see close up just how big lorries are and why the blind spots are so dangerous. One after another, the children can climb into the cab of a skip lorry – and they are always astonished when the whole of their class disappears in the lorry's blind spot.

Many primary schoolchildren go to school on foot or by bike. This project should help make them more aware of road safety so that there are fewer accidents involving the most vulnerable road users, such as cyclists and pedestrians. The driving simulator is currently located in Herne where it is being put through its paces and prepared for its future use. In the future, it will be installed onto a lorry so that it can be deployed at other branches as well.

Staying alert behind the wheel

Peter has been an HGV driver for over 20 years and knows his lorry like the back of his hand. Today is a particularly hectic day. His route takes him past a dicey spot: a major crossroads with several turn-off lanes. When the traffic lights turn green, Peter puts his foot on the accelerator and turns on his indicator. Suddenly he hears a warning sound and slams on the brakes. A cyclist appears next to his lorry – a cyclist he had almost collided with. That was a close shave!

Last week, Peter took part in an online training course that reminded him how important it is to stay alert behind the wheel and keep a close eye on the other road users. How right they were! Thank goodness the blind spot assist system was working. But what about the next time? What if the device stops working properly? Peter is relieved that his employer is so focused on the subject of driver safety awareness and has introduced e-learning courses and an HGV simulator so he can practise dealing with tricky situations as often as he needs to. In the future, he will be able to refresh his knowledge far more often and remind himself of the dangers lurking on every street corner.



The HGV simulator provides

a realistic experience and

ITILALL BEBETTER!

Today science fiction – tomorrow a reality? Just for a change, an optimistic look at the future of sustainability.



Ernest Hemingway

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rnest Hemingway once said that the strangest thing about the present is that it will one day be called the 'good old days'. This is just as true today as it was back then. In fact, it is true for all times and all ages. Unfortunately, there have always been environmental problems - centuries ago, the indigenous Easter Islanders almost made their home Rapa Nui uninhabitable because of excessive deforestation. Pandemics have been a well-known phenomenon since historical records began. The first pandemic, which someone took the time to sit down and record for future generations, was the Plague of Athens that ripped through the city between 430 and 426 B.C. during the Peloponnesian War. Talking about the Peloponnesian War ... when it comes to living together peacefully, humans don't seem to have learned a great deal since then.

No matter what point in history it may have been, the news at the time was never going to have to pay entertainment tax. Is this a reason for being pessimistic? We don't think so. The truth is that a closer look reveals that things have got better for humans over the centuries in practically all socially relevant topics. Nowadays, we our easing our way towards a better future with our high tech and computers that, with their artificial intelligence, can solve problems in no time at all - problems that we humans normally don't pick up until the horse has already bolted. There are, therefore, some good reasons for optimistic realism.

Over the next few pages, we take you on a short trip into the future into the second half of our century. We have switched on our time machine and taken a look at what our world will be like in 30 years' time, 50 years' time and beyond. The bad news first: we won't be able to travel at warp speed nor will we be able to be beamed from one place to another in the 22nd Century either as only Hollywood can ignore the laws of physics. The good news, though, is that everything you read about here is based on actual developments and the latest research ideas. So please fasten your seat belts and put your seats into an upright position. All it takes to leap into the future is to turn over the page. Have fun! . >>



The world's last ever vehicle with an internal combustion engine – a still function-

2052

al Mercedes T model built in 1984 and used by Taxi Zielowski in the north of the Ruhr region - is ceremoniously withdrawn from service as there are no more petrol stations left where it can fill up its tank. Thanks to further developments made to the glass battery invented by Nobel Prize winner John Goodenough, the batteries installed in all sizes of cars and commercial vehicles can now be recharged within a few seconds. Their range exceeded the 1,000km mark back in the 2030s. In the world's more remote regions, where a comprehensive supply of renewable electricity is not yet available, buses, trains and other forms of transport are run on hydrogen. For the most part, this fuel is being supplied by the former OPEC states, which moved into this business after the world completely gave up using oil.

Back in the 2020s, Transdev began retrofitting its public transport and regional vehicles on a grand scale so that it could deliver a zero emission service. Its pioneering position back then is now paying off with the company now transporting humans around the world without a single gram of CO_2 being emitted.

REMONDIS and Rhenus have been deploying clean fuels across the whole of their logistics business to transport recycled raw materials and other goods for three decades now. Drones are even being used in large cities in 2052 to collect recyclables – a fully automatic, fully electric and, for the most part, completely quiet service.

2056

The people working in Buchen's control centre for automated industrial cleaning services are celebrating the launch of their new generation of jet washers. With the help of Robbie Clean, an android with exceptional cognitive abilities (but with a humour that takes getting used to), the employees can now steer the free flying jet cleaners to clean the furthest corners of industrial plants no matter how hard they are to reach.

It goes without saying that the operatives have not needed to climb into the tanks wearing full PPE and hazmat suits for a long while now. Buchen began deploying its automated BTS jet washer and their robot colleague as an android for the rough work all the way back in 2022.

In the meantime, XERVON's colleagues are taking it easy with a cup of fair trade coffee. For a long while now, their condition monitoring system – first successfully established in the 2020s – has made it possible to permanently monitor a system's condition using fully automated sensor systems. The time-consuming task of having to dismantle machines and check their condition by hand is a thing of the past. The highlight here are the digital twins that are available for every facility. It is simply a statement of fact that work can be carried out more efficiently and more cleanly in cyberspace.



2061

After the global expansion of renewable energy production was stretched to its limits due to a lack of available space and supplies of raw materials, mankind's dream finally comes true in the 2060s. The first electricity produced by a fusion reactor is fed into the grid.

The principle of nuclear fusion has been around since 1917 and the first pilot reactor was even built and tested in 1983 by the Joint European Torus (JET) in Culham (UK). For many decades, though, the joke so often told by fusion physicists rang true: "Fusion power is just 30 years away and it always will be."

But now it's finally here. The race between the German "Stellarator" Wendelstein 7x and the French "Tokamak" ITER ended in a draw. Both have proven that the process that powers the sun – nuclear fusion – can be reproduced on Earth without having a negative impact on the environment. All that is needed to generate this energy is hydrogen. And as we have infinite supplies of this substance in the form of seawater, the problem of providing humans with a sustainable supply of clean energy has finally been solved.

Image: Max Planck Institute for Plasmaphysics (IPP)

One of the consequences of this success is that REMONDIS has a lot of work to do. All around the world, old wind farms and solar farms are being dismantled as they are no longer needed. All of the raw materials are being recovered so that they can be reused to make new high-tech products.

10 years' later, there is not a single fossil fuel power station left in the world. Just the one or other campfire where sausages made of artificial stem cell meat are being barbequed next to the happy cows grazing in the open air and the pigs having fun rolling in the clean mud.



The last material life cycle has been closed. From now on, everything that humans produce is made exclusively of recycled raw materials or is fully recyclable.

It was a long trek from the first calls for a comprehensive Ecodesign Directive – that also took raw material efficiency into account – to the very first "No Waste Day". REMONDIS had begun calling for the introduction of a recycling label that lets consumers see how sustainably products were made and how well they could be recycled all the way back in 2018.

As soon as this label was launched around the world, an ever greater number of products that were bad for the environment disappeared from the market. Climate neutrality and resource conservation became the most important sales criteria across the globe. In the olden days, we had what was called "rubbish", something that used to be "disposed of" – a word that has now disappeared from our vocabulary. We then had "waste" which was processed using complex sorting and separating systems so that the raw materials could be recovered and recycled. And now finally we have pure recyclable materials that are collected by REMONDIS and immediately passed on to their industrial customers as high purity materials. A perfect loop.

At the same time that waste becomes a thing of the past, humans are making progress cleaning the planet's seas and oceans. Fully automated systems, developed and controlled by artificial intelligence, are cleaning up our oceans freeing them of the waste inherited from the world's industrial past.

Once again, we can enjoy lying on clean beaches and jumping into clean water – whether it be in Bangladesh or Borkum.



The last material life cycle has been closed. From now on, everything that humans produce is made exclusively of recycled raw materials or is fully recyclable.

2098

A well-known pioneer of e-mobility and private spaceflights – who succeeded in being the first human to have a full body transplant in 2062 to transition from Homo sapiens to Homo technicus – has, as president of the first Mars colony, awarded REMONDIS Space Corp. with a general contract to deliver planetary circular economy services.

Over the coming months, REMONDIS will set up its first branch on Mars to be able to fulfil its new tasks. This location will produce high quality materials by recycling all technical and organic leftovers generated by the Mars colonists. As a result, Musk City, the capital of Mars, will be almost completely independent as its need for supplies of raw materials from Earth will have been reduced to practically zero. In the future, it will actively contribute towards terraforming, i.e. changing Mars's atmosphere into a habitable state without the need for technological aids.

Commenting on his decision, the President gave the following statement: "We need a 100% circular economy here on Mars like the one on Earth so that we can achieve our sustainability goals for our Red Planet. Which is why we have opted to work with REMONDIS. They can do this! We know that there is plenty of space here still to throw our scrap into some canyon or other but landfilling was recently prohibited here on Mars as well."

Just as it has been on Earth since 2050.

As to whether our predictions – written with a twinkle in our eyes – will come true? Well, we have no idea of course. Being one of the leading recycling businesses, we are committed to achieving the goals set – whether they have to do with curbing climate change or conserving natural resources. Together with our approx. 40,000 employees, we will be doing everything in our power to make the future of our blue planet sustainable and better.

WORKING FOR THE FUTURE!



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